

CENTRAL VIRGINIA SOLID WASTE MANAGEMENT PLAN

2014 – 2034

2004 – 2024 Original Plan



Prepared by

Central Virginia Waste Management Authority
Adopted February 20, 2004; Updated 2009 and 2014

With

Richmond Regional Planning District Commission
Adopted April 8, 2004

Crater Planning District Commission
Adopted March 17, 2004

TABLE of CONTENTS

1. Introduction	Page 1
1.1. Purpose	Page 1
1.2. Scope	Page 2
1.3. Plan Development Responsibilities	Page 3
1.3.1. History of the Central Virginia Waste Management Authority	
1.3.2. Planning District Commissions	
1.3.3. Citizen Advisory Commission	
1.4. Plan Development and Adoption Process	Page 5
1.5. Citizen Participation	Page 6
1.6. Plan Contents	Page 9
2. Service Area Description	Page 10
2.1. Overall Existing Development Trends	Page 11
2.2. Crater Planning Subarea Existing Development Trends	Page 11
2.3. Richmond Planning Subarea Existing Development Trends	Page 12
2.4. Future Development Trends	Page 12
3. Goals, Objectives and Policies of the Solid Waste Management Plan	Page 13
3.1. Goals for the Solid Waste Management Plan	Page 14
3.1.1. Objective 1.0	
3.1.2. Objective 2.0	
3.1.3. Objective 3.0	
3.1.4. Objective 4.0	
4. Existing Solid Waste Management System	Page 19
4.1. Data Collection Methodology	Page 19
4.2. Waste Collection and Recycling Systems	Page 19
4.2.1. Waste Collection Services	
4.2.1.1. Richmond Planning Subarea	
4.2.1.2. Crater Planning Subarea	
4.2.2. Liter Control Programs in the CVWMA Service Area	
4.2.3. Landfill and Transfer Station Facilities	
4.2.3.1. Private Sanitary and C/D/D Landfill Facilities	
4.2.3.2. Public Sanitary and C/D/D Landfill Facilities	
4.2.3.3. Regional Landfills Adjacent to the CVWMA Area	
4.2.3.4. Transfer Stations and Convenience Centers	
4.2.4. Publicly Sponsored Recycling Programs	
4.2.4.1. Curbside and Drop-Off Program Origins	
4.2.4.2. Special Waste Collections	
4.2.4.3. Private/Public Partnerships	
4.2.4.4. Public Education	
4.2.4.5. Richmond Planning Subarea Recycling Programs	

4.2.4.6. Crater Planning Subarea Recycling Programs	
4.2.5. Privately Sponsored Recycling Programs	
4.2.6. Waste Reduction and Reuse Activities	
5. Waste Generation and Composition	Page 48
5.1. Waste Generation Methodology	Page 48
5.1.1. Estimates of 2002 Waste Generation	
5.1.2. Solid Waste Quantity Estimates for 2004 – 2024 Planning Period	
5.1.3. Special Types of Solid Waste	
5.1.3.1. Principal Recyclable Materials	
5.1.3.1.1. Appliances	
5.1.3.1.2. Automobile Bodies	
5.1.3.1.3. Waste Motor Oil	
5.1.3.1.4. Wood, Brush, Leaves, Grass and Other Arboreal Materials	
5.1.3.2. Supplemental Recyclable Materials	
5.1.3.2.1. Incinerator Ash	
5.1.3.2.2. Batteries	
5.1.3.2.3. Construction, Demolition and Land Clearing Debris	
5.1.3.2.4. Stumps	
5.1.3.2.5. Scrap Tires	
5.1.3.2.6. Sludge and Septage	
5.1.3.2.7. Other Special Wastes	
5.1.3.2.7.1. Agricultural Wastes	
5.1.3.2.7.2. Household Hazardous Wastes	
5.1.3.2.7.3. Low-Level Radioactive Wastes	
5.1.3.2.7.4. Medical Wastes	
5.1.3.2.7.5. Mining Wastes	
5.1.3.2.7.6. Spill Residues	
5.1.4. Qualifications about Projection Methodology	
5.2. Recycling Rate Methodology	Page 61
5.3. Solid Waste Generation and Recycling Rate	Page 62
5.3.1. Waste Estimates and Recycling Rate	
5.3.2. Waste Estimates and Projections	
5.4. Solid Waste and Recyclable Material Composition	Page 62
5.4.1. Composition of Wastes	
5.4.2. Recycling of Wastes by Component	
6. Solid Waste Needs Assessment	Page 64
6.1. Locality Input	Page 64
6.2. Planning	Page 68
6.3. Solid Waste Information and Data	Page 70
6.4. Source Reduction and Reuse	Page 70
6.5. Recycling	Page 71
6.6. Special Wastes Management	Page 71
6.7. Resource Recovery	Page 72
6.8. Volume Reduction and Incineration	Page 73

6.9. Landfilling	Page 73
7. Preferred Regional Waste Management System	Page 76
7.1. Introduction	Page 76
7.2. Preferred Waste Management System Components	Page 77
7.2.1. Source Reduction and Reuse	
7.2.2. Recycling	
7.2.3. Waste Collection and Transportation	
7.2.4. Waste Disposal	
7.3. Costs and Assumptions	Page 79
7.3.1. Preferred System - Recycling	
7.3.2. Preferred System – Jurisdiction Recycling Costs	
7.3.3. Preferred System - Collection and Transportation	
7.3.4. Preferred System - Waste Disposal	
7.3.5. Preferred System - Total Costs	
7.3.6. Avoided Landfill Costs	
7.3.7. Cost Comparison: Preferred / Existing	
8. Implementation Issues	Page 84
8.1. Institutional Issues	Page 84
8.1.1. Local versus Regional Programs	
8.1.2. Ownership of Facilities	
8.1.3. Collection and Transfer Operations	
8.2. Legal and Regulatory Issues	Page 87
8.2.1. Waste Stream Flow Control	
8.2.2. Voluntary vs. Mandatory Recycling	
8.2.2.1. Material Bans	
8.3. Funding Issues	Page 89
8.4. CVWMA Funding	Page 90
8.5. Plan Maintenance and Amendments	Page 90
8.5.1. Policy Objectives	
8.5.2. Institutional Framework	
8.5.3. Local Government Support and Commitment	
8.5.4. Plan Maintenance	
8.6. Implementation Milestones	Page 91
8.7. Amendments to the Approved Plan	Page 92
8.7.1. Major Amendments Including Changes to Boundary	
8.7.2. Minor Amendments	

Appendix A

Citizen’s Advisory Committee Listing
 Technical Advisory Committee Listing
 Ad Hoc SWMP Working Group

Appendix B

Population Projection – Table 9

Appendix C

2015 Solid Waste Projections – Table 10
2020 Solid Waste Projections – Table 11
2025 Solid Waste Projections – Table 12
2030 Solid Waste Projections – Table 13
2035 Solid Waste Projections - Table 14

Appendix D

Active Solid Waste Facilities in the Region
Closed Solid Waste Facilities in the Region

Appendix E

Mandatory SWMP Item Reference List

Appendix F

Public Hearing Comments

Appendix G

CVWMA Resolution of SWMP Approval
Crater PDC Resolution of SWMP Approval
Richmond Regional PDC Resolution of SWMP Approval
Joyce Engineering Letter of Technical Acceptance

Appendix H

List of Abbreviations / Acronyms

Appendix I

Press Release Announcing Planning Process
Waste Practices Survey to Localities
Newspaper Ad Soliciting Public Input
Letter to CAC Requesting Input
Request to Localities for Input on Current Systems
Request to Localities for Citizen Comments
Timetable for SWMP
Newspaper Ad for Public Hearing
Input Request to CAC for Public Hearing

Appendix K

Ad Hoc Working Group Meeting Agendas and Meeting Summaries

Appendix L

Amendment 2

Appendix M
Amendment 3

Appendix N
Amendment 4

Appendix O
Letters of Consistency (2004-2014)

Appendix P
Amendment 5

Appendix Q
Amendment 6

Appendix R
Surveys of Jurisdiction Waste Practices and Needs – 2014

Appendix S
Maps and Charts

List of Maps

Map 1	Central Virginia Waste Management Authority Service Area
Map 2	Existing and Future Areas of Urban Concentrations
Map 3	Solid Waste Collection and Disposal Sites in CVWMA Service Area Map 3 Key
Map 4	Solid Waste Disposal Sites Outside of CVWMA Service Area
Map 5	Solid Waste Recycling Facilities Map 5 Key
Map 6	Preferred Solid Waste System Map 6 Key

List of Charts

Chart 1	Process for Development of the SWMP	Page 8
Chart 2	CVWMA Solid Waste Management Process	Page 21

List of Tables

Table 1	Waste Collection Services within CVWMA	Page 20
Table 2	Active Landfills	Page 26
Table 3	Public Transfer Centers / Convenience Centers	Page 37
Table 4	CVWMA Special Waste Contractors	Page 40
Table 5	Materials Recycled by Location	Page 47
Table 6	Coal Burning Facilities	Page 54
Table 7	2014 Solid Waste Tonnages	Page 63
Table 8	Estimated Annual Cost – Preferred System	Page 82
Table 9	Population: Projections 2010-2035	Appendix B
Table 10	MSW Tonnages by Composition – 2015	Appendix C
Table 11	MSW Tonnages by Composition – 2020	Appendix C
Table 12	MSW Tonnages by Composition – 2025	Appendix C
Table 13	MSW Tonnages by Composition – 2030	Appendix C
Table 14	MSW Tonnages by Composition – 2035	Appendix C

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Central Virginia

Solid Waste Management Plan

2004 (Revised/Updated 2009)
(Revised/Updated 2014)

1. INTRODUCTION

The geographic area served by the Central Virginia Waste Management Authority (CVWMA)¹ is estimated to produce over 2,600 tons of municipal solid waste per day. By the year 2034, the level of waste generated is anticipated to increase to over 3,300 tons per day. How to properly and cost-effectively manage this increasing level of waste is a significant challenge facing this area and its local governments. Waste management is a major public policy issue, which will not be readily solved without significant changes in the waste generation and disposal practices of area citizens, businesses, and governments.

Prior to the establishment of the Central Virginia Waste Management Authority, local governments relied on their own resources and capabilities to meet this challenge. However, rising solid waste collection and disposal costs, complications in siting waste disposal facilities, and increasingly more stringent (i.e., costly) federal/state environmental laws and regulations provided incentives for local governments to address solid waste management needs on a multi-jurisdictional basis.

Efforts in this area spearheaded by the Crater and Richmond Regional Planning District Commissions (PDCs), examined resource recovery and recycling programs. These efforts resulted in the successful establishment of the Central Virginia Waste Management Authority by 13 area local governments in December 1990.

The promulgation of mandated solid waste management planning and recycling goals for local governments by the Commonwealth of Virginia in 1990 provided an opportunity for local member governments to meet these mandates through a regional planning approach under the auspices of the CVWMA, in cooperation with the two respective planning district commissions. Each local governing body passed a resolution in 1990 requesting that the Crater and Richmond Regional PDCs prepare a regional solid waste management plan for the CVWMA and its 13 member localities to meet the mandated requirements of VR 672-50-01 ("Regulations for the Development of Solid Waste Management Plans," dated May 15, 1990).

Solid waste management and recycling programs within the Region have developed and operated under the auspices of the Solid Waste Management Plan prepared in 1991.

1.1 PURPOSE

The Central Virginia Solid Waste Management Plan (CVSWMP) was prepared for the CVWMA and 13 local governments within the Authority's service area in accordance with the requirements and provisions of Regulations for Solid Waste Management Planning (9 VAC 20-130-10 et seq., Amendment 1).

In meeting this objective, the Central Virginia Solid Waste Management Plan is intended to achieve the following purposes for the CVWMA and its member governments:

¹ See Appendix H for a complete listing of acronyms and abbreviations used throughout this document

- Define specific solid waste management objectives for the CVWMA service area that meet identified management needs and public policy objectives, including State mandated recycling goals;
- Provide an integrated management strategy with supporting financial and implementation strategies to meet solid waste management objectives;
- Provide agreement on specific roles and responsibilities for the CVWMA and its member governments in the implementation of waste programs and services for meeting the region's waste management needs; and,
- Establish specific milestones, responsibilities, and a schedule for meeting solid waste management objectives.

1.2 SCOPE

The Central Virginia Solid Waste Management Plan focuses on all elements of solid waste management in the CVWMA service area, including generation, collection, transportation, treatment, storage, and disposal. A working definition of solid waste, as defined in 9 VAC 20-130-10 Regulations for Solid Waste Management Planning, Amendment 1:

"means any garbage, refuse, sludge and other discarded material, including solid, liquid, semisolid or contained gaseous material, resulting from industrial, commercial, mining and agricultural operations, or community activities but does not include (i) solid or dissolved material in domestic sewage, (ii) solid or dissolved material in irrigation return flows or in industrial discharges that are sources subject to a permit from the State Water Control Board, or (iii) source, special nuclear, or byproduct material as defined by Federal Atomic Energy Act of 1954, as amended."

For a more technical definition of solid waste see 9 VAC 20-81-95. Except for a brief section in this document, the Plan does not address infectious medical wastes or those items excluded as solid waste in the state regulations, such as: solid or dissolved material in domestic sewage, industrial discharges, and irrigation returns; hazardous wastes as defined in the Virginia Hazardous Waste Management Regulations; and radioactive materials, by-products, and wastes.

Although, the Plan does address both public and private solid waste management issues and encourages public and private sector partnerships and participation in its implementation, its primary focus is on governmental actions and initiatives to meet solid waste management objectives. In that regard, the Plan assigns specific roles and responsibilities for the Central Virginia Waste Management Authority, planning district commissions, local governments, and other participating public agencies for plan maintenance and implementation.

The geographic scope of the Central Virginia Solid Waste Management Plan is the service area of the CVWMA. It covers an area of 2,441 square miles with a 2010 population of approximately 1,110,844. This service area (shown in Map 1) includes the following 13 jurisdictions within two planning districts:

- Richmond Regional Planning District (also referred to as Richmond Planning Subarea and PDC 15 in this Plan)
 - Charles City County
 - Chesterfield County
 - Goochland County
 - Hanover County
 - Henrico County
 - New Kent County
 - Powhatan County
 - Town of Ashland
 - City of Richmond

- Crater Planning District (also referred to as Crater Planning Subarea and PDC 19 in this Plan)
 - Charles City County (in both PDCs)
 - Chesterfield County (in both PDCs)
 - Prince George County
 - City of Colonial Heights
 - City of Hopewell
 - City of Petersburg

1.3 PLAN DEVELOPMENT RESPONSIBILITIES

The roles and responsibilities of the participating agencies and organizations in the development of the Central Virginia Solid Waste Management Plan are described in the following subsections.

1.3.1 History of the Central Virginia Waste Management Authority

The Central Virginia Waste Management Authority was formed in December 1990 in response to a 1989 General Assembly mandate that required Virginia localities, either individually or collectively, to develop comprehensive Solid Waste Plans that identified how mandated and specified recycling rates would be attained within the plan development area. On May 31, 1991, the Virginia Department of Waste Management, at the request of the Crater Planning District Commission (PDC 19) and the Richmond Regional Planning District Commission (PDC 15), designated the geographic boundaries of the CVWMA as a regional Plan area pursuant to Section 10.1-1411 of the Code of Virginia.

The formation of the Authority under the provisions of the Virginia Water and Waste Authority Act (Section 15.2-5100 et seq. of the Code of Virginia, as amended) provided for representation from each of the 13 member jurisdictions on the basis of population. Effective in 2008, member

jurisdictions with a population up to 75,000 are represented by one voting member, 75,001 to 150,000 are represented by two voting members and 150,001 and above are represented by three voting members on the CVWMA Board of Directors. The initial Solid Waste Management Plan was developed and adopted in accordance with a Memorandum of Understanding among the Richmond Regional Planning District Commission (RRPDC), Crater Planning District Commission (CPDC) and CVWMA. The Virginia Department of Waste Management was requested to designate the service area of the CVWMA as the planning boundary for a regional solid waste management plan and to recognize the CVWMA as the entity responsible for the implementation of the Plan. The initial plan was approved on May 14, 1992.

The CVWMA, as the agency charged with implementing the components of the plan, has developed recycling and waste management programs in concert with and at the request of its member jurisdictions. A menu of services is available to meet the needs of a diverse geographical region. The original focus of the CVWMA was toward meeting the recycling mandates established by Virginia law. House Bill 1488 adopted by the 1988 Virginia General Assembly required that 25 percent of the region's solid waste be diverted through recycling and reuse programs by 1995. The uncertainty of this requirement was the driving force that resulted in a regional approach to this mandate and the formation of the CVWMA. The recycling mandate has been revised since the 1988 legislation. Each solid waste planning unit shall maintain a minimum 25% recycling rate or a minimum 15% recycling rate if it has (i) a population density of less than 100 persons per square mile according to the most recent United States Census, or (ii) a not seasonally adjusted civilian unemployment rate for the immediately preceding calendar year that is at least 50% greater than the state average as reported by the Virginia Employment Commission for such year. (Revised in 2006).

In addition, each solid waste planning unit or locality with a population of greater than 100,000 persons according to the most recent United States census shall prepare and submit a recycling survey report to the Department of Environmental Quality annually. Each solid waste planning unit or locality with a population of 100,000 or less according to the most recent United States Census shall prepare and submit a recycling survey report to the Department of Environmental Quality once every four years. Recycling survey reports submitted once every four years shall only be required to include information for the most recent single year. The first reports submitted pursuant to this section shall be submitted by April 30, 2013, for the reporting year ending December 31, 2012. (Revised 2012)

The CVWMA has developed customized recycling and solid waste programs that provide either exclusive or complementary support to local initiatives throughout the CVWMA service area. All CVWMA programs are provided through a competitive procurement process with private contractors. Procurements are in compliance with the Virginia Public Procurement Act. Programs are developed that benefit rural, suburban and urban communities and are designed to fill the need and in some cases provide exclusive waste management services for member jurisdictions.

The CVWMA maintains a close working relationship with the two planning district commissions and with each CVWMA member locality. The roles and responsibilities of the participating agencies, localities, and organizations in the development of the Central Virginia Solid Waste

Management Plan are described in the following sections.

The CVWMA staff, CVWMA Technical Advisory Committee (TAC), the staff of the two PDCs and environmental consultants provided technical input in development of the Plan. The TAC consists of at least one technical staff representative from each CVWMA member jurisdiction and several representatives from the private sector. (A TAC membership list is provided in Appendix A.)

Because of the significance and scope of the development of the plan, an Ad Hoc Working Group consisting of CVWMA staff members, TAC members and Mr. Milton Martin, was assembled. This group prepared materials for the plan and at monthly meetings, provided guidance and feedback on plan elements. (A Working Group membership listing is included in Appendix A). CVWMA Staff updated the Plan with minor revisions in 2009. In 2014, the 10 year mark, CVWMA Staff worked with the Technical Advisory Committee, member localities, the Executive Committee and the CVWMA Board on revising the Plan for the 20 year period 2014-2034. The Update and Revisions to the Plan were approved by the CVWMA Board of Directors on July 18, 2014.

1.3.2 Planning District Commissions (PDC)

In the designation resolutions mentioned previously, each local government also requested that its respective planning district commission be recognized as the planning entity responsible for development of their respective planning Subarea's portion of the Central Virginia Solid Waste Management Plan. The Authority coordinated the planning activities of the two planning district commissions to insure development of an integrated plan for the entire service area.

1.3.3 Citizen Advisory Committee (CAC)

Formal citizen participation in development of the Plan was encouraged in part through the Citizen Advisory Committee. (A list of CAC members is presented in Appendix A.)

The CAC was solicited for input on the planning process, feedback on the plan draft and encouraged to help educate the general public and identify the needs and concerns of citizens in their respective jurisdictions. The CVWMA CAC was discontinued in 2009.

1.4 PLAN DEVELOPMENT AND ADOPTION PROCESS

As noted in the preceding section, the CVWMA staff developed the Central Virginia Solid Waste Management Plan. Throughout the 2003 calendar year, advice was obtained from the Technical Advisory Committee of the CVWMA as well as the Ad Hoc Working group. Mr. Milton Martin was hired by the CVWMA to provide technical assistance in the organization and preparation of the Solid Waste Management Plan. The firm of Joyce Engineering, Inc. provided technical assistance and engineering review.

At several critical points in development of the Plan, the planning staff made presentations to the CVWMA Board of Directors, apprising the members of the accomplishments to date and the upcoming development and adoption schedule.

The Crater Planning District Commission and the Richmond Regional Planning District Commission adopted the Plan during the second quarter of FY 2004. Copies of the resolutions of plan approval are included in Appendix G. The final Plan was submitted by the CVWMA to the Department of Environmental Quality on June 30, 2004. As required by the regulations, the CVWMA conducted public hearings on the final draft Central Virginia Solid Waste Management Plan at the February CVWMA Board of Directors Meeting and in each of the two planning Subareas prior to submitting the Plan to the DEQ. Public hearing comments are presented in Appendix F.

1.5 CITIZEN'S PARTICIPATION IN DEVELOPING THE SOLID WASTE MANAGEMENT PLAN

Work to generate the Solid Waste Management Plan (SWMP) for the Central Virginia Waste Management Authority began in earnest in July 2003. A first step was to organize a nine member working committee, composed of three members of the Central Virginia Waste Management Authority staff, one representative from both the Richmond Regional and Crater Planning District Commissions (PDCs), three representatives of the CVWMA Technical Advisory Committee, and the planning consultant. This group met monthly to develop and review information and to oversee the process for developing the plan. As a part of this project, a plan for informing the public of the project and seeking citizen participation was prepared.

As a part of the effort to inform the public of the project, monthly updates on the status of the project were included as agenda items for both the full 40 member CVWMA Board of Directors and the 26 member Technical Advisory Committee.

Outreach efforts for citizen participation began in August 2003. The first step was to prepare and publish a Press Release (see Appendix I) on the project. The Press Release included the schedule of the project, and announced opportunities for citizen's input during the planning process. The press release was sent to most major local media, as well as Solid Waste Management Program Managers and Public Information Officers of member localities. The intent of the press release was to publicize the project, to identify opportunities for public input during the development of the Plan, as well as during the formal review and approval process required by state law and regulations, and to solicit public comments. The Press Release notified the public that full copies of the 1992 Plan were available for review at the PDC offices.

During the same time frame, written communications were sent to the Chief Executive / Administrative Officer of member localities, asking for their comments on the current solid waste management system, and any issues or needs that required specific attention during the preparation of the Plan. Responses from all 13 members were received.

In October, a Public Input session was scheduled for the regular CVWMA Board of Directors monthly meeting. This Public Input Session was advertised in the local media. Special notices were provided to vendors currently contracted by the CVWMA.

Staff prepared a PowerPoint presentation, which outlined the Solid Waste Management Plan project. It was presented to the CVWMA Board of Directors at the October 17, 2003 Board Meeting.

Following this presentation, the same material was sent to all members of the CVWMA eleven (11) member Citizen Advisory Committee, soliciting their input at this point in the development of the Plan.

A separate communication was sent to all CVWMA members, asking for any citizen comments that they may have in their files or may have received in the past.

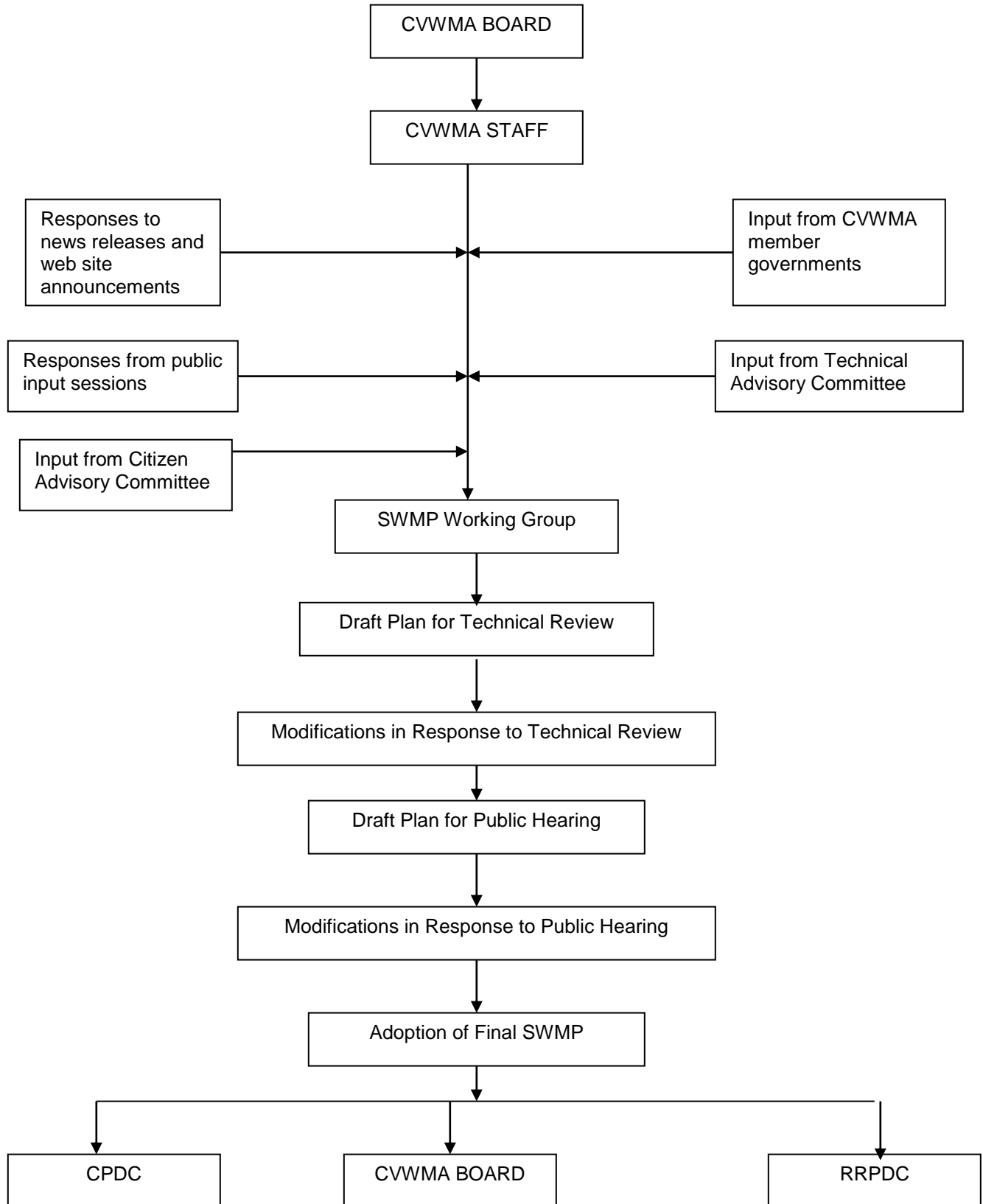
Once the initial draft plan for review was prepared, citizen participation efforts continued. The availability of the draft plan was announced by a press release published by CVWMA. All comments received were considered as the initial draft was put into form for the formal public hearing process.

Formal public hearings in compliance with state requirements were held prior to action by approving bodies. A public hearing was held at the February CVWMA Board of Directors Meeting.

Chart 1 illustrates the adoption process for the Central Virginia Solid Waste Management Plan.

Chart 1

PROCESS FOR DEVELOPMENT OF SOLID WASTE MANAGEMENT PLAN



1.6 PLAN CONTENTS

This document is the Central Virginia Solid Waste Management Plan. The Table of Contents provided at the beginning of the document outlines each chapter and also lists the appendices, charts, maps and tables found in the Plan document.

Chapters 1 through 5 of the Plan provide an introduction, the Plan's policy framework, descriptions of the service area, the legal framework for implementation, the existing (2003, updated 2014) public solid waste management system and recycling programs operating in the CVWMA service area, background and projections of waste generation and composition and the regional recycling rate for 2002 (updated 2014).

Chapter 6 describes the service area's solid waste management needs and the waste management options evaluated and selected for recommendation. Chapter 7 outlines the recommended (preferred) regional municipal solid waste (MSW) management and recycling system, which is based on the selected management options.

Chapter 8 discusses implementation issues and milestones, and outlines the plan amendment process for both major and minor amendments.

2. SERVICE AREA DESCRIPTION

The Central Virginia Waste Management Authority Service Area covers 2,441 square miles of land area, making it the largest service area of any public service authority in Virginia. This service area covers the entire Richmond Regional Planning District (referred to as the Richmond Planning Subarea), which includes the City of Richmond, the Town of Ashland and the Counties of Charles City, Chesterfield, Goochland, Hanover, Henrico, New Kent and Powhatan. The Service Area also covers the Cities of Petersburg, Colonial Heights and Hopewell and the County of Prince George, all located within the Crater Planning District (referred to as the Crater Planning Subarea). Throughout the Central Virginia Solid Waste Management Plan, the terms "service area" and "region" are used interchangeably and refer to the 13-jurisdiction CVWMA Service Area.

This chapter discusses existing and future development trends within the CVWMA Service Area. Specific information is provided on future anticipated population and employment growth. Both population and employment growth are parameters that influence waste generation and are used as planning factors within this plan to project future solid waste generation.

2.1 OVERALL EXISTING DEVELOPMENT TRENDS

The CVWMA Service Area is a mixture of highly urbanized, suburban and rural areas. Map 2 depicts these areas currently and projects future urban expansion within the planning period.

The highest population density and the greatest concentration of jobs are within the City of Richmond and the immediate surrounding suburbs of Chesterfield and Henrico Counties. Population density decreases as one travels away from Richmond toward the suburban areas of Henrico, Chesterfield, and Hanover Counties. Rural development patterns are found in northern and eastern Hanover County and the Counties of Charles City, Goochland, New Kent and Powhatan.

This development pattern changes toward the southern boundary of Chesterfield County. South of Chesterfield County are the Cities of Petersburg, Colonial Heights and Hopewell. Immediately adjacent to these cities is Prince George County, which is characterized by suburban development adjacent to the three cities and by rural development patterns in southern portions of the jurisdiction. The City of Petersburg remains the Crater Planning Subarea's employment and population center, housing most of the Subarea's jobs and households.

The entire Service Area grew by almost 152,000 people (18 percent) during the 1990's according to the U.S. Bureau of the Census, which was a higher rate of growth than experienced by the entire Commonwealth of Virginia (14 percent). Although the entire service area's population grew, Hopewell, Petersburg and Richmond Cities lost approximately 10,700 persons (4 percent) during the last decade.

Population has increased by about 139,000 persons, or 14% from the 2000 census to the 2010 census. Chesterfield and Henrico Counties have grown by 21% and 17%, respectively and the City of Richmond has experienced new development and growth of 3%. Hanover County's

population growth has also expanded more than 15% since 2000. In the Crater SubArea, the Cities of Colonial Heights, Hopewell and Petersburg have seen small growth while Prince George County has grown nearly 8%, due somewhat to the growth at Fort Lee.

In the 1990's, the number of jobs within the Service Area grew by over 67,500, a 15.6 percent increase, which is in line with the state percentage increase (16 percent). Employment in the Richmond Planning Subarea grew by 67,275 and in the Crater Planning Subarea by only 262 (0.6 percent). This slight growth is due to the Cities of Colonial Heights, Hopewell, and Petersburg losing almost as many jobs as Prince George County gained.

Within the Service Area, population and employment trends have been very similar to those of other metropolitan areas and the state. Trends throughout the state indicate that many cities are losing population and employment to surrounding suburbs that are gaining in density. The Richmond and Crater areas are no different. The number of people residing within the Cities of Hopewell, Petersburg, and Richmond has decreased over the last decade. The only city with an increasing population has been Colonial Heights.

Between 1990 and 2000, the population of service area cities declined by 13 percent, even with a combined Colonial Heights population increase of just over five percent during the same time period. This decline is contrasted to the entire service area increase of over 15 percent. The cities' share of the service area population fell from 34 percent in 1990 to only 27 percent in 2000, reflecting the continuing decentralization and growth of population outside these municipalities.

Employment shows a more dramatic decline in growth. Employment within the four cities has decreased by slightly more than 19,000 during the 1990's, compared to the unincorporated areas, which show an increase of over 86,000 or five times greater than the cities employment rate. Combined, the cities lost over 52 percent of their workforce between 1990 and 2000, and which the counties gained slightly over 30 percent. The cities' share of employment in the service area fell from about 34 percent in 1990 to 26 percent in 2000.

2.2 CRATER PLANNING SUBAREA EXISTING DEVELOPMENT TRENDS

Most of the developed land in the Crater Planning Subarea is residential land. The majority of residential development in the Subarea has been in the form of single-family homes. The 2000 Census reports 44,070 housing units in the area, 32,294 (73 percent) units are single-family and 11,776 (27 percent) units are multiple-family. This is an increase of 3,017 units from 1990. Most of the new increases are in Prince George County and the City of Colonial Heights. On a per unit basis, the average lot size in the cities or urbanized area is about 1/3 acre. The County of Prince George requires lower density and larger lot size than the cities. The average lot size in Prince George County is one acre.

The major industrial land uses in the Planning Subarea are the Hopewell Industrial District, near-downtown Petersburg, Puddledock, and the South Point Business Park in Prince George County. The primary operations there consist of manufacturing, energy, railroad yards, warehousing, wood processing, and sand and gravel operations. The direction of new industrial growth in the Planning Subarea is in the general area of the intersection of Interstate 295 and US 460 in Prince George County.

There are many commercial shopping areas in the Crater Subarea; but, the five major commercial areas are: Downtown Petersburg, Downtown Hopewell (including Cavalier Square), the Crossing Shopping area, the Southpark Mall area, and the Boulevard corridor in Colonial Heights. The Southpark Mall area will continue to be the primary commercial growth area.

2.3 RICHMOND PLANNING SUBAREA EXISTING DEVELOPMENT TRENDS

The Richmond Planning Subarea continues to be the employment and population center of the entire CVWMA Service Area. Stable national, state, and local employment has allowed the Subarea to weather past and current economic downturns. Manufacturing jobs have declined over the past decade with financial and business services increasing presence in the region. As the state capitol, the City of Richmond remains the urban center, but has lost top ranking as the regional employment center with Henrico County now holding the largest number of jobs (141,202) within the Subarea and the service area. While this remains true, the entire area has lost several Fortune 500 company headquarters, such as CSX, Reynolds Metals, and Richfood, as well as several regional banks as they have merged with national banks and consolidated offices.

Existing business expansion has led to employment gains in Henrico, Goochland, and Chesterfield Counties and the City of Richmond. Most notably has been the expansion of Capital One to their West Creek campus in Goochland County and the Phillip Morris USA (subsidiary of Altria Group) headquarters move from New York City to Henrico County and retaining of manufacturing within the City of Richmond.

Population growth within the Richmond Subarea continued the robust growth cycle (35 percent) over the past decade, outpacing population growth in Virginia (14 percent). Powhatan County has had explosive percentage gains (46 percent) while Chesterfield County continues the suburban population boom with over 50,000 new persons with the county. All the counties within the Richmond Subarea maintained double-digit growth as suburban populations continue to expand and urban areas decline; the City of Richmond experienced a decline of 2.6 percent.

Along with population growth in the suburban areas, housing increases continue at about the same rate as urban flight moves to the outlying areas. Housing units in Richmond declined by two percent as the rural communities housing expansion increased by enormous rates (Powhatan 53 percent, Hanover 36 percent, New Kent 31 percent, Goochland 26 percent, and Charles City 25 percent). The two largest metro Richmond suburban counties, Chesterfield and Henrico, commanded the largest numerical growth, 20,378, and 18,031, respectively, within the region.

2.4 FUTURE DEVELOPMENT TRENDS

Based on growth projections, a series of projections for population, were tabulated for the CVWMA service area. These projections are presented in Appendix B, Tables 9. This table indicate numerical and percentage rate growth from 2015-2035 in 5, year increments.

Projections for future development in the Service Area closely mirror past trends, while leveling out slightly. Between 1990 and 2000 and between 2000 and 2010, average annual growth rates

hit 1.7 percent and 1.4 percent, respectively. Projections out to 2035 indicate an average annual growth rate of about 1.5 percent. While the population within the Service Area is projected to increase by 1.2 percent between 2015 and 2025, virtually all of this growth will be in the suburban and rural counties. The cities in the service area have shown some decline in the 1990-2000 decade, however are projected to remain steady and how some moderate population growth over the next 20 years.

The majority of growth in the service area will be in the Richmond Planning Subarea. The population of the counties in this portion of the service area is projected to increase between 19 and 65 percent between 2015 and 2035. The largest actual increase in population is projected to be in Chesterfield County, where the population is anticipated to increase by 207,000 over the next two decades.. Chesterfield is and is projected to be the largest populated locality within the service area.

The population growth in the Crater Planning Subarea is projected to be much less than that in the Richmond Planning Subarea. Projected growth rates range from 3 percent in the City of Petersburg to an increase of 17 percent in Colonial Heights. This growth is anticipated to be an extension of existing development patterns and the expansion of Fort Lee.

3. GOALS, OBJECTIVES AND POLICIES OF THE SOLID WASTE MANAGEMENT PLAN

The preparation of the 1992 Solid Waste Management Plan involved the creation of a set of goals, objectives, and policies. They were devised to provide the policy framework for the successful implementation of the preferred solid waste management plan.

Those goals, objectives, and policies have proved invaluable to the Central Virginia Waste Management Authority. Over the years that the plan has existed, they have guided CVWMA through numerous events, and have provided the foundation for its successful operation. Because of the success of those goals, objectives, and policies, it was decided that the 2004 Solid Waste Management Plan would rely to the greatest extent possible on the earlier goals, objectives and policies, with modifications as deemed necessary to reflect the challenges of the next planning period.

The framework for the Goals, Objectives, and Policies remains the same. The Goal is the general statement that represents the accomplishments that the CVWMA hopes to achieve. It is an overarching statement that provides guidance and a foundation under which the Authority operates.

To achieve the stated goal, a series of Objectives have been developed. Objectives are specific statements defining the means by which progress towards the goal is to be achieved. Objectives are definite and lend themselves to the formulation of measurement devices. Adequate and acceptable measurements provide the Authority with a means to evaluate its success in a practical manner.

The third component is the Policies. These are actions or strategies that are taken to insure that the Objectives are achieved, and that continuous progress towards the overall goal is maintained. Policies assist in resolving the day-to-day issues and courses of action to guide regional, local, and private decision-making.

The development of this framework was guided by the Virginia Department of Environmental Quality hierarchy of solid waste management strategies, which are

- Source Reduction
- Reuse
- Recycling
- Resource Recovery (Waste to Energy)
- Incineration
- Landfilling.

As a part of the Plan development Process, the CVWMA Board of Directors, CVWMA Citizen Advisory Committee, CVWMA Technical Advisory Committee, and the SWMP Working Group reviewed these goals, objectives, and policies, and appropriate modifications were made.

3.1 GOALS FOR THE SOLID WASTE MANAGEMENT PLAN

A comprehensive, integrated system of solid waste management in the Central Virginia Waste Management Authority Service Area that achieves the specific service, health and safety, financial, environmental and institutional objectives for each member, yet balances these public values in a manner that brings maximum benefit and public service to the citizens of the service area as a whole.

3.1.1 OBJECTIVE 1.0: To establish and maintain an ongoing planning and plan implementation process to meet current and future needs for the service area based on the state's adopted hierarchy of waste management strategies.

Policies:

- Develop a Regional Solid Waste Management Plan and planning process for the Central Virginia Waste Management Authority Service Area that meets State regulations, fulfills regional and local needs and priorities, and outlines a schedule of accomplishments and implementation program.
- Continue to designate the CVWMA as the legal implementing entity for the Regional Solid Waste Management Plan and incorporate in the Plan mechanisms to provide the opportunity for regional coordination of local member government solid waste management programs and activities under the Regional Solid Waste Management Plan.
- Designate specific responsibilities for the CVWMA and its member governments for implementing programs and activities that meet the waste management needs and requirements of the Regional Solid Waste Management Plan.
- Support the general principle that the Planning District Commissions (PDCs), as

empowered under the Virginia Area Development Act, are primarily responsible for broad, multi-governmental, long-range comprehensive planning and policy development, for their two respective planning Subareas of the CVWMA service area.

- Provide intergovernmental procedures and processes to effectively implement and maintain the Regional Solid Waste Management Plan, including delineation of incremental stages toward meeting the regional solid waste management objectives and provisions for major updates that, at a minimum, meet all schedules for completion established by State regulations.
- Provide a standardized and centralized records system for the CVWMA service area as required by state regulations:
 - Receive and record state required information on all closed, active or proposed solid waste disposal, treatment and storage facilities and collection systems;
 - Collect, maintain and report data required to meet state regulations on source reduction activities and on the amount of solid waste of each type (residential, commercial and industrial, including principal and supplemental recyclable materials) generated, disposed, reused, recycled and exchanged within the service area;
- Provide for coordination among public and private sector solid waste management activities within the regional solid waste management planning process.
- Encourage private sector participation in the planning process through involvement with the CVWMA Technical Advisory Committee and participation in public meetings and other forums.
- Monitor legislative initiatives that would assist in meeting state planning regulations and waste management goals, or further the objectives of the Authority and local governments in regional waste management.
- Provide in the planning process an evaluation of the potential economic impacts on the private and public sectors of various regional solid waste management alternatives.
- Engage in continuous contact with the Solid Waste Management industry in the areas of emerging technology and solid waste management techniques, so that the CVWMA members may have access to new industry developments and standards.
- Recognize the increased urbanization of the Central Virginia area examine opportunities to provide waste management services to member communities as their service level needs are expanded.

3.1.2 OBJECTIVE 2.0: To assist in meeting the solid waste management needs of the Central Virginia Waste Management Authority service area and the individual member localities through

the year 2024 in an efficient, cost-effective, reliable and equitable manner, while providing adequate flexibility in meeting unforeseen needs and integrating new and innovative processes.

Policies:

- Support a regional solid waste management planning process, which is based on the state's adopted hierarchy of strategies pursued in the following order of priority: source reduction; reuse; recycling; resource recovery (WTE); incineration; and landfill disposal.
- Support mechanisms that coordinate, facilitate and promote local solid waste management efforts and provide leadership in establishing and administrating regional recycling and disposal activities.
- Support mechanisms to regularly evaluate and monitor the waste management facilities and systems within the service area, so as to maintain compliance with federal and state regulations and standards, regularly refine the systems and remedy problems, maximize the use of existing facilities, test new options and integrate workable innovations into the regional system.
- Support and encourage public and private partnerships in meeting solid waste management needs.
- Promote private sector participation in meeting waste management needs; incorporate existing private recycling operations into the Plan; and encourage expansion of private operations as practical, consistent with the objectives and policies of the Solid Waste Management Plan.
- Support intergovernmental solutions to meeting the service area's and local jurisdictions' solid waste management needs that are equitable in terms of sharing the costs, risks and benefits among local jurisdictions and private sector waste management interests within the service area.
- Promote regional and local strategies that secure adequate public and private financial resources for meeting local and regional solid waste management needs.
- Provide a forum where member jurisdictions can have contact with adjoining localities, for the purpose of exploring additional opportunities to provide solid waste management programs in the most efficient manner.
- Continue to research and bring forth innovative systems for handling non-routine or emergency solid waste management needs.

3.1.3 OBJECTIVE 3.0: To continue to meet or exceed the state mandated recycling goals for the CVWMA Service Area.

Policies:

- Establish overall recycling objectives for the CVWMA service area, and specific objectives for each local jurisdiction, established by the locality, based on considerations of localities individual preferences.
- Provide cost-effective mechanisms for the disposal or recycling/reuse of residential, commercial, and industrial solid waste and waste from other sources.
- Provide cost-effective mechanisms for the disposal or recycling/reuse of special wastes associated with unique disposal considerations, such as white goods, yard wastes, batteries, used tires, used motor oil, household hazardous wastes, and land-clearing debris, construction debris, mining wastes, agricultural wastes, ash, inoperable vehicles and spill residues.
- Support local government in-house source reduction and recycling activities, as well as waste collection and disposal programs.
- Provide information on alternative systems and techniques of recycling to reduce the amount of waste requiring disposal by other means.
- Make available additional recycling programs and service areas consistent with the needs of CVWMA members.
- Promote efforts to achieve resource conservation and save landfill space.

3.1.4 OBJECTIVE 4.0: To secure maximum public support for the regional solid waste planning and implementation process through public participation and education programs.

Policies:

- Facilitate and encourage public participation in the regional planning process through use of citizen advisory committees, public meetings, public hearings, and the media.
- Establish effective education and public information programs for schools, businesses and industries, public and private agencies and the general public.
- Coordinate solid waste management education and promotional programs with those of the local, state, other public and private agencies and industry.
- Become a resource for solid waste information for utilization by agencies, businesses, and the general public.
- Enhance the opportunities of CVWMA members to mutually and individually develop programs and systems addressing solid waste management needs of multiple localities.

- Maintain contact with other industries and the public to identify creative mechanisms for converting solid waste materials into goods for productive use.
- Reduce the improper disposal and littering of wastes through education, the involvement of volunteers, local governments, law enforcement, and other efforts.
- Identify alternatives in the planning process that cause the least environmental damage in terms of adverse ecosystem and habitat changes, and negative impacts on natural, historical, cultural, recreational, and aesthetic resources.

4. EXISTING SOLID WASTE MANAGEMENT SYSTEM

A description of the various programs and facilities constituting the existing solid waste management system within the service area is presented in this chapter. These public and private sector systems and facilities represent the existing (2014) or baseline conditions for evaluating the area's solid waste management needs.

This description begins with a description of the methodology used to collect data on the existing solid waste management system within the service area follows. Existing waste collection, transfer and disposal programs and facilities are then described, including local litter control programs. The chapter concludes with a description of local waste reduction and reuse efforts.

4.1 DATA COLLECTION METHODOLOGY

No central databases or mandatory reporting requirements for solid waste generation exist within the CVWMA service area. Therefore, all the solid waste data used for this plan are generated from the available information and from the information published by the EPA in *Municipal Solid Waste in the United States: 2012 Facts and Figures* in conjunction with population data and projections for the PDCs.

Solid waste quantities were calculated based on locality populations and the EPA year 2012 figure of 4.38 pounds per day per person generated municipal solid waste¹.

4.2 WASTE COLLECTION AND RECYCLING SYSTEMS

Nearly 50 percent of the service area's generated residential waste is collected through various municipal programs. Voluntary citizen drop-offs, primarily at transfer stations/convenience centers and public landfills, account for approximately 15 percent of this total. Private haulers collect nearly all commercial and industrial waste, and the remainder of the residential waste.

A description of existing waste collection services is presented in the following subsections. Chart 2 depicts the waste and recycling processes that are described in the subsections. In addition, information on local litter control programs and area source reduction/reuse and recycling programs are provided at the conclusion of the description of existing waste collection services. Table 1 lists the waste collection options available within each locality in the Central Virginia Waste Management Authority service area in 2014.

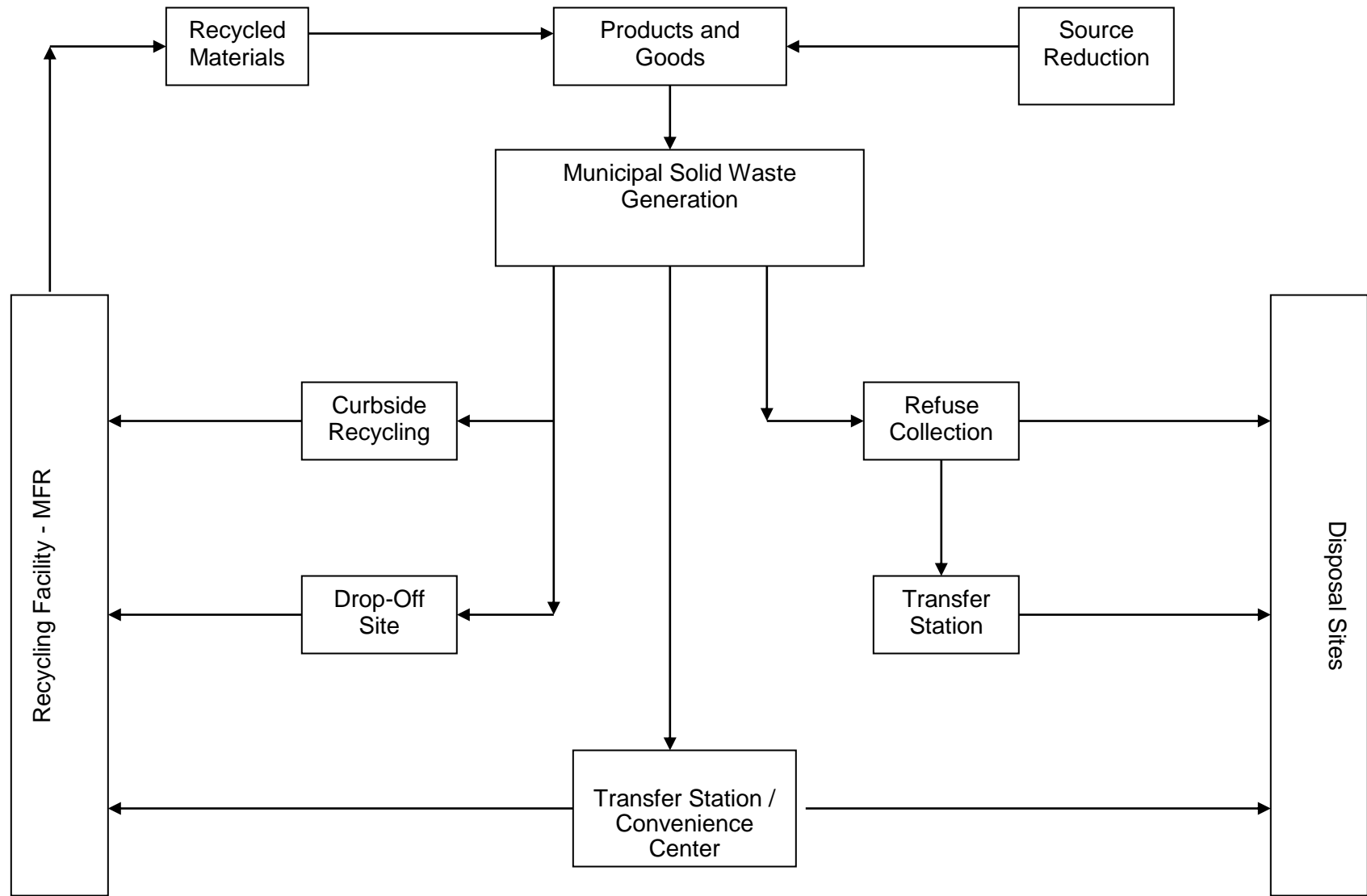
¹ *Municipal Solid Waste in the United States: 2012 Facts and Figures*, Office of Office of Resource Conservation and Recovery U. S. Environmental Protection Agency, June 2013

Table 1**Waste Collection Services Within CVWMA Service Area**

Jurisdiction	Public Collection	Private Collection Through Public Contract	Private Contract	Convenience Center / Transfer Station	Leaf & Bulky Item Collection
Ashland		X			X
Charles City			X	X	
Chesterfield			X	X	
Goochland			X	X	
Hanover			X	X	
Henrico	X		X	X	X
New Kent			X	X	
Powhatan			X	X	
Richmond	X		X	X	X
Colonial Hts.		X			X
Hopewell		X		X	X
Petersburg		X			X
Prince George			X	X	

Chart 2

CENTRAL VIRGINIA WASTE MANAGEMENT AUTHORITY SOLID WASTE MANAGEMENT PROCESS



4.2.1 Waste Collection Services

Waste Collection in the 13 member jurisdictions of the CVWMA ranges from no curbside collection to subscription services to municipality provided collection. The paragraphs below describe current waste collection activities (2014) in each locality by Subarea. Recycling collection is described in Sections 4.2.4 and 4.2.5 below.

4.2.1.1 Richmond Planning Subarea

The Town of Ashland, located within Hanover County, contracts through the CVWMA to collect residential waste from approximately 1,465 households on a weekly basis. Effective July 1, 2014 the Contract for residential waste collection in Ashland was changed to after CVWMA conducted a procurement. Commercial waste is collected under private contract between businesses and private waste collection firms.

Charles City County provides convenience centers for drop off of residential solid waste. Waste Management provides hauling and waste disposal at their Charles City Landfill. County also provides drop off recycling opportunities at the 3 convenience centers. Commercial waste collection services is provided through private haulers.

Chesterfield County only provides trash collection to residents with tax-relief. This collection is provided through contract with the private sector. The remainder of County residents utilize licensed private waste haulers for curbside solid waste collection services or they take their residential solid waste to one of the two County owned and operated convenience centers. Most of the private waste haulers provide collection services on a weekly basis. Some also provide bagged yard waste and bulky waste collection services. Businesses and industry use private waste collection companies for their waste disposal.

County of Goochland, private waste collection companies provide curbside residential waste collection. The limited number of private waste collectors in the County dispose of the trash in landfills outside the County. Commercial waste collection service is provided through individual contracts with private haulers.

County of Hanover, private waste collection companies provide all curbside residential waste collection services to individual subscribers as well as commercial waste collection services through contracts managed by the commercial establishment. The private collection companies that serve the County take the trash collected to privately owned and operated sanitary landfills outside the County or to the County 301 Transfer Station, which currently has transfer and disposal under contract with a landfill outside of Hanover County.

Henrico County provides a fee-based subscription collection service to approximately one-half of the 85,000 single-family residential units in the County. Private waste collection contractors collect residential solid waste in both areas served and areas not served by the County. Waste collected through private subscription service is disposed of in landfills in and outside the County. Henrico's Springfield Road Landfill closed to commercial haulers June 30, 2014 and the landfill is scheduled to close in calendar year 2015. Refuse from the County's collection

operation will go to Old Dominion Landfill. Commercial waste collection is provided by means of private collectors throughout the County. The County also provides bulky waste and leaf collection to its residents.

In **New Kent County**, private waste collection companies provide curbside residential waste collection, particularly in the western portion of the County. Waste collected from local haulers and at the 4 convenience centers operated by the County is disposed of in landfills outside the County. There is also a number of private companies collecting and disposing of waste from commercial entities and of construction and demolition waste within the County.

Several small private firms provide curbside residential waste collection service for residents predominantly in the eastern portion of the **County of Powhatan**. The waste is disposed of at landfills outside of the County. Private haulers also collect construction and demolition waste within the County. Commercial waste collection and disposal is provided by private collectors in landfills outside of the County.

The **City of Richmond** services over 60,000 homes and 2,000 businesses with 95-gallon carts for collection of residential waste. Waste is collected and taken to the Transfer Station on Hopkins Road owned by the City. Then, via contract, the waste is hauled and disposed in a landfill outside of the City. Private contractors also service “supercans” at apartment buildings. Larger commercial establishments utilize private contractor provided front-end containers for their waste collection and disposal, as does the City for most of its facilities. The City hauls and permits residents to haul brush/yard waste in unlimited amounts to the City’s East Richmond Road site. This material is ground into mulch and used in parks and given to residents. The City is working towards a Pay-As-You-Throw trash collection program to increase recycling efforts and reduce landfill disposal, to be implemented sometime in 2015.

4.2.1.2 Crater Planning Subarea

The **City of Colonial Heights** contracts through the CVWMA to collect residential waste from approximately 6,700 households and small businesses on a weekly basis. Larger commercial entities contract with private waste haulers.

The **City of Hopewell** contracts through the CVWMA to collect residential waste from approximately 8,650 households on a weekly basis. Commercial waste is collected under private contract between businesses and private waste collection firms. In addition, the City provides waste disposal options at the City operated Convenience Center.

The **City of Petersburg** contracts through the CVWMA to collect residential waste and recycling from approximately 11,000 households and small businesses, including approximately 200 homes and businesses in Olde Towne on a weekly basis. Larger commercial waste is collected under private contract between businesses and private waste collection firms.

Prince George County residents must contract individually with private firms for waste collection services or they can take their residential waste to the County convenience center site. The County of Prince George has few private contractors collecting curbside residential waste. The contractors currently serve only the more densely populated areas such as subdivisions. All County owned and school system facilities contract waste collection services with private haulers selected through an annual bid process.

4.2.2 Litter Control Programs in CVWMA Service Area

The Commonwealth of Virginia levies three taxes to support litter prevention and recycling program activities in Virginia. The three taxes are comprised of a malt beverage tax, a soft drink tax and a retail establishment fixed fee of \$10 or \$25. These funds are collectively referred to as the “litter taxes.”

Each locality in Virginia is eligible for an annual grant funded by these taxes and administered by the Virginia Litter Control and Recycling Fund Advisory Board through the Department of Environmental Quality. Localities use these grants to fund salaries, administration, educational materials, travel, equipment and other expenses related to litter prevention and recycling programs.

Since the inception of the State grant program in 1978, Cities and Counties in the CVWMA service area have formed citizen committees to guide litter prevention and recycling education efforts. Often full or part-time coordinators manage these programs. Litter prevention programs provide student and community education regarding proper solid waste management practices and recycling. The programs also coordinate some litter cleanup and recycling activities.

Programs may follow the guidelines of Keep America Beautiful, Inc. The Cities of Hopewell and Richmond are affiliates of Keep America Beautiful. Program coordinators may also be active in the Virginia Council for Litter Prevention and Recycling and Keep Henrico Beautiful, which organizes statewide educational efforts.

The local department of public works or cooperative extension office sponsors many programs, which provide office and administrative assistance to the program.

The following is a summary of current litter control efforts in the CVWMA Service Area.

- Charles City: Activities coordinated by the Clean Community Commission through the Department of Development.
- Chesterfield: Activities coordinated by Chesterfield Anti-Litter Program through the Chesterfield Department of General Services.
- Goochland: [Activities coordinated by Goochland Anti-Litter and Recycling Council \(GARC\) through Planning Department](#)
- Hanover: Activities coordinated through the Department of Public Works.
- Henrico: Activities coordinated by Keep Henrico Beautiful through the Department of Public Utilities.
- Hopewell: Hopewell activities are coordinated through Keep Hopewell Beautiful under the auspices of the Director of Development.
- New Kent: Activities coordinated through the Clean County Committee in the Department of Planning.

- Petersburg: Activities coordinated through the Department of Public Works.
- Powhatan: Activities coordinated by the Anti-Litter Council through the Powhatan Extension Office.
- Prince George: Activities coordinated through the Department of Public Works.
- Richmond: Activities coordinated by the Clean City Commission through the Department of Public Works.

4.2.3 Landfill and Transfer Station Facilities

By 2014, publicly owned landfills were almost non-existent in central Virginia. In 2010, one of the 2 public landfills (formerly the Petersburg Landfill) was sold to a private entity and is now known as the Tri-Cities Landfill. By 2015, the last publicly owned landfill, Springfield Road Landfill in Henrico County's west end will close. Effective June 30, 2014, the County ceased accepting commercial waste. In 2013, more than 85,000 tons of municipal solid waste were disposed of in public landfills (Springfield Road, Henrico County). The remaining landfilled residential and commercial waste was disposed of in private facilities.

There are 10 permitted landfills currently being utilized within the Central Virginia Waste Management Authority region. Five of the landfills are classified as sanitary landfills, of which one is publicly owned and operated (Henrico Springfield Rd), and four are privately owned and operated. Five of the Region's landfills are Construction, Demolition and Debris (C/D/D) landfills: all are privately owned and operated. One of the 5 C/D/D landfills, Skinquarter Landfill (added to the Plan in 2006) is not currently active. It is located in western Chesterfield County and is planned for potential future activity. Additionally, five (5) sanitary landfills outside the CVWMA region are utilized by contractors hired to haul and dispose of MSW collected at convenience centers and transfer stations within the region.

Table 2 below provides a summary of the type, location, permitted capacity and remaining capacity as of January 1, 2014. Map 3 shows the location of these facilities. Remaining capacity figures listed in Table 2 reflect DEQ reported information for the CY 2013. These capacity figures could increase as some of these landfills have submitted Part A Applications for expansion subsequent to the publication of the source report and others may do so in the future.

This section also includes a brief descriptions of the major regional landfills being utilized that are within the CVWMA's Service Area and in jurisdictions in close proximity to the CVWMA's Service Area. Appendix D contains a complete listing of active and closed solid waste facilities, including landfills, within the Service Area.

Table 2: Sanitary and CDD Landfills Utilized by CVWMA Localities

Landfill Name	Location	Date Permitted	Permitted Capacity (tons)	Remaining Capacity (tons as of 1//1/2014)
Sanitary Landfills in the CVWMA Region				
1 Charles City Landfill	Charles City	9/1989	24,000,000	13,842,450
2 Old Dominion Sanitary Landfill	Henrico County	4/1993	17,000,000	2,546,103
3 Springfield Road Sanitary Landfill *	Henrico County	11/1973	3,514,000	130,287
4 Shoosmith Sanitary Landfill	Chesterfield County	9/1976	37,900,000	7,550,000
5 Tri-Cities Regional Landfill	Petersburg	7/1977	3,704,627	2,145,139
Construction/Demolition/Debris Landfills in the Region				
6 623 C/D/D Landfill	Goochland County	3/1987	18,300,000	8,588,120
7 Ashcake C/D/D Landfill	Hanover County	9/1994	1,125,827	563,146
8 The East End Landfill	Henrico County	7/1988	2,912,700	274,230
9 Taylor Road Landfill	Chesterfield County	7/1979	12,000,000	9,625,044
10 Skinquarter Land, LLC Landfill	Chesterfield County	8/2010	4,600,000	4,600,000
Sanitary Landfills outside the CVWMA Region				
11 King & Queen Sanitary Landfill	King & Queen	6/1993	31,500,000	9,441,589
12 Atlantic Waste Disposal Sanitary Landfill	Sussex	12/1993	66,000,000	40,808,523
13 Maplewood Recycling & Waste Facility	Amelia	6/1992	33,600,000	17,364,025
14 King George County Landfill *	King George	8/1995	18,500,000	9,519,264
15 Middle Peninsula Sanitary LF	Gloucester	8/1994	23,500,000	17,770,606
Source of Capacity Figures: Commonwealth of Virginia Department of Environmental Quality Solid Waste Managed in Virginia During Calendar Year 2013 Report, June 2014				
* Publicly owned Landfills				
2 Permitted Capacity includes previously amended; Part B of the permit pending				
3 Landfill scheduled to close in 2015				
10 Skinquarter LF is permitted, however as of 2014 has not opened to accept CDD waste.				

4.2.3.1 Sanitary and C/D/D Landfill Facilities

4.2.3.1.1 Sanitary Landfills - Richmond Planning Subarea

1. One of the area's largest sanitary landfills is located in Charles City County. The **Waste Management of Virginia, Charles City Landfill** is a Sub-Title D landfill owned by the County and operated and maintained by Waste Management under a 40-year lease contract with Charles City County. This facility, located approximately 20 miles southeast of the City of Richmond was opened for operation in May 1990 and is located on a property of approximately 600 acres of which 289 acres (DEQ Permit Number 531) are for disposal. The facility is permitted in ten phases.

The Landfill has a 40+ year planned gross capacity based on the current daily volume of 2,000 tons being received with a peak daily acceptable tonnage of 5,000 tons.

In addition to the waste generated within Charles City County, waste is currently brought to the facility from the City of Richmond's transfer station and from areas outside the Region and the Commonwealth. The facility provides disposal for MSW, Construction and Demolition Debris as well as pre-approved, manifested contaminated soils, ashes, WWTP and industrial sludges, approved and profiled by the Waste Management Environmental Manager. The facility does not accept the following wastes: whole tires, asbestos containing debris, batteries, electronic component debris, radioactive waste, hazardous waste, waste containing free liquids, drummed wastes or any other unapproved waste.

2. The **Republic Services Old Dominion Landfill** is located in eastern Henrico County at 2001 Charles City Road. The landfill is located east of the City of Richmond approximately 2.5 miles west of the Richmond International Airport. Access to the landfill can be gained from Charles City Road approximately 1.5 miles west of the intersection of Charles City Road and Laburnum Avenue.

The Old Dominion Landfill is a sanitary landfill primarily serving the Metro-Richmond area and Central Virginia. Under the terms of the Host Agreement with Henrico County, no MSW can be accepted from outside a 150-mile radius. The landfill accepts waste material collected from Republic's waste collection operations and from other area private collectors.

The Old Dominion Landfill operates under VDEQ Permit No. 553, originally issued in 1992. As of August 2005, the property currently owned by Republic Services (formerly Allied Waste and BFI) totals 268 acres, of which 74.8 acres have been permitted for waste disposal. The currently permitted waste disposal (as of August 2005) occurs in eight cells designated Phase 1 through 8.

Republic negotiated with Henrico County for purchase of land east of the existing landfill. The additional parcel is 168.42+/- acres, and includes the closed Henrico County Landfill No. 3 (HCL3) and undeveloped land east of HCL3. Allied Waste plans to develop 125.5+/- acres of this land in two phases, (i) Phase I which involves waste placement over the existing closed Henrico County Landfill No. 3 (HCL3), and (ii) Phase II which involves the use of the undeveloped land to the east of HCL3. In 2010, Republic Waste negotiated with S. B. Cox for purchase of land east of the Henrico parcel. The additional parcel is 21+/- acres and will facilitate development across the S. B. Cox site as well as the closed BFI Charles City Road Landfill which is 59 +/- acres, totaling an additional 80 +/- acres for development.

Parcel	Acres	Acres Permitted or Proposed for Waste Disposal	Disposal Volume (million CY)	Site Life (years)**
Existing Site	268	74.8		
Expansion Parcel	168.42+/-	Phase I - 45.0+/--(Piggyback on to HCL3)*	11.6	7.0
		Phase II - 80.5 +/-	27.4	16.8
TOTAL ACRES	436.42+/-	200.3+/-	39	23.8

*The proposed piggyback expansion will occupy land from both the existing site and the expansion parcel.

**Based on a yearly average of 1,317,992 tons/year (daily average = 1,317,992/52/6 = 4,224.33 (4,225) tons/day) and an in-place waste and cover soil density of 0.81 tons/cubic yard (65lbs/cubic ft).

The planned net additional capacity of the facility expansion has been calculated based on conceptual information at approximately 39,000,000 cubic yards that includes the capacity gained in the existing site due to the final cover side slopes change from 4H:1V to 3H:1V. The average waste stream is limited by the Host Agreement to 1,346 tons/week of MSW from Henrico County and 24,000 tons per week from other sources for a total of 25,346 tons per week. The anticipated daily average and maximum waste disposal limits over the expected site life of the facility will be limited to 4,225 tons per day and 6,000 tons per day respectively.

Republic's Old Dominion Landfill provides disposal for MSW, construction waste, demolition waste and debris waste. Pending landfill expansion, it is estimated that the landfill will continue to serve the needs of the County, Metro-Richmond, and Central Virginia for an additional approximately 23.8 years.

43. The **Henrico County Sanitary Landfill #1 (Springfield Road Landfill)** is a sanitary landfill owned and managed by the County of Henrico. It is located near the intersection of Nuckols Road and I-295 at 10600 Fords Country Lane in the western portion of Henrico County.

As of July 1, 2014, the County no longer accepts waste from commercial haulers. The landfill is anticipated to close in calendar year 2015. The County built a transfer station to accommodate waste from the Springfield Public Use Area and its refuse collection service. The Public use area is open 7 days per week from 7:30 a.m. to 7:00 p.m. for Henrico citizens to drop off recyclables and to dispose of trash for a fee.

The landfill operates under Virginia Department of Environmental Quality (DEQ) Permit Number 545 which was originally issued December 18, 1992. The permitted property acreage is 195 acres, the permitted disposal acreage is 103 acres and the acreage currently being utilized is approximately 95 acres. The current cells being utilized are Phases 2,3 and 4.

The total capacity for the Springfield Road Landfill for solid waste is 3,514,000 tons. As of 12/31/13, the remaining capacity is approximately 130,000 tons. This facility now only serves the County of Henrico and accepts both municipal solid waste and construction/demolition/debris waste from citizens of Henrico County. The landfill no longer accepts waste from commercial haulers and the landfill is slated to close in calendar year 2015.

4. Virginia Waste Services Sanitary Landfill (aka. Shoosmith Brothers) is located at 11800 Lewis Road Chester, Virginia. This is south of Route 10, approximately 1,500 feet WSW of the intersection of Route 10 and Lewis Road in Chesterfield County. Although the sanitary landfill is the only active facility operated by the company, an inactive asbestos landfill is located adjacent to the facility.

The landfill operates under DEQ Permit Number 587 (originally #211) on 506 permitted property acres. The permitted disposal acreage is 374 and currently used acreage is 164 acres.

The designed capacity is approximately 75.8 million cubic yards (~37.9 million tons) with an average daily tonnage of 3,562 tons and a peak daily tonnage of 5,350 tons. VWS services Chesterfield County, the Greater Richmond Metropolitan Area, other jurisdictions located within the Commonwealth of Virginia and selected geographic locations outside the state as allowed by permit number 587. VWS currently has contractual agreements through CVWMA with Chesterfield County to accept some of its waste, and with the County of Hanover to accept all of their residential solid waste.

The facility accepts the following types of waste: agricultural waste, ash and air pollution control residues classified as non-hazardous, commercial waste, compost, construction waste, debris, demolition waste, MSW, sludge, institutional waste except anatomical waste or infectious waste, reclaimed soil classified as non-hazardous, scrap metal and white goods, sludge, tires (which are subsequently split, cut or shredded), non-regulated hazardous wastes by specific approval only small animal carcasses and occasional large animal carcasses.

In 2010 the landfill added a MRF that could handle up to 1,000 tons per day of MSW and recyclables. At the MRF materials such as cardboard, paper, aluminum, metals, plastics and glass are recovered from incoming loads for recycling. Materials not recovered from incoming loads at the MRF will be transferred to the landfill for disposal. Recently in 2014, County Waste leased and now operates the MRF for their recycling and VWS recycling customers.

4.2.3.1.2 Sanitary Landfill Crater Planning Subarea

5. The landfill (Permit #228) formerly owned and operated by the City of Petersburg was sold in 2009 to The CFS Group Disposal and Recycling Services, LLC (CFS) and is now operated by **Tri-Cities Regional Disposal and Recycling Services**. The facility, located at 390 Industrial Drive, Petersburg consists of approximately 69 acres, of which approximately 21 acres comprise the active waste disposal area in the western portion of the site.

The Part B Permit Modification Application approved by the DEQ in March 2011 increased the capacity of existing Cells D and E through the use of mechanically stabilized walls (MSE walls). The permit amendment increased the capacity to approximately 485,096 cubic yards. The

expected life of cells D and E with the expansion is 1.24 years. Option 2 proposed a higher than 5' berm along the interface of Cells C and D which resulted in a capacity of 536,500 cubic yards and an estimated life of 1.38 years. Additionally CFS is in the process of expanding the entire site through a series of MSE walls and embankment and is expected to submit additional permit amendments in the future. The entire expansion process will include the installation of a Subtitle D liner and leachate collection system prior to placement of waste in this additional area. CFS also constructed and operates a material recovery facility (MRF) on the site.

Currently the site is permitted for an average daily waste intake of 1,000 tons per day with a proposal to amend their Permit to an average of 1,500 tons per day. The expanded facility optimized waste disposal and recycling services in the Tri-Cities Area (Colonial Heights, Hopewell and Petersburg) and the surrounding jurisdictions (Prince George County, Dinwiddie County) The host agreement allows the facility to accept waste generated within Virginia the metropolitan Washington DC area, and certain parts of Maryland. The facility will accept only non-hazardous waste.

The additional expansion beyond cells D and E results in approximately 3.5 million cubic yards of additional disposal capacity for the site and an estimated life of 20 years with on-going transfer station operations. It is anticipated that the maximum daily waste intake for the final expansion will be 1,500 tons per day for the landfill and 1,000 tons per day for the Material Recovery Facility.

Two other private MSW landfills located outside the Region that may become part of this solid Waste Plan include the Lunenburg Landfill (owned by CFS) and Cumberland County Landfill (owned by Republic Services). Currently the Cumberland County Landfill has not been constructed and the Lunenburg Landfill accepts very little solid waste from the Region.

4.2.3.1.3 Construction, Demolition and Debris Landfills Richmond Subarea

6. The **623 Landfill** is a C/D/D landfill located at 1961 Ashland Road, Rockville in eastern Goochland County just North of I-64. The landfill operates under SWP 506. The average acceptance rate is 4,000 tons per day with a daily maximum rate of 5,500 tons per day. The landfill accepts construction, demolition and land clearing debris. It does not accept hazardous waste, MSW, regulated medical waste, sludge, liquid waste or friable asbestos.. Additionally the landfill added a MRF (early 2014) that can handle up to 1,000 tons per day of CDD, MSW and recyclables. At the MRF materials such as cardboard, metals and wood will be recovered from incoming loads for recycling. Materials not recovered from incoming loads at the MRF will be transferred to an appropriately permitted disposal facility.

7. Hanover County's one private debris landfill is the **Ashcake C/D/D Landfill** facility. The facility accepts waste material such as construction and demolition waste, wood, brush, inert and clean fill, as well as concrete and brick that it grinds. All wood including brush and stumps is also ground. This facility has a total of 938,577 cubic yards of airspace remaining as of January 2014.

8. **The East End Landfill** is a non-captive construction/demolition/debris (CDD) landfill located in eastern Henrico County, Virginia, at 1820 Darbytown Road. This site is approximately 1.7 miles northwest of Laburnum Avenue, and approximately 1,000 feet north of

Oakland Road, on the east side of Darbytown Road. Access to the site is by private road off Darbytown Road.

The landfill (TEEL) operates under Virginia Department of Environmental Quality (DEQ) Permit Number 524, which was originally issued by the State Health Department for Landfill Operations on July 26, 1988. The permit has been amended several times, including a major amendment that incorporated permit number 525 (former Cox's Darbytown Road Landfill [DRL]) into the TEEL permit. The former DRL was originally permitted by the Health Department as permit number 188, issued July 3, 1975, which was superseded by permit number 525 on June 20, 1989.

Permit number 524 currently covers waste disposal for DRL Cells 1 and 2, and Cells I, II (and its sub-cells), III (and its sub-cells), IV, V and VI. The total acreage of the facility is approximately 108 acres, of which 53.50 acres are within the permitted waste management unit boundary. The total design capacity of TEEL is 4,854,500 cubic yards. Based on an intake rate of 1,000 tons per day, the site life is estimated at approximately 3 years (effective December 2013). The maximum daily intake is 3,500 tons per day.

An amendment to Permit 524 was initiated during 2013 to request an expansion of the landfill to increase the permitted waste management unit boundary to 74.75 acres and the total design capacity to 11,417,000 cubic yards by adding Cell VII. This proposed amendment to the Plan, that would have added an estimated 15 to 17 years to the life of the landfill, was denied by the CVWMA Board of Directors on January 24, 2014.

TEEL accepts CDD waste originating within 150 miles of the site. Construction Waste is defined as solid waste that is produced or generated during construction, remodeling, or repair of pavements, houses, commercial buildings and other structures. Construction waste includes lumber, wire, sheetrock, brick, shingles, glass, pipes, concrete, paving materials, non-friable asbestos-containing building materials and metal and plastic construction materials and containers. Demolition waste is solid waste that is produced by the destruction of structures and their foundations, and includes the same materials as construction waste. Debris waste results from land-clearing operations, and includes stumps, wood, brush, leaves, soil and road spoils. TEEL does not accept municipal solid waste, hazardous waste, industrial waste (including coal combination residuals), friable asbestos, free liquids, semi-liquids, or compressed gases.

9. S.B. Cox's Taylor Road Landfill is a construction/demolition/debris (C/D/D) landfill, owned and operated by S.B. Cox, Inc. The facility is located on State Route 646 (Taylor Road) approximately 0.7 miles north of the intersection of State Route 602 (River Road) and State Route 646 in western Chesterfield County, Virginia. Access to the site is via State Route 646.

The Landfill operates under Virginia Department of Environmental Quality (DEQ) Permit Number 270, which was originally issued on July 6, 1979. The facility property totals approximately 256 acres of which a total of 21.2 acres are currently permitted for disposal. The active disposal area (14.5 acres) is permitted in three contiguous areas/phases; Areas C, D, and E. Remaining life of the existing permitted area is estimated to be four years.

S.B. Cox, Inc. amended the solid waste management facility permit to expand the C/D/D

disposal limits and operation onto adjacent land located south of the existing facility. The expansion, as well the existing facility, is situated on a 256-acre parcel owned by S.B. Cox, Inc. The expansion increased the disposal limits and disposal volume to approximately 137 acres and 20 million cubic yards, respectively. It is anticipated that development of the expansion area will be sequential, i.e., each cell will be developed to the fullest extent possible prior to moving disposal activities to a subsequent cell. The expansion will provide approximately 70 years of disposal capacity based on permitted intake levels.

The constructed airspace of the facility in year 2024 (excluding Areas C, D and E) will be 2.09 million cubic yards. The current estimated average daily acceptance rate is equivalent to 190 tons per day. Waste acceptance rate at this facility is not expected to change significantly as a result of the expansion. However, the waste acceptance rate is estimated to increase approximately two percent annually due to population growth and increasing construction demands. The average daily acceptance rate after 20 years will be approximately 280 tons per day. The peak daily acceptance rate after 20 years is estimated to be 390 tons per day.

This facility primarily serves the disposal needs of the local area by providing for the disposal of land clearing materials (stumps, brush, branches, logs), waste building materials from construction, remodeling, or demolition projects (brick, block, concrete, plaster, wood, wallboard, pavement, pallets, cardboard, non-friable asbestos containing materials, etc.). Occasionally waste materials resulting from the manufacture of building products are accepted. No hazardous wastes will be accepted at this landfill.

10. The proposed **Skinquarter Land, LLC Landfill** will be a C/D/D landfill owned and operated by Skinquarter Land, LLC in Chesterfield County. The landfill will be located at 20701 Hull Street Road in Moseley, Virginia and currently serves as a wood recycling facility. Access to the site is via State Route 360. The landfill is not active as of July 1, 2014, but is permitted as a C/D/D landfill.

The total site consists of approximately 115 acres of which approximately 18 acres are currently being utilized for wood chipping and mulching operations. Skinquarter Land, LLC is proposing the construction of a C/D/D Landfill on approximately 55 acres of the property. Recyclable C/D/D material will be segregated from the non-recyclable C/D/D waste and will be recycled at the facility.

The primary purpose of the proposed operations at the facility will be to expand recycling operations and divert a significant portion of the C/D/D from being disposed of in landfills. Recyclable C/D/D waste includes yard waste, land clearing debris and some construction debris (i.e. wood, cardboard, metal, sheet rock). Material will be segregated, reclaimed and recycled as it arrives at the facility if economically feasible. Any material that cannot be recycled will be disposed of on the proposed C/D/D landfill. Material recycled and material disposed of in the proposed C/D/D landfill will reduce the amount of C/D/D material being disposed of in sanitary landfills in the region and increase their lives. It is unknown in 2014 when operations will begin.

The proposed facility will provide approximately 9.2 million cubic yards (~4,600,000 tons) of disposal capacity. The expected daily average and maximum disposal limits for the facility are

4,000 and 5,500 tons per day respectively. It is anticipated that 50% of the incoming waste will be recycled. The site life of the facility is estimated to be approximately 8 years considering 100% of the disposal capacity will be occupied by C/D/D waste and 50% of the incoming waste is recycled. It will be about 4 years if no waste is recycled.

The facility will accept land clearing materials (stumps, brush, branches, logs) and waste building materials from construction, remodeling or demolition projects (brick, block, concrete, plaster, wood, wallboard, pavement, pallets, cardboard, non-friable asbestos containing materials etc.). Occasionally waste materials resulting from the manufacture of building products will be accepted. No hazardous wastes will be accepted at this landfill.

4.2.3.1.2 Crater Planning Subarea

When the Plan was developed there were no active private sanitary or debris landfills located within the Crater Planning Subarea. Subsequently, the City of Petersburg sold its' landfill (2009) and it is now operation under as the Tri City Regional Disposal and Recycling Services under private ownership. See section 4.2.3.2.2.

4.2.3.2 Public Sanitary and C/D/D Landfill Facilities

4.2.3.2.1 Richmond Planning Subarea

The Goochland County Landfill, which was owned and operated by the County, closed in July 1992. Thus, there are currently no active public landfills in the County of Goochland.

The County of Powhatan does not have any active public or private sanitary landfills.

With the closing in 2002 of the 35-acre Hanover County Sanitary Landfill, located on Route 820, south of the County Courthouse, there are no active sanitary public landfills in Hanover County. Hanover County is operating a yard waste facility and a transfer station adjacent to the County's closed 301 sanitary landfill.

Chesterfield County's Northern Area Landfill, located off Genito Road, is no longer an active landfill. There are currently no active public landfills in Chesterfield County.

The Henrico County Sanitary Landfill #1 (Springfield Road Landfill) is a sanitary landfill owned and managed by the County of Henrico. See Section 4.2.3.1.1.

Henrico County Sanitary Landfill #3 was closed and purchased by Republic Services (Allied Waste). See Section 4.2.3.1.1 regarding Old Dominion Landfill.

4.2.3.2.2 Crater Planning Subarea

The landfill (Permit #228) formerly owned and operated by the City of Petersburg was sold in 2009 to The CFS Group Disposal and Recycling Services, LLC (CFS) and is now operated by Tri-Citys Regional Disposal and Recycling Services. See Section 4.2.3.1.2.

4.2.3.3 Regional Landfills Adjacent to the CVWMA Service Area

Three major sanitary landfills in jurisdictions adjacent to the CVWMA service area are currently being utilized as recipients of waste from the CVWMA area. The landfills are located in King and Queen, Amelia and Sussex Counties. These facilities can be seen on Map 4.

11. King and Queen County: The King and Queen Sanitary Landfill operated by Republic Services (Allied Waste Systems of VA) is located at 4443 Iris Road approximately 3 miles east of the intersection of Route 614 and Route 14 in Little Plymouth, Virginia.

The site operates under DEQ Permit Number 554 contains a total of 420 acres. The waste management facility is comprised of 373 acres, of which 269 acres encompass the limits of waste disposal.

The Landfill receives approximately 1,200 tons of waste per day and has a 4,000-ton per day maximum acceptance limit of in state and out of state waste. The landfill, which began accepting material in October 1993 and has a capacity estimated to be 62.1 million cubic yards over a design life estimate to be 66.4 years. The phasing scenario includes the development of five phases comprising nine cells.

The facility accepts MSW, industrial waste, commercial waste, special waste, sludge, contaminated soil, asbestos waste, ash, off-spec material and liquid waste requiring solidification prior to disposal.

12. Sussex County. The Atlantic Waste Disposal Sanitary Landfill facility is a Waste Management Sub-Title D landfill located in Sussex County (Waverly) approximately 45 miles southeast of the City of Richmond. The facility is located on Route 602, just off US Route 460.

The Landfill operates under DEQ Permit Number 562 and Sussex County Permit Number 94-21. The facility property includes approximately 1,315 acres of which 373 acres are permitted for disposal.

The Landfill's current daily volume is about 5,000 tons per day with a maximum daily volume limit of 15,000 tons. The facility provides disposal for both in state and out of state wastes including: MSW, Construction and Demolition Debris, as well as pre-approved manifested contaminated soils, ashes, WWTP and industrial sludges and treated medical waste approved and profiled by the Waste Management Environmental Engineer. The facility does not accept the following materials: whole tires, asbestos containing material, batteries, electronic component debris, radioactive waste, hazardous waste, waste containing free liquids, drummed waste or any other unapproved waste.

13. Amelia County: The **Waste Management of Virginia Amelia Landfill (Maplewood)** is a Sub-Title D landfill located on an 804-acre site in the western portion of Amelia County in Jetersville, Virginia. The facility is located approximately 35 miles southwest of the City of Richmond near US Route 360.

The Landfill under DEQ Permit Number 540 has approximately 404 acres permitted for disposal. The facility is permitted in 34 phases. The landfill has a +/- 80 year planned gross capacity based on current average daily volume of 1,400 tons with a peak daily acceptable tonnage of 5,000 tons

The Facility provides disposal for both in state and out of state wastes including: MSW, Construction and Demolition Debris, and asbestos, as well as pre-approved manifested contaminated soils, ashes, WWTP and industrial sludges and treated medical waste approved and profiled by the Waste Management Environmental Engineer. The facility does not accept the following materials: whole tires, batteries, electronic component debris, radioactive waste, and hazardous waste, waste containing free liquids, drummed waste or any other unapproved waste.

Two additional sanitary landfills outside the CVWMA Region that are also occasional recipients of MSW from the area are the King George County Sanitary Landfill in King George County (#14 in Table 2) and the Middle Peninsula Sanitary Landfill in Gloucester (#15 in Table 2).

4.2.3.4 Transfer Stations and Convenience Centers

4.2.3.4.1 Richmond Planning Subarea

County of Charles City residents may take their waste materials to the Waste Management Charles City County Landfill. Waste Management operates three convenience centers for residents in the County.

Chesterfield County operates two convenience centers. There is a minimum charge for disposing of waste at these centers. There may be additional charges depending upon the quantity and type of waste brought for disposal. During FY 2014, there were approximately 225,000 visits to the convenience centers. Over 18,000 tons of municipal solid waste was collected at the two convenience centers in FY 2014.

Goochland County operates two convenience centers, one located at the site of the Goochland County Landfill that was closed in 1992 and the second one is located in the western portion of the County. The facilities utilize mechanical compacting equipment that the Contractor provides with the transportation and disposal of the waste under contract through 2023. County residents brought nearly 7,300 tons of MSW to the convenience centers in FY 2014. The second convenience center in the Western portion of the County on Hadenville Fife Road was opened in January 2007.

A waste transfer station is located within the County of Hanover at the site of the closed sanitary landfill off Route 301. This facility, operated by the County, accepts MSW and C/D/D material. This facility has a permitted capacity of 300 tons per day. A large portion of the C/D/D generated in Hanover County is hauled directly by private companies to the Ashcake C/D/D landfill and to other C/D/D disposal facilities located in other jurisdictions. Additionally, Hanover County currently owns and operates six (6) convenience centers throughout the county for citizens (900,000 visits in 2013) who have elected not to contract with a private trash collector for curbside trash services. Most of these sites utilize mechanical compacting equipment. The trash collected at these sites is currently disposed of at Virginia Waste Services (Shoosmith Bros.) Sanitary Landfill in Chesterfield County. During fiscal year 2014, more than 25,000 tons of MSW was collected at the convenience center sites in Hanover County and a total of 32,000 tons was accepted at the Transfer Station.

Additionally, the County is currently operating a yard waste facility adjacent to the former 301 Sanitary Landfill site which receives approximately 2,500 tons of leaves and grass annually for composting. Leaves and grass are accepted at some convenience centers for recycling. The 301

Transfer Station and Mechanicsville Convenience Center also process brush into mulch and fuel chips.

Powhatan County waste is processed through a publicly owned convenience center operated by the County located off Route 626 in the western portion of Powhatan. This facility utilizes mechanical compacting equipment. The facility only accepts residential waste. Waste Management provides transportation and disposal of waste under contract with CVWMA and Powhatan County through 2023.. County residents brought over 6,500 tons of MSW to the convenience centers in FY 2014.

Henrico County citizens may take their waste to convenience centers located at the closed Charles City Road Landfill and the closed Springfield Road Landfill.

New Kent County provides four (4) refuse convenience centers, for New Kent County residents only, to take their MSW. During FY 2014 nearly 5,600 tons of MSW was collected at the four convenience centers. Waste Management is contracted through the CVWMA to maintain the four convenience centers and transport and dispose of the collected MSW. Compacting equipment is utilized at all four of the convenience centers. There is no fee charge by the County to citizens for taking their solid waste to the convenience centers. The County does not accept commercial construction or demolition debris at the convenience centers but individuals may bring small amounts of construction debris and yard waste to the Route 618 site.

City of Richmond residents may take their waste materials to the City owned and private contractor operated Transfer Station on Hopkins Road or to the City owned East Richmond Road Convenience Center. Commercial accounts are allowed to haul to the Hopkins Road Transfer Station for a fee. The waste from the transfer station is disposed of at a Waste Management operated Landfill.

4.2.3.4.2 Crater Planning Subarea

Colonial Heights no longer operates a convenience center where residents can dispose of trash. However, the City provides a recycling center where residents can recycle cardboard, paper, cans and bottles, yard waste, and scrap metals. The Recycling Center is open on Fridays and Saturdays only.

Citizens of Prince George County currently have one convenience center where they can dispose of their trash. County citizens pay a fee to enter the site based on the amount of trash they wish to dispose of. Additional fees are assessed for the disposal of tires and white goods. No commercial or industrial facilities may use this site. Currently Container First Services is contracted to operate the site and to haul the trash away and disposes of it at the Tri-City Landfill in Petersburg. Current annual tonnage of waste through this facility is approximately 2,000 tons. No mechanical compaction equipment is utilized at this facility.

The City of Hopewell operates a convenience center where residents, for a fee, may take refuse for disposal. Yard waste is accepted from residents at no charge. The hauling and disposal of the waste is currently under contract through 2019 and the waste is hauled to Tri-Cities Landfill in Petersburg.

Table 3 lists all the transfer stations / convenience centers currently in operation in the region.

**Table 3
Public Transfer Stations / Convenience Centers in CVWMA Region**

SITE	Location
Northern Area Convenience Center	Chesterfield County – Warbro Rd.
Southern Area Convenience Center	Chesterfield County – Landfill Rd
Goochland Convenience Center	Goochland County – Old landfill
Goochland Convenience Center West	Goochland County – Hadensville Fife Rd
Powhatan Convenience Center	Powhatan County – Mitchell Rd.
Courthouse Convenience Center	Hanover County – Courtland Farm Rd
Beaverdam Convenience Center	Hanover County – Beaverdam Rd
Doswell Convenience Center	Hanover County – Doswell Rd
Elmont Convenience Center	Hanover County – Lewiston Rd
Mechanicsville Convenience Center	Hanover County – Verdi Lane
Montpelier Convenience Center	Hanover County – Clazemont Rd
Hanover County Transfer Station	Hanover County - Courtland Farm Rd
Charles City Rd Public Use Area	Henrico County
Springfield Rd Public Use Area	Henrico County
Rt. 612 Convenience Center	County of New Kent
Rt. 618 Convenience Center	County of New Kent
Rt. 634 Convenience Center	County of New Kent
Rt. 647 Convenience Center	County of New Kent
Prince George Convenience Station	Prince George County – Rt. 649
Richmond Southside Transfer Station	City of Richmond – Hopkins Rd
East Richmond Convenience Center	City of Richmond – E. Richmond Rd
Hopewell Convenience Center	City of Hopewell – Station Street
Mount Zion Convenience Center	Charles City County
Mumford Convenience Center	Charles City County
District 1 Convenience Center	Charles City County - Landfill

4.2.4 Publicly Sponsored Recycling Programs

The Region faces many challenges in working toward a system that follows the waste management hierarchy. The Region, as have other Virginia localities and areas, have experienced a shift in the waste handling model that was established in the early 1990's when grassroots recycling efforts became part of local and State government solid waste management planning. Discounted landfill disposal fees and excess capacity at landfills in Virginia provide a disincentive for solid waste collectors to recycle. Vertical solid waste corporate structures maximize their cash flow by retaining as much of the waste captured as possible through a continuum of services from collection and transport through disposal.

This section provides a description of the various public recycling programs. Detailed information on the specific amounts and types of materials recycled in the CVWMA service area is presented in the next chapter.

4.2.4.1 Curbside and Drop-Off Program Origins

The Central Virginia Waste Management Authority, following the recommendations presented in the Richmond/Tri-Cities Area Regional Recycling Plan implemented a pilot curbside recycling program based on the Plan's recommendations in April 1991. The program began with 19,700 households and now, nearly 275,000 homes in the region have curbside recycling available.

CVWMA Pilot Curbside Recycling Program. In April 1991, the CVWMA began implementing a regional pilot curbside recycling program for approximately 19,700 households within the service area. Residents placed used aluminum, steel, and bi-metal cans, number one (PET) and number two (HDPE) plastics, glass containers and newspapers in Authority-provided bins and set these out for collection of the materials. Aluminum foil was added in the fall of 1991 to both the curbside and the new CVWMA drop-off site programs. The localities involved in the program include the Cities of Richmond and Colonial Heights, the Counties of Chesterfield, Goochland, Hanover, and Henrico, and the Town of Ashland. By August 1991, 20,629 households were participating. Program expansion for approximately 35,000 additional households was approved for fiscal year 1992, in the City of Richmond, and in Chesterfield, Goochland, Hanover, and Henrico Counties. By October 1991, the program had expanded to serve a total of 56,670 households within the service area. By 1995, curbside recycling was available to nearly 200,000 households. Chesterfield and Henrico took the program County-wide in 2002 and 2008, respectively. By 2014, the curbside recycling program had expanded to include 275,000 households in 9 jurisdictions, including Petersburg and Hopewell.

The CVWMA contracted for a two-year period (plus one year renewal option), with the Recycle America division of Waste Management Incorporated to provide the necessary collection and material processing and marketing services. The success of the program led to it becoming a permanent part of the regional recycling landscape. The Recycle America division of Waste Management Incorporated continued to provide the necessary collection and material processing and marketing services until Tidewater Fibre Corporation replaced them in 1999 through a procurement. In 2013 and 2014, respectively the Cities of Petersburg and Hopewell added curbside recycling to their menu of services.

The intent of the curbside recycling program is to increase participation in residential recycling by making it more convenient for households. The program is designed to allow for service expansion within participating jurisdictions or to currently non-participating jurisdictions.

Currently, approximately 275,000 households in the CVWMA Region have curbside recycling services available to them. This makes the CVWMA curbside program the largest curbside program in the Commonwealth of Virginia. Residents no longer need to separate recyclables in the current single stream program that accepts aluminum cans and steel cans, PET containers, HDPE containers, glass bottles and jars, newspaper, mixed paper and old corrugated cardboard (OCC). This program collected over 35,000 tons in FY2014.

CVWMA Drop-Off and Mobile Recycling Network. In November 1991, the CVWMA, through a contract with Chambers Development Corp., implemented a program with 2 permanent multi-material drop-off sites in Goochland (1), Henrico (10), and Chesterfield Counties (6), the City of Petersburg (1) and Hanover County (6). Powhatan County then expressed interest in participating. In addition, a mobile truck recycling program served the City of Hopewell five days per week. In 1993, the City of Hopewell determined it was more effective and more economical to locate the drop-off bins at permanent sites. By early 1992, Henrico County and the City of Richmond added sites. The drop-off center program collects the same materials as the curbside effort.

The CVWMA regional drop-off program currently has 28 sites throughout the region. The locations of these sites can be seen on Map 5. The sites accept a variety of commodities that may include newspaper, mixed paper, OCC, HDPE and PET plastic containers, aluminum cans, glass bottles and jars, and steel cans.

4.2.4.2 Special Waste Collections

Special wastes are those that require special handling. The collection of these wastes in the Region is handled through private contractors (Table 4) either directly with the locality or through contracts with the CVWMA. These materials include:

- Recovered refrigerant (CFC/HCFC)
- Waste motor oil
- Oil filters
- Antifreeze
- Scrap tires
- Lead-acid batteries
- Paints and solvents
- Used propane tanks
- Scrap metals to include white goods
- Electronic Waste

Table 4
Current Contracted CVWMA Special Waste Processors

Recyclable Material	Processor	Location
CFC/HCFC	Tri-City Appliance	Petersburg, VA
Waste Motor Oil	Hydrocarbon Recovery Service (dba FCC Environmental)	Goochland, VA
Oil Filters	Hydrocarbon Recovery Service (dba FCC Environmental)	Goochland, VA
Antifreeze	Hydrocarbon Recovery Service (dba FCC Environmental)	Goochland, VA
Scrap Tires	Virginia Recycling Corporation	Providence Forge, VA
Lead-Acid Batteries	Battery Barn of VA	Petersburg, VA
Paints and Solvents	Safety-Kleen Corporation	Chester, VA
Propane Tanks	Massey, Wood and West, Inc.	Richmond, VA
Scrap Metals & White Goods	Sims Metal Corporation and C&C Cullet	Richmond, VA
Electronic Waste	Creative Recycling Systems	Durham, NC

Recovered Refrigerant: Refrigerant (CFC and HCFCs) is removed from refrigerant containing units (e.g. refrigerators, freezers, air conditioners, dehumidifiers) that are taken by the public to designated drop-off sites within the region. The refrigerant recovery equipment and operator are certified as required under the Air Reconditioning and Refrigeration Institute (ARI) 740-1993 Standard per 40 CFR Part 82, Subpart F by ARI or by Underwriters Laboratories (UL). The recovered refrigerant is recycled for reuse and the appliances are handled as scrap metal.

Used Motor Oil: Area citizens and businesses can take their used motor oil to designated drop-off sites where they pour the used oil into storage tanks or drums. A contractor collects and processes the used oil. Many businesses in the region such as auto repair facilities that generate used oil also collect and recycle it with a private contractor of their choosing.

The waste must be transported in accordance with Department of Transportation (DOT) regulations 49 CFR Parts 100-185. The waste oil transporter must have an EPA identification number and must placard the product in accordance with DOT regulations.

Antifreeze: Drums or tanks are provided at designated drop-off sites within the Region for citizens to dump their used antifreeze. A private contractor collects the used antifreeze on an as-needed basis, removes the contaminants to include water and recycles and remarkets the resulting product as antifreeze. Used antifreeze is not specifically identified as a hazardous waste in Virginia nor is it a RCRA listed hazardous waste. The antifreeze, however, must be transported in accordance with DOT regulations 49 CFR Parts 100-185.

Waste Tires: Area residents and businesses may deliver used tires of all types to designated drop-off sites within the Region where, for a small fee that varies by locality, they may dispose of them. The tires are collected and recycled by private contractors.

Lead-Acid Batteries: Lead-Acid batteries of all sizes are collected from citizens at specified drop-off sites within the Region. A private contractor who packages and ships the batteries to smelters where they are recycled collects the batteries. Recycled lead from the batteries is supplied to manufacturers and used in all segments of the lead industry. The recycled plastic is provided for reuse to plastic compounders and fabricators for use in new battery cases and other consumer products. The acid from the recycled batteries is used to produce sodium sulfate for use in the pulp and paper industry, and also as a stabilizer in common laundry detergents.

Scrap Metals (White Goods): Metals including white goods are collected from residents at some drop-off sites, transfer stations, and landfills. The metals are then taken to local recyclers who then process the metals and market the resulting bale or shred to the appropriate ferrous and non-ferrous markets.

Used Oil Filters: Citizens take used oil filters to drop-off sites throughout the Region and deposit them in 30-gallon containers. When the containers are full, they are picked-up and replaced with empty containers by a private contractor. The oil filters are then shipped to a processor where the remaining oil is recovered and recycled and the filters are processed as scrap steel.

Propane Tanks: A change in the National Fire Protection Association standard requiring overfill protection devices on propane tanks took effect as of April 1, 2002, resulting in many of the tanks becoming obsolete. They could no longer be legally refilled. Localities in the CVWMA region responded to this situation and kept these obsolete tanks out of the landfills by entering into a contract through the CVWMA with Massey, Wood and West, Inc., to collect and recycle the propane tanks. Citizens are now able to recycle propane tanks by taking them to designated drop-off sites in the participating local jurisdictions. This program was initiated July 1, 2002, and 1,307 propane tanks were recycled during the first year. Propane tanks collected as part of this program include the standard 20-pound tanks, as well as smaller propane tanks. Some of the recycled tanks are retrofitted with the required overfill protection devices and put back into service as usable propane tanks. The remainder are cut up and recycled for the metal content.

Electronic Waste: Recycling of electronic waste such as computers, monitors, TVs, laptops, and basically ‘anything with a plug’ is conducted in many jurisdiction by holding periodic events. Some jurisdictions provide ongoing collection of e-waste. Virginia requires manufacturers take back used electronic equipment from Virginia residents at no cost.

4.2.4.3 Public/Private Partnerships

Solid Waste and Recycling Contracts:

The CVWMA provides 13 member localities with solid waste and recycling programs, which benefit urban, suburban and rural communities. The CVWMA administers these programs through public procurement with private contractors such as waste haulers, recyclers and farmers.

The CVWMA’s ability to negotiate and administer contracts with the private sector on behalf of the thirteen member localities relieves the localities of the time and effort of the procurement process and administering solid waste and recycling programs.

Regional Cooperation

Regional cooperation is necessary for the success of CVWMA programs. The CVWMA is committed to providing quality regional programs for member localities to choose from that are accessible, convenient, and cost-effective.

4.2.4.4 Public Education

Providing cost-effective recycling that meets the state's mandated goals is a fundamental goal of the CVWMA. The CVWMA staff works with local program managers, state agencies, and community organizations to help coordinate effective education of the public. Some examples of current CVWMA educational programs are noted in the following sections. These programs may change to suit the changing needs of the Region.

CVWMA's newsletter, *The Regional Waste Line*, is published twice yearly to provide program updates to elected officials, program managers, media contacts, and school officials.

Waste Reduction News, an email newsletter published monthly by CVWMA, includes pertinent information relating to waste reduction and recycling and is sent to civic groups, homeowner associations, and interested citizens. Past articles have featured household hazardous wastes, community clean-ups, environmental celebrations, and program changes.

A variety of CVWMA publications are produced to inform the public of specific programs, the most significant being the annual curbside recycling collection schedule mailed to each household eligible for curbside recycling. Brochures featuring the Curbside Recycling, Drop-Off Recycling, and Safe Garage Programs include program guidelines, accepted materials, and locations.

To educate our youngest citizens, the CVWMA has special children's publications that are available to groups such as schools and scout troops in a variety of quantities and the CVWMA has developed programs for school aged children. CVWMA has also produced videos illustrating recycling activities in Central Virginia. The video depicts the entire cycle from collection to processing to purchase, using concepts compatible with the Virginia Standards of Learning. The video is available for loan to citizens within the CVWMA service area.

The CVWMA website (www.cvwma.com) includes information about the Authority's purpose, history, staff and programs. Timely information is added to the site each month to keep the public knowledgeable and interested in CVWMA services. A general email address, info@cvwma.com, encourages further inquiry to meet specific needs. A growing resource to the community, visits to the CVWMA website continue to increase over previous years and this trend is expected to continue. In addition, some local governments maintain their own websites that provide waste disposal and recycling information to their residents.

CVWMA continues to be an active supporter of Earth Day festivities in the Region and participates in America Recycles Day activities, as well. Participating in community events such as these present unique opportunities to reach a wide range of people in a short period of time.

The CVWMA partners with local and regional media, which enables the Authority to utilize

public funds to provide information and education to a large audience in the Region. Through these efforts, the CVWMA continues to provide the public with timely information about local sites and information for recycling opportunities, program changes, and improvements.

Knowledgeable customer service representatives are available to assist citizens with questions about recycling. The CVWMA Recycling Hotline, (804) 340-0900, is staffed Monday through Friday between the hours of 7:30 am and 5:00 pm and on Saturdays from 8:00am-10:00am.

4.2.4.5 Richmond Planning Subarea Recycling Programs

Residents of Charles City County can drop-off materials including plastic containers, corrugated cardboard, paper, aluminum containers, glass bottles and jars, used oil, antifreeze, and metals for recycling at the County's three convenience centers. Additionally, a household hazardous waste collection event is held periodically for County residents.

Chesterfield County citizens may drop-off batteries, tires, electronics, cardboard, cans, glass aluminum, mixed paper, newspapers, brush and yard waste, scrap metal, appliances and paints and other household hazardous waste for recycling at the two convenience centers. Additionally, the County provides a single stream recycling program for various County office buildings and many County schools. During FY2014 , 602 tons of recyclables were collected from County buildings.

Goochland County provides drop-off containers for the collection of newspaper, mixed paper, HDPE and PET plastic containers, aluminum containers, steel cans, and glass bottles and jars at the County transfer station. Additionally, citizens can take white goods, used oil, antifreeze, used oil filters, yard waste, and tires to the convenience center to be recycled. Approximately 1,250 households in sub-divisions primarily in the eastern portion of the County have curbside recycling services available to them. There are also some private recycling activities, such as drop-off newspaper bins, occurring within the County.

The County of Hanover provides for the collection of newspaper, mixed paper, OCC, HDPE and PET plastic containers, metal containers and glass bottles and jars at the six convenience centers. Additionally, citizens can take batteries, scrap metal, white goods, used oil, antifreeze, solvents, paints, yard waste (including Christmas trees), textiles and tires to the convenience centers for recycling. Some office paper is collected from a number of County office buildings and processed by the Community Service Board. Schools and some public buildings have single stream recycling through contract with a private hauler.

Henrico County has recycling drop-off sites located at the two County public use areas and several fire stations. The County collects newspapers, mixed paper, corrugated cardboard, co-mix (aluminum, glass, steel and PET and HDPE plastic containers), white goods, yard waste, used motor oil, tires, and lead acid batteries. The materials are delivered to local recycling and processing markets. During the Christmas holiday season, the County also sponsors a Christmas tree recycling program. Yard waste disposed of by County residents at the public use areas are recycled for free within the County.

New Kent County citizens can recycle white goods and metals at the main Route 618 convenience centers. Additionally, newspaper, mixed paper, corrugated cardboard, plastic

(HDPE and PET) containers, glass bottles and jars, steel and aluminum containers, used motor oil, oil filters and antifreeze can be recycled at all four New Kent convenience centers.

Additionally approximately 275,000 Households in Ashland, Chesterfield, Colonial Heights, Goochland, Henrico, Hanover, Hopewell, Petersburg and Richmond are eligible to participate in the regional curbside recycling program that provides bi-weekly collection.

4.2.4.6 Crater Planning Subarea Recycling Programs

In addition to the bi-weekly curbside recycling (changed from weekly July 1, 2012 when all residents were provided with 95-gallon carts) program, City of Colonial Heights residents have one drop-off site available to them. Corrugated cardboard, newspaper, mixed paper, HDPE and PET plastic containers, aluminum containers, and glass bottles and jars can be recycled with these programs.

Four drop-off recycling containers are located within the City of Hopewell for residents to recycle bottles, cans, corrugated cardboard, newspaper, mixed paper and HDPE and PET plastic containers. Additionally, effective July 1, 2014 a bi-weekly curbside recycling program was initiated for all Hopewell residents.

City of Petersburg residents have three drop-off sites available to them where they can take their corrugated cardboard, newspaper, mixed paper, HDPE and PET plastic containers, metal containers, and glass bottles and jars for recycling. Appliances, tires, wood waste, leaves, and Christmas tree recycling programs are also available to City residents at the Tri-Cities Landfill. In March 2013 curbside recycling services began for all Petersburg residents.

Residents of Prince George County can bring their recyclables to the County convenience center where drop-off bins are available for corrugated cardboard, newspaper, mixed paper, HDPE and PET plastic containers, metal containers and glass bottles and jars. White goods, tires, yard waste, used oil, and antifreeze can also be taken to the convenience center for recycling.

Table 5 summarizes the materials that may be recycled and/or diverted from the waste stream in each of the localities within the Region.

4.2.5 Privately Sponsored Recycling Programs

Various commercial recycling collection activities are carried out by the private sector within the CVWMA service area. As new programs are constantly being developed and implemented and older programs expanded and modified, for the most up-to-date information, the reader is advised to contact the private operators directly or the CVWMA staff.

Commercial recycling programs within the Region exist for newsprint and other paper products, aluminum and other metals, tires, propane tanks, used oil, antifreeze, batteries, textiles and electronic waste. Several buy-back centers pay individuals and groups for recyclables; others accept donations of these materials.

Some private waste haulers provide limited curbside recycling collection service to their customers in addition to curbside refuse collection.

Many permanent private and public recycling drop-off centers operate in the service area, not

including the majority of used motor oil drop-off points. In addition, some churches, civic groups, and schools conduct periodic recycling campaigns.

Office paper recycling programs are prevalent within the service area. Several vendors in the Region buy back or collect computer or other office paper, or corrugated cardboard. Several of these vendors will provide training and customized programs. Document shredding has been added to the list of needs of the citizens in central Virginia. There are several companies in the area that provide on-site document shredding and many jurisdictions have added this service to events.

Examples of private efforts in recycling are the following: B C Wood in Hanover County generates wood chips for fuel, particleboard and hardboard from both pre- and post-consumer wood. Coastal Supply Co. in Hanover generates mulch from wood chips. Virginia Wood Processing, Inc. generates mulch and boiler fuel from wood chips. Among other wood products they also grind used pallets.

4.2.6 Waste Reduction and Reuse Activities

Source reduction includes all activities and programs that result in waste minimization, i.e., generation of reduced quantities of waste materials. Reuse is a reduction strategy in which a product, after its initial use, is reused for the same or a new purpose without undergoing significant reprocessing.

Waste reduction programs in the service area include the several area supermarket programs to reuse kraft paper grocery bags and sell alternative canvas bags for reuse, and the Puritan Cleaners program to reuse and recycle metal clothes hangers, and reuse its cleaning solvent.

In Hanover County, Bakery Feeds utilizes 100 – 200 tons per day of pre-consumer waste as a feed supplement. Additionally, all Hanover County convenience centers and the Transfer Station have reuse areas.

Traditional reuse activities in the service area include the resale of used items through thrift shops, yard/garage sales, and "flea markets," and the reuse of items donated through charities.

Currently, no comprehensive data are available on quantities or tonnages of materials reused within the service area. Standardized methods for quantifying source reduction and reuse activities are not available.

Education and promotion activities are essential to accomplish a significant level of waste reduction within the service area. Currently, several of the litter control and recycling committees in the service area are distributing, through the schools and municipal offices, literature that promotes source reduction, reuse, and recycling.

A new privately owned and operated composting facility became available in 2007 located at 13101 North Enon Church Road in Eastern Chesterfield County. This composting facility was owned and operated by Environmental Solutions Incorporated.. This complex was formerly owned and operated by Brown and Williamson Tobacco. The site of the facility is in a major industrial corridor of the County of Chesterfield and the proposed operation is consistent with the approved zoning ordinances. The composting bed was to be located within the 143-acre site slightly and utilize approximately 5 acres, more than a quarter of a mile from the western

property fence line. This facility was shut down in 2013.

In 2011, VCU developed a composting facility at 1050 Oliver Hill Road in the City of Richmond to divert up to 60 tons per year of food waste and between 80 and 100 tons per year of vegetative debris and wood chips from the solid waste stream.

**Table 5
Materials Recycled by Locality**

Locality	Mixed Paper	ONP	PET/HDPE	Glass *1	Aluminum Containers	Steel Cans	Tires *1	Used Oil *1	Oil Filters *1	Antifreeze	Paints	White Goods	Propane Tanks	Batteries
Charles City Co	X	X	X	X	X	X		X		X				
Chesterfield Co	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Goochland Co	X	X	X	X	X	X	X	X	X	X	X	X	X	
Hanover Co	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Henrico Co	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New Kent Co	X	X	X	X	X	X	X	X	X	X	X	X	X	
Powhatan Co	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Town of Ashland	X	X	X	X	X	X								
City of Richmond	X	X	X	X	X	X	X	X	X	X	X	X	X	X
City of Colonial Heights	X	X	X	X	X	X		X	X		X	X	X	X
City of Petersburg	X	X	X	X	X	X	X					X		
City of Hopewell	X	X	X	X	X	X	X					X	X	
Prince George Co	X	X	X	X	X	X	X	X		X		X	X	X

1. These materials are diverted from the waste stream for other applications such as waste to energy (used oil and tires), landfill cover (tires, glass) or road paving (glass)

5. WASTE GENERATION AND COMPOSITION

Waste quantities to be managed during the planning period are a critical component of the solid waste plan. These quantities are compared to available resources to evaluate the ability of the plan's components to successfully meet the projected needs. In addition, an accurate evaluation of the region's recycling activity is utilized to determine the Region's recycling rate and its compliance with DEQ mandates.

This chapter presents the estimates and projections of waste generation and recycling activity in the CVWMA service area. Methodologies used to make these estimates and projections are described.

5.1 WASTE GENERATION METHODOLOGY

The methodologies used to prepare estimates of the tonnages of waste generated in 2015 and projections of future waste generation in the CVWMA service area are described in this section. Specific problems with the data upon which these estimates and projections are based, are also identified.

The initial step in the process is to establish basic assumptions. It is assumed that the solid waste generation rate will remain constant during the planning period. This assumption is necessary for several reasons. It establishes a realistic beginning point for planning purposes. Furthermore, it recognizes a core need that has been documented over the past. Obviously, there may be some significant modifications to waste generation in the future. Any such modifications would probably be largely beyond any specific set of actions by CVWMA members. CVWMA and its members can continue to pursue activities to enhance public awareness and attention to issues surrounding waste management but the reality of the situation is that it will require action by those outside of the local sphere to make significant alternations to the quantities of waste generated.

5.1.1 Estimates of 2015 Waste Generation

The actual quantity of waste produced in the area is not available. This plan therefore relies on published data available from the U. S. Environmental Protection Agency (EPA). Per the EPA, the amount of municipal solid waste generated per person is 4.38 pounds per day. No similar data unique to the Central Virginia area is available from the Virginia Department of Environmental Quality, or from CVWMA. Absent any more precise information, the estimate prepared by EPA has been used.

An estimate of the 2015 Central Virginia solid waste generation was based on the U. S. Bureau of Census population for the Region and the EPA information noted above. With 1,203,088 persons projected to be living in the area in 2015, the estimated quantity of waste to be produced in 2015 was determined to be in excess of 961,000 tons (see Table 10 in Appendix C).

Landfilling and recycling are currently the two primary disposal methods for the waste generated in the CVWMA service area. Data currently exists for recycling tonnages within the Region. It is assumed for purposes of this Plan that the tonnage of waste landfilled and recycled tonnage account for almost all waste originating in the area. Therefore, subtracting the recycling tonnages from the estimate of total solid waste generated provides an estimate of municipal solid waste being landfilled for the Region.

This amount varies by type of material. Records maintained by CVWMA and reported to the Virginia DEQ indicate a recycling rate of 58.4%[^] for the CVWMA service area in 2013. The area's numbers are larger than EPA estimate of 34.5% in 2012.

5.1.2 Solid Waste Quantity Estimates for the 2015-2035 Planning Period

Utilizing the population projections made by the Richmond Regional and Crater Planning District Commissions in connection with information provided by the Weldon Cooper Associates and the methodology noted above, solid waste generation projections were calculated for the region for the 20-year period through 2035. (Appendix C) For the years 2015 through 2035, each annual population projection was multiplied by the accepted EPA estimate, to create a gross amount of municipal solid waste materials to be handled. This amount was then reduced by 50%, this is a little less than the 2013 CVWMA rate (58.4%). to generate a net amount of municipal solid waste material to be disposed. This amount was totaled for the 20-year planning period. The net amount of municipal solid waste generated is expected to be approximately 21 million tons. Assuming a conservative recycling rate of 50%, this leaves approximately 10.5 million tons of municipal solid waste to be landfilled during the 20 year period.

Historically, Central Virginia jurisdictions have relied primarily on disposal sites within the boundaries of member jurisdictions. Changes in solid waste management external to the operations of CVWMA have resulted in the development of new, large facilities outside the CVWMA area, but still well within transportation constraints. These sites are considered to address CVWMA disposal needs. According to data provided by the Virginia DEQ, there are 5 active MSW disposal facilities physically located within the CVWMA service area. These sites have a combined Year 2014 Remaining Capacity of approximately 26,500,000 tons. In addition, there are three sites within reach by available transportation systems. These three sites (King and Queen Sanitary Landfill – 9,441,589; and Atlantic Waste Disposal Sanitary Landfill – 40,808,523; Maplewood Sanitary Landfill – 17,364,025) have a Year 2014 Remaining Capacity of 50,267,476 tons. Combined, capacity within or near the CVWMA service area at the 8 sites currently available to CVWMA members is over 80 million tons.

It can be concluded from this methodology that given current practices and regulations, the existing sites are capable of handling the projected solid waste materials, with a sufficient reserve capacity. A change in regulations or a change to the economics may at some time over the life of this Plan, result in a situation where the localities would consider additional landfills or other waste disposal options.

Waste composition estimates were developed for each type of waste material generated, including newsprint, corrugated, paper, plastics, ferrous metals, non-ferrous metals, glass, yard and wood wastes, and other principal recyclable materials for the years 2015, 2020, 2025, 2030 and 2035. These estimates were generated from population projections and U.S. EPA waste type percentages, (Appendix C).

5.1.3 Special Types of Solid Waste

Special wastes are those materials that are difficult to handle or collect or which require special or unusual disposal methods. In the service area, it is estimated that special wastes make up roughly 15 -20 percent, by weight, of the waste generated.

The Virginia Regulations for the Development of Solid Waste Management Plans (9 VAC 20-

130-150) specify that Plans will include...

“3. Estimates of solid waste generation from households, commercial institutions, industries and other types of sources. Estimates should identify special waste to include, at least, the following: stumps, land-clearing debris and construction wastes, motor vehicle tires, waste oil, batteries, sludges, mining wastes, ash, white goods, septage, agricultural wastes and spill residues. “

For purposes of this Plan, automobile bodies, household hazardous wastes, low-level radioactive wastes, and medical wastes are included within the category of special wastes because of their special disposal requirements.

A description of special waste handling and disposal practices are presented, including a discussion of disposal issues. In addition, estimates and projections of existing and future special waste generation by type is presented, including estimates of existing recycling rates for these special wastes.

5.1.3.1 Principal Recyclable Materials (PRM)

Paper, metal, , plastic, glass, yard waste, wood, tires, used oil, used oil filters, used anti-freeze, batteries, electronics and textiles are special wastes that are considered "principal recyclable materials" as defined by 9 VAR 20-130-10. The state regulations require that the weights of these materials be included in the disposal and recycling calculations in each regional solid waste management plan.

5.1.3.1.1 Appliances

In waste management terminology, used refrigerators and other common home appliances are termed "white goods." Many appliances are repaired when malfunction occurs. While major appliances generally have a long life expectancy (an average of 10 to 14 years or longer), often the high cost of repair leads to premature disposal of some appliances. For many years these items have been collected by scrap dealers for their iron and steel content.

Components of some white goods can contain compounds that if disposed of improperly, may pose a threat to natural resources. Such compounds include polychlorinated biphenols (PCBs), which may be found in the capacitors and lighting ballasts of refrigerators, freezers, fluorescent lights, air conditioners, microwaves and some other appliances manufactured prior to 1980; chlorofluorocarbons (CFC/HCFCs) found in Freon in air conditioners, refrigerators and freezers, and mercury switches.

Capacitors may be landfilled if they are not leaking. Recycled white goods are usually shredded resulting in metal and a by-product produced from shredding called "fluff". If the "fluff" contains greater than 50 parts per million of PCBs, the EPA has ruled that this material must be disposed of as a hazardous waste, adding to the expense of disposal. The Clean Air Act Amendments require that CFC/HCFC containing devices must have this material removed and recycled prior to the device being recycled or disposed of. The CVWMA has programs for the recycling of white goods and for the removal of the CFC/HCFCs.

Many retailers in the region accept a used appliance from a household when a new replacement appliance is purchased.

5.1.3.1.2 Automobile Bodies

Inoperable automobiles are composed largely of steel, iron, aluminum and plastics. Automobile manufacturers continue to reduce vehicle weight through the use of plastics, aluminum and magnesium, as a means of addressing environmental and fuel efficiency issues.

For many years, steel and iron from junk automobile bodies have been recycled. According to the Institute for Scrap Recycling Industries, nearly 98 percent (10 – 12 MM cars per year) of stripped inoperable ferrous hulks are eventually recycled. The aluminum used in cars has a high market value, and it is usually recycled when the vehicle is scrapped. In fact, approximately 95 percent of all vehicle parts, including used motor oil, batteries, and other components are recyclable.

The disposal of auto fluff created in the shredding process can sometimes pose problems. It is sometimes difficult to find a landfill facility willing to accept fluff. Depending somewhat on lack of thoroughness during the stripping and recycling processes, some fluff may be classified as a hazardous waste.

The reuse of used auto parts is a continuing tradition. The current trend is for more elements of each vehicle to be recyclable, and research is continuing in this area.

Recycling plastic automotive components is currently hindered because of several factors. The primary hindrance is that a single automobile may contain 20 different types of plastics in its various components. The effort needed to identify and separate the different types of plastics has made recycling less than cost-effective within the salvage industry. Fortunately, less than five percent of each salvaged vehicle produces plastic "fluff" material that is usually landfilled or incinerated. Furthermore, manufacturers are interested in demonstrating the recyclability of all automobile parts, largely due to public pressure. Recycling of plastic and metals from automobiles may increase throughout the planning period.

Inoperable automobiles are a substantial problem when abandoned on streets and in the rural landscape. In addition to detracting from the landscape, they can pose safety hazards to children and animals. Vector problems can develop, and environmental pollution can occur if oil, gas, lead or battery acid leak into the environment. The removal of vehicles from improper disposal areas may also be quite costly.

It is difficult to estimate the number of stripped automobile bodies generated in the CVWMA service area each year. As noted above, eventually 99 percent of the stripped hulks are recycled. For the purposes of the Regional Plan, the assumption was made that the generation rate for stripped hulks approximates the recycling rate on an annual basis.

5.1.3.1.3 Waste Motor Oil

Waste motor oil is of concern for any scheme of solid waste management, as improper dumping, or spraying for dust control, can lead to serious environmental problems. Many major collectors of waste oil collect used motor and machine oils as a mixed batch. These oils are collected and used as fuel, or they are recycled into grease and lubricants.

Used motor oil poses a threat to the environment because improper dumping is prevalent and as little as one quart of oil can contaminate up to one million gallons of drinking water. Oil can harm plant and animal life as well. It is illegal to dump oil into any waters, storm drain systems or on land within the Commonwealth.

A large portion of the waste motor oil generated in the CVWMA service area is recycled.

The CVWMA programs for the collection of used oil collected approximately 93,844 gallons of waste oil in 2014 through recycling programs. Some service stations pay a fee to have the waste motor oil collected. However, some stations have been able to sell the used oil to commercial collectors.

Some service stations are reluctant to accept used motor oil from the general public, citing that the operation is messy, customers sometimes drop oil off after hours, and that at times excessive quantities are dropped off. Another problem often cited by service station managers is that citizens have unwittingly contaminated the oil with kerosene and other substances, which in large quantities may ruin the batch and make the oil difficult to recycle or dispose of.

5.1.3.1.4 Wood, Brush, Leaves, Grass and Other Arboreal Materials

Wood, brush, leaves, grass, and other arboreal materials make up a large percentage of the waste stream, and are widely recycled on a local or regional basis. Wood and yard wastes seasonally account for between 13 and 18 percent of the weight of municipal solid waste. This type of waste is composed of materials that can frequently be recycled through natural processes.

The encouragement of source reduction is vital in any wood and yard waste recycling program. Backyard composting of leaves and grass, and similar activity in the commercial sector, can assist in diverting waste from landfills. Incentives and public education can increase these source reduction activities substantially.

The collection and composting of yard waste on a local government or regional scale is an attractive adjunct to home recycling. There are various methods of composting, some more technically sophisticated than others. Brush, leaves, grass, sludge and some larger woody items may be incorporated into compost. Usually they must be clean and preprocessed. The end products may be utilized as soil amendment, garden compost and mulch. These materials are commonly given to residents or large commercial users.

Source reduction for wood debris produced from land-clearing and trimming activities can include programs to sell wood for its timber value, some can be given away or sold to the public as firewood. It has been a common practice for private contractors and local governments to burn much of this waste. However, air pollution regulations are currently placing heavy restrictions and bans on burning activities, providing an even greater incentive to recycle and reuse these organic materials.

The private sector is accomplishing some recycling of wood wastes.

Presently the CVWMA has contracted with several Contractors for wood waste and yard waste processing. These contractors grind the wood waste and yard waste that localities have collected or have had dropped-off by residents. Most localities allow residents to avail themselves of the

resultant grindings for use as mulch. Hanover County operates a yard waste composting facility.

For planning purposes, it is assumed that approximately 129,828 tons (per year) of the waste stream in the base year of the plan is composed of wood and yard wastes.

5.1.3.2 Solid Waste Reused

Several wastes are defined as "Solid Waste Reused". These materials include construction waste, demolition waste, ash, sludge and concrete when reused. Weights of these items may be included in the regional generation and recycling totals if the materials are "productively used or sold as product substitute or other beneficial products"

5.1.3.2.1 Incinerator Ash

Ash is the solid residue remaining after combustion. It may contain organic, as well as inorganic components. Typically, there are two types of ash: bottom and fly. Bottom ash is made up of larger pieces of matter left after combustion. It comprises 75 to 90% of the total ash produced. Fly ash makes up the balance. This ash is subject to collection through air pollution control equipment on exhaust gases prior to discharge into the atmosphere.

Hazardous ash must be disposed of in a hazardous waste landfill. Currently, there are no hazardous waste landfills in Virginia. A proper landfill for non-hazardous ash disposal in Virginia is any permitted public or private sanitary or industrial landfill.

For each type of ash generated, the ash generator must file a special waste disposal application with the Department of Environmental Quality, and submit a sample of the ash for testing. A determination is then made by the Department regarding whether the material is hazardous or not.

Frequently, bottom and fly ash are mixed with water and combined for ease of handling and disposal in a landfill. Combining the two ashes dilutes the concentration of some toxic metals and organic compounds such as dioxin and furan, which are most frequently found in the fly ash portion of municipal solid waste (MSW) ash.

Ash from MSW resource recovery (waste-to-energy) facilities must be disposed of in properly designed and operated landfills to prevent possible ground or surface water contamination.

In the Central Virginia Waste Management Authority service area, there are a variety of facilities that burn material and produce ash residue. These facilities include electrical energy generators and co-generators, as well as industrial and institutional facilities. There are no "waste-to-energy" facilities in the area. A list of the facilities having permits as coal burning facilities is found in Table 6.

**Table 6
Coal Burning Facilities in the CVWMA Region**

<u>Name</u>	<u>Address of Facility</u>
James River Cogeneration Company	912 East Randolph Road Hopewell 23860
Cogentrix of Richmond	5001 Commerce Road Richmond 23234
Dominion Hopewell Power Company	107 Terminal Street Hopewell 23860
Henrico County Government Complex	4301 East Parham Road Richmond 23228
Transmontaigne Terminating Inc	700 Goodes Street Richmond 23224
Dominion Virginia Power - Chesterfield	500 Coxendale Road Chester 23831
Honeywell International	905 East Randolph Road Hopewell 23860
Saint Laurent Paper Products - West Point	19th and Main West Point 23181
Smurfit-Stone Container Corp. - Hopewell	910 Industrial Street Hopewell 23860
Phillip Morris USA Manufacturing Center	3601 Commerce Road Richmond 23234
Bear Island Paper Company	10026 Old Ridge Road Ashland 23005
Phillip Morris USA Manufacturing Center	4100 Bermuda Hundred Road Chester 23836
University of Richmond	Three Chopt and River Road Richmond 23173
VSU 212	1 Hayden Drive Petersburg 23804
Southside Virginia Training Center	120 West Washington Street Petersburg 23803
Virginia Corrections Center for Women	2841 River Road West Goochland 23063
Stranges Greenhouses	4201 Creighton Road Richmond 23223
Stranges Florists Inc Broad Street	12111 West Broad Street Richmond 23223

Making projections about the future of coal-burning facilities and the amount of ash created is subject to a variety of external factors. Included in these factors are:

- The role of the Virginia Department of Environmental Quality and the U. S. Environmental Protection Agency as manifested through the promulgation and enforcement of environmental regulations;
- The ability of the facility to remain economically viable; and,
- The ability and economic competitiveness of the coal as a fuel.

Given these variables, for planning purposes, it is assumed that the existing facilities will remain in place and operate at their current levels.

The current facilities have in place operations to dispose of their ash. For planning purposes, it is taken that the amounts of ash will remain constant over the planning period, and that the operations in place will continue. The disposal of incineration ash resulting from the burning of coal is handled outside of the solid waste management covered by this plan.

5.1.3.2.2 Batteries

Household and automotive batteries combined make up only a very small percentage of total

solid waste.

The most common kind of household battery is the alkaline battery, which no longer contains mercury. These batteries, are not currently recycled by any reputable U.S. firms, while mercury and silver oxide "button cells" and nickel-cadmium (Ni-Cad) rechargeable batteries are recycled to some extent. The CVWMA had button battery program (discontinued in 2010) and continues to operate a rechargeable (nickel-cadmium, Nickel Metal Hydride, Lithium Ion and Lead Acid) battery recycling program.

Rechargeable batteries have a much longer life than alkaline batteries. They do contain another toxic heavy metal, cadmium, and therefore it is debatable whether or not these should be landfilled in sanitary landfills. As rechargeable household batteries are recyclable and long-lived, many recycling advocates believe their use should be encouraged.

Since 1985, automotive batteries have been classified as hazardous. In Virginia, lead-acid automotive batteries are banned from sanitary landfill disposal, and may not be disposed of in municipal solid waste landfills.

Each automobile battery contains approximately 18 pounds of lead and approximately a gallon of sulfuric acid. Used batteries returned to gas stations and other businesses are sent to recycling facilities. Unfortunately, some used batteries are improperly dumped. Once in the environment, there is the possibility that the lead and acid contents will leak into surface and groundwater, potentially poisoning wildlife and tainting public water supplies.

In recent years, several states including Virginia have banned lead acid automotive batteries from landfills. In 1990, the Virginia General Assembly prohibited the disposal of lead acid batteries with municipal solid waste. Lead acid batteries must now be disposed of by delivery to a battery retailer or wholesaler, to a secondary lead smelter, or to a collection or recycling facility authorized by the state or the EPA. Battery retailers must accept used automotive batteries of the same type and in the same quantity as sold to the customer. They must also post a sign provided by the Department of Environmental Quality that informs the public of these requirements.

Ten localities in the CVWMA service area provide drop-off sites for used automotive batteries; Chesterfield, Hanover, Henrico, New Kent, Prince George, Goochland, Charles City and Powhatan Counties and the Cities of Richmond and Colonial Heights.

5.1.3.2.3 Construction, Demolition and Land-Clearing Debris

Land clearing and construction debris represents a significant portion of the solid waste stream. Land clearing is generally necessary when agricultural or forested land is converted into development sites. Independent sources in Northern Virginia have estimated that such land clearing generates 150 tons of debris waste per acre.

A March 2009 report¹ prepared for the U.S. Environmental Protection Agency estimates the per capita generation rate for construction and demolition debris to be 3.2 pounds per person per day.

¹ Estimating 2003 Building-Related Construction and Demolition Materials Amount, March 2009, US EPA EPA530-R-09-002

Utilizing this figure, it is estimated that approximately 702,603 tons of construction and demolition debris will be generated in the Region in 2015. This figure is anticipated to not grow dramatically per year by the end of the planning period. The report cited above estimates that about 52 percent of construction and demolition debris is landfilled. The rest is managed on site, recycled, burned, or disposed of in unpermitted landfills.

This waste category includes construction and demolition rubble, concrete and similar inert materials (that can go into locally approved fill areas) and large diameter tree stumps. Other organic wastes, such as wood and brush, are frequently discarded commingled with construction materials. A description of the disposal practices for these additional organic materials is found above in the Wood, Brush, Leaves, Grass and Other Arboreal Materials (5.1.3.1.4) section of the plan. Construction and demolition waste may include: bricks, concrete, shingles, steel, treated and untreated wood, sheetrock (also known as drywall), windows, vinyl and plastics, and plaster.

Construction and demolition debris may contain some contaminants, including asbestos, lead-based paint, fiberglass and old fuel tanks, may be present which can cause problems. Usually, debris landfills are less heavily regulated than sanitary landfills, and there are fewer restrictions on construction and operation. Disposal of contaminants may occasionally occur at some of these locations.

There are five private debris landfills in the CVWMA. There are two C/D/D landfill in Chesterfield County, one in Henrico County, one in Goochland County, and one in Hanover County.

A limited number of public and private landfills in the area accept the medium to larger items from contractors. Little data is available within the service area concerning weight and quantity of these materials.

Additionally there are two CDD recycling facilities in the Region, ACE Recycling in Chesterfield and S. B. Cox in Richmond.

Frequently, no specific tracking system exists at debris landfills to quantify tonnage or truckloads of construction and land-clearing wastes received.

The majority of builders pay excavating and land-clearing companies or private haulers to dispose of the debris. Some contractors bury or burn these wastes on site.

Once wood wastes are commingled with construction and demolition debris, separating components for recycling is difficult and costly.

5.1.3.2.4 Stumps

Within the CVWMA service areas, most stumps are generated during land clearing for construction of buildings, support areas for buildings, roads, or recreation facilities. On rare occasions, stumps are generated during natural disasters. Because of increasing EPA regulations for air quality, the traditional method of burning stumps is less available for the Region. Therefore, the disposal process tends to be the transfer of stumps to a C/D/D landfill.

5.1.4.2.5 Scrap Tires

Scrap tires are associated with a host of disposal problems and thus merit special consideration.

Automobile tires make up approximately 85% of all scrap tires. Estimates of total used automobile and truck tire generation in the U.S. range from 190 to 240 million tires annually, which is approximately equal to one percent of municipal solid waste by weight.

Within the CVWMA service area, most landfills charge for the disposal of scrap tires, with the exception that some residents may dispose of a minimal number at no charge. Whole tires are not allowed in landfills by DEQ regulations.

The Virginia Department of Environmental Quality has put forth the estimate that waste tires are produced at the rate of 1 tire per person per year. Using population projections provided by the PDC's, over the 20 year planning period, the CVWMA service area is estimated to produce approximately 23,000,000 tires. Except in rare cases, tire vendors handle disposal of tires through private reprocessing and disposal facilities. CVWMA has established contracts with tire recyclers in the area.

5.1.3.2.6 Sludge and Septage

Sludge is the liquid residual resulting from wastewater treatment processes (public municipal, private subdivision), or public water treatment systems. Septage is the liquid residual collected from private on-site sewage disposal systems (septic systems). Biosolids are residual sludge from public-owned wastewater treatment works (POTW's) that have been further processed at the POTW to meet the pathogen reduction and stabilization methods regulated by the Virginia Biosolids Use Regulations (12 VAC 5-585) (BUR). Sludge from public water treatment works is a precipitate composed of aluminum sulfate, $Al_2(SO_4)_3$. Alum sludge from public water treatment works is either disposed in a Municipal Solid Waste (MSW) landfill with liner, and leachate collection and treatment; or is blended with stabilized biosolids and land applied. Alum sludge provides no nutrient value to soils, but is considered inert and the cake consistency is considered a soil amendment to some farmers.

No POTW's in the CVWMA suburbanized areas have the level of stabilization and pathogen reduction to produce "Class A" biosolids. Class A biosolids are completely stabilized and can be marketed in bags to homeowners. CVWMA's POTW's all produce Class B biosolids. These are partially stabilized and safe land application includes quick turn-around between biosolids production at the POTW and spreading on the farm fields with a manure spreader or tanker truck (with liquid jet spreaders). Exposure to sunshine and air-drying further stabilizes biosolids. Thus the requirement in the BUR that public exposure is restricted for a minimum of 30-days after complete land application of biosolids, to reduce the risk to public health of air-borne pathogens and respiratory irritation particulates from lime stabilized biosolids.

Sludges and septage are normally collected in tanker trucks from POTW's, private waste water treatment works and private septic tanks and run through a POTW with size, capacity and biosolids management end process drying beds or centrifuges to produce stabilized cake biosolids, suitable for land application. The Virginia regulations for POTW's and for private waste water treatment works require no permanent, covered storage for cake biosolids, as is found in most other state regulations. Permanent holding facilities are difficult for biosolids haulers to construct, due to local zoning restrictions for nuisances. Odor accompanies the manipulation of biosolids, and interim permanent storage facilities are normally not covered, to save costs. Concrete lined lagoons protect groundwater from uncovered biosolids storage

exposed to rainwater, and a second lagoon is required for these facilities for the liquid residual to be transferred via pump. This liquid residual from stormwater infiltration through stored cake biosolids is called supernatant. Supernatant may be land applied for disposal, but it contains very little nutrient value and is subject to turning “septic” and not meeting the proper pH required by the BUR for land application of cake biosolids.

Five POTW’s serve the CVWMA suburban areas. Three of these facilities – Richmond, Henrico/New Kent, and South Central (Petersburg and Colonial Heights) dispose of all of their biosolids primarily by land application. These facilities contract for biosolids disposal, and the biosolids contractors are haulers of the material, and also are the permit holder for the farm fields for land application. The BUR does not allow land application of biosolids when fields are too wet or frozen to support land application vehicles and haul trucks. Therefore, the shortage of biosolids storage at the POTW’s has placed a demand in the region for consideration of a regional storage facility. This facility should be covered and designed to be able to restabilize biosolids, since microbial decomposition continues to degrade the pH and nutrient value of the material, causing strong odors and if land applied, contributing to stream pollution and soil degradation.

One POTW facility – Hopewell (Hopewell/Prince George) disposes of its biosolids materials by incineration followed by landfill of remaining ash. The disposal of this material is handled outside of the CVWMA umbrella.

Industrial wastewater accounts for 85% of the wastewater handled by Hopewell. The residential flow is a minor component of the flow and consequently, of the ash production. Over the next 20 years, the population projections for the residential areas served by the Hopewell facility show limited growth. For the purpose of this plan, it is assumed that the ash produced by the Hopewell facility will remain constant. The amount of ash produced by this facility is a minor amount and is not expected to show much, if any, growth in the future.

Municipal landfills are considering ways to safely combine biosolids with wood chips to produce a stable end product that can be marketed as compost or potting soil. Landfills are also continuing to investigate irrigation of leachate and supernatant to improve landfill ground cover. Since these facilities are lined and have leachate collection systems, they provide groundwater protection and runoff controls that make their location excellent for on-going research and refinement of alternatives for biosolids disposal, in addition to land application.

It has been proposed that the BUR be amended to allow field storage of biosolids during frozen or wet conditions. Monitoring and testing of the field-stored biosolids is being required by the proposed regulations, as well as covering and lining of stockpiles. If the stored biosolids do not meet the pathogen reduction, pH and stabilization required by the BUR, the proposed regulation requires that the stockpiled material be removed and re-treated at a POTW.

5.1.3.2.7 Other Special Wastes

For the purposes of the Regional Solid Waste Management Plan, "other special wastes" includes waste materials listed in the regulations that are neither classified Principal nor Supplemental

Recyclable Materials. These materials include agricultural wastes, mining wastes and spill residues. In addition, the Plan includes descriptions of household hazardous wastes, low-level radioactive wastes and medical wastes, as the general public and local governments are particularly concerned about the proper handling and disposal of these materials. 9VAC 20-130-10 defines special wastes to mean “solid wastes that are difficult to handle, require special precautions because of hazardous properties or the nature of the waste creates waste management problems in normal operations”.

5.1.3.2.7.1 Agricultural Wastes

The farms in the rural parts of the CVWMA Region generate agricultural wastes, including animal manure and bedding, pesticides and herbicides, and animal carcasses. Much of this waste is removed and disposed by private waste collectors under contract to individual farm owners. Animal manure is generally disposed of in the area by land application.

5.1.3.2.7.2 Household Hazardous Wastes

Hazardous waste is defined by the EPA to have properties that render it of particular concern to human health or the environment. These wastes are either listed in the EPA regulations as hazardous or exhibit the characteristics of a hazardous waste. 9 VAC 20-80-10 defines household hazardous waste as: “ any waste material derived from households (including single and multiple residences, hotels, motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas) which, except for the fact that it is derived from a household, would otherwise be classified as a hazardous waste in accordance with 9 VAC 20-60.”

Household hazardous wastes are typically found in such products as pesticides, furniture polish, paints, solvents, and cleaning solutions. It is estimated that these substances comprise one percent or less of municipal solid waste.

The EPA regulates commercial and industrial hazardous waste. Household hazardous wastes (HHW) are conditionally exempt from regulation by the EPA, although they may pose serious risks to residents, collection personnel, wildlife, and the environment. Special HHW collection events are expensive because the transportation and hazardous waste disposal costs are very high. In addition, the actual amount of waste diverted by a single community event is only a small fraction of the household hazardous wastes generated annually.

There is a need to educate the public regarding the hazards of disposing of potentially dangerous wastes. The general public is often unaware of the hazardous properties of items used in the household on a regular basis, such as cleaners, paints, and solvents. Information is widely available regarding more benign, environmentally desirable substitutes for the more toxic substances, identification of potentially hazardous components of various products, and identification of safer disposal methods for residues and containers.

Although several localities in the CVWMA service area currently provide information to the public regarding the proper disposal of these wastes, Chesterfield County is the one locality in the service area that has a special program for the collection of household hazardous wastes. Several household hazardous waste collection days have been conducted in the CVWMA Region. Several other localities collect Category 1 material at their Convenience Centers.

Few reliable statistics are available to estimate a per capita generation rate of household hazardous wastes. As noted above, a rough estimate is that these materials make up one percent or less by weight of the municipal solid waste stream.

5.1.3.2.7.3 Low-Level Radioactive Wastes

Low-level radioactive wastes are special wastes generated, for the most part, by nuclear power plants, universities, laboratories and hospitals, industrial sources and some governmental facilities. The U.S. Department of Energy is responsible for the disposal of defense waste. This disposal is carried out at government-owned facilities.

Several federal agencies are involved in regulation of commercial low-level waste disposal, including the Department of Energy, the Nuclear Regulatory Commission, and the Department of Transportation.

CVWMA member jurisdictions are not involved in low-level radioactive waste and those few entities involved in its use manage this material. Radioactive waste is not further considered in this plan.

5.1.3.2.7.4 Medical Wastes

Medical wastes are generated by numerous community facilities including hospitals, physician's offices, dentist's offices, nursing homes, clinics, laboratories, veterinary facilities, and blood banks. "Sharps" (e.g., scalpels, needles, and surgical instruments), bandages and medical gloves, and other materials contaminated with body fluids or body parts are considered by the DEQ to be medical wastes.

The Virginia Regulated Medical Waste Management Regulations originally went into effect in 1990 (recently updated). They require regulated medical wastes to be specially packaged, labeled, and inventoried. These wastes must then be incinerated within a specified temperature range and time period, or steam sterilized. Ash and sterilized trash are sent to landfills for disposal. Since the regulations have gone into effect, many Virginia hospitals have stopped incinerating on site and have contracted for waste disposal services. Others are planning new on-site incinerators. The listing of active solid waste facilities in Appendix D includes facilities with permitted regulated medical waste (RMW) incineration operations.

5.1.3.2.7.5 Mining Wastes

According to the Mineral Resources Division of the Virginia Department of Mines, Minerals and Energy, very little mining waste is generated in the CVWMA service area, and virtually none of it is classified as hazardous.

The few sand and gravel companies contacted in the region report that the materials they mine are sold or are stored on site. Stone quarry waste is also minimal. Luck Stone Corporation reports that almost all material mined is converted to a product. The small quantities of waste generated are inert and are stored or disposed of on site.

5.1.3.2.7.6 Spill Residues

The potential exists that when a hazardous substance is spilled in the environment a portion of the material may pollute the soil and ground and surface water resources. Therefore, careful cleanup of all such spills is required.

The Virginia Hazardous Materials Emergency Response Program was approved and funded by the 1987 Session of the General Assembly. It is coordinated by the Department of Emergency Services (VDES), which works with appropriate state and local agencies.

When a spill occurs the state is contacted. The material is tested to determine the presence of heavy metals, and organic compounds. A determination is then made regarding whether or not the material must be treated as a hazardous waste and disposed of at a facility licensed to handle hazardous materials. If the material is determined to be non-hazardous, it may be disposed of in a landfill permitted by the state to accept this type of special waste.

In the CVWMA service area, several private landfills accept spill residue including petroleum-contaminated substances (in accordance with specific guidelines) and friable (easily crumbled) asbestos. Sanitary landfills may, after approval by the DEQ, accept non-hazardous special wastes.

As potentially hazardous materials are transported through the region, on occasion minor spillage occurs. The Virginia Department of Emergency Services maintains a log of incidents reported by locality. Of reported incidents, approximately one quarter involved petroleum products.

5.1.4 Qualifications About Projection Methodology

The available landfill capacity figures and annual tonnages entering landfills in the region are extracted from the Virginia Department of Environmental Quality report, Solid Waste Managed in Virginia During Calendar Year 2013¹. Only total tonnages are published by DEQ. The jurisdiction that is the source of the waste going to these landfills cannot be determined making it difficult to correlate these numbers with the waste generation totals.

It should be recognized that no direct data is available concerning specific composition of the wastes at area landfills.

5.2 RECYCLING RATE METHODOLOGY

The methodology employed to determine the recycling rate for 2013 used the following tonnage-based formula:

Calculated Recycling Rate: Using the formula below.

$$\frac{[\text{PRM} + \text{Credits}]}{[\text{PRM} + \text{Credit} + \text{Total MSW (M)}]} \times 100 = \text{ \% Recycling Rate}$$

Where:

- PRM is tons of Principal Recyclable Materials. (Paper, Metal, Plastic, Glass, Comingled, Used Oil, Used Oil filters, Used Antifreeze, Waste Tires, Batteries, Electronics, Yard

¹ *Solid Waste Managed in Virginia During Calendar Year 2013*, June 2014, Department of Environmental Quality

Waste (composted or mulched), Waste Wood (chipped or mulched) and Textiles).

- Credits are materials that are solid wastes such as construction waste, demolition waste, ash, sludge and concrete when reused in tons.
- - MSW is tons of Municipal Solid Waste Disposed.

5.3 SOLID WASTE GENERATION AND RECYCLING RATE

Estimates and projections of solid waste generation for the CVWMA service area are presented in the following sections.

5.3.1 Waste Estimates and Recycling Rate

It is estimated, based on the waste generation projection methodology described in the previous section, that the CVWMA service area will produce slightly over 961 thousand tons of municipal solid waste in 2015. Approximately 480,500 tons, or 50 percent of the waste stream generated by the CVWMA service area, entered the region's landfills. Nearly 480,500 tons (or approximately 50 percent of the total waste stream) was recycled. Using the state recycling formula, the 2013 recycling rate was 58.4 percent. CVWMA used 50% as a conservation number.

It should be noted that the landfill estimates are based on projection methodology.

5.3.2 Waste Estimates and Projections

Table 7 provides a breakdown of the estimated tonnage of projected municipal solid waste by material for the Region in 2014. As indicated in the tables in Appendix C, it is anticipated that the amount of waste generated in the CVWMA service area will increase from an estimated 961,688 tons in 2015, to 1,219,449 by 2035.

5.4 SOLID WASTE AND RECYCLABLE MATERIAL COMPOSITION

The estimated composition by weight of the CVWMA service area's solid waste is presented in this section. This information, which is summarized in Table 7, is useful in the analysis of waste management and recycling needs. A brief description of the estimated rate of recycling for various components follows.

5.4.1 Composition of Wastes

The estimates and projections of waste stream composition based on EPA data are presented in Table 7. Construction and demolition wastes are not included in this Table 7. Since the C/D/D landfills in the region are privately owned and operated and the material is collected and hauled by private contractors, very little data is available on this waste segment. The construction and demolition total tonnage, however, is consistent with the total tonnage reported¹ disposed of in the four active C/D/D landfills located within the Region.

¹ *Solid Waste Managed in Virginia During Calendar Year 2013*, Department of Environmental Quality, June 2014

It should be recognized that these composition numbers are not based on direct sampling within the service area.

An analysis of this data reveals that paper products comprise a major portion of the regional waste stream.

Ferrous and non-ferrous metals together accounted for 8.9 percent of the waste stream. Of the remaining components, plastics (12.7%), yard trimmings (13.5%) and food scraps (14.5%) account for more than ten percent each.

5.4.2 Recycling of Waste By Component

Some of the basic 2014 recycling and waste generation data indicate the following recycling rates:

Paper Products: All paper waste combined accounted for an estimated 263,503 tons of waste in 2014, of which 131,752 tons or 50.0 percent was recycled. The recycled paper tonnage is also equal to 27.4 percent of the total tonnage of recycled materials in 2014.

Yard/ Trimmings: An estimated 129,828 tons of yard trimmings were generated in the CVWMA service area, which was equal to 13.5 percent of the total waste stream. Of this total, 64,914 tons were recycled.

Plastics: Approximately 122,134 tons of plastic wastes were generated in the CVWMA service area, equaling nearly 12.7 percent of the total waste stream.

Glass: Glass accounted for 4.6 percent (44,238 tons) of the waste stream.

Metal (Ferrous and Nonferrous): The total tonnage of metal is equal to about 8.9 percent of the total waste stream.

**Table 7
2015 CVWMA Region Solid Waste Estimated Tonnages by Material**

Material	Percent Generated	Est. Regional Tons Generated	CVWMA Programs - FY2015 Recycled Tonnages	Regional Recycled Tonnages
Paper & Paperboard	27.40	263,503	27,522	131,752
Glass	4.60	44,238	4,352	22,119
Metals:	8.90	85,590	4,610	42,796
Inc. Ferrous and Non-Ferrous				
Plastics:	12.7	122,134	4,477	61,067
- inc. PET, HDPE and Other plastics				
Rubber, Leather and Textiles:	8.7	83,667	1,580	41,833
- inc. tires				

Wood	6.3	60,586	20,220	30,293
Food Scraps	14.5	139,445		69,723
Yard Trimmings	13.5	129,828	47,181	64,914
Other	3.4	32,697	50	16,348
Total	100.00	961,688	109,992	480,844

Note: Data based on Central Virginia Planning Area 2015 population of 1,203,088 and EPA percentages from 2012 data.

6. SOLID WASTE NEEDS ASSESSMENT

The existing solid waste management system was evaluated to identify specific needs to be addressed in the development of the Central Virginia Solid Waste Management Plan and its implementation. This assessment was based on an evaluation of the following factors:

- Capabilities of the region's recycling programs to continue to meet State mandated recycling goals;
- Consistency of existing waste management system with the State's waste management hierarchy and adopted Goal, Objectives, and Policies of the Plan;
- Capacity and capability of the components of the waste management system to meet existing and projected waste collection, transportation, and disposal needs; and,
- Environmental and other external impacts associated with existing waste management collection, transportation, and disposal techniques.

The needs assessment is divided into sections corresponding to the waste management hierarchy. It concludes with an assessment of planning and overall system needs.

Within the management hierarchy, needs are generally listed in order of priority from the most significant to the least.

6.1 LOCALITY INPUT

In the development of the preferred system it was critical that the system meet the anticipated needs of the member jurisdictions. To assure that this was true, the localities were surveyed as to what these anticipated needs might be. After each question of the survey, we have provided as summary of the responses from 2004 and 2014. Copies of the 2014 actual surveys can be found in Appendix R. The following is a summary of the locality input that was carefully considered in the development of the preferred system:

1. Are there programmatic or operational issues with solid waste management activities in your locality that merit attention? If so, please describe. What, if any, products/waste streams would you handle differently? What additional products/waste streams do you anticipate a future need to find ways to collect, store, transport, transport and/or dispose of?

2004 Response Summary

- Disposal of yard waste grindings/chips
- Review of convenience center facility (Colonial Heights)
- E-waste, including fluorescent bulbs disposal
- Restrictions on landfilling grass, leaves, yard waste...
- Vegetative Debris
- Yard Waste is a large problem. Large quantities are produced with little markets for them.
- Abandoned automobile fuel tanks
- Anticipate electronics to present a challenge in the future

- Brush & Leaf Disposal; Disposing of the mulch

2014 Response Summary

- Illegal dumping of yard waste and pet waste
- More e-waste recycling challenges in the future.
- Recycling of all plastics
- Yard Waste Recycling and management.

2. Please describe any changes you anticipate to your current methods of collection and disposal of municipal solid waste. Do you anticipate any significant changes in volume? Do you anticipate changes in your collections done by public or private personnel and if so how? Do you anticipate changes to your disposal by public or private landfill and if so how?

2004 Response Summary

- Possibly privatizing convenience center and adding 1 or 2 more (Prince George) within the next several years
- Possible western convenience center (Goochland) within the next several years
- Possible eastern convenience center (Powhatan) within the next five years
- May add or delete a convenience center(s) (Hanover) over the planning period
- Adding a PBR yard waste composting facility (Hanover)
- Increases in trash volume through convenience center(s) (New Kent, Hanover, Chesterfield) as populations increase
- Springfield Road Landfill (Henrico) will be closed in about 10 years and transfer stations will ship waste to commercial facilities
- With shortages in qualified personnel, we will become more dependent upon both automating as many collection routes as we can, and continuing to explore contracting out our household collection. (Richmond)
- A private contractor is presently handling our disposal and we anticipate that to continue. (Richmond)

2014 Response Summary

- Expansion of curbside MSW and recycling collection by private and public contracted haulers (Hanover)
- Transition to Enterprise Fund for solid waste collection and recycling from a General Fund (Richmond)
- PAYT program with RFID technology. (Richmond)
- Springfield Road Landfill (Henrico) has closed and a new transfer station will ship waste to commercial facilities.
- Possible eastern convenience center (Powhatan) with drop-off recycling
- No issues at this time (Charles City, Chesterfield, Goochland,
- Increase in recycling will reduce landfill volumes (Petersburg)

3. *Do you have sufficient capacity? Do you anticipate any additional solid waste management facilities – collection stations, public landfills, private landfills, transfer stations, recycling facilities, etc – in your jurisdiction?*

2004 Response Summary

- Possible western convenience center (Goochland)
- Additional capacity (a second convenience center) required (Powhatan)
- May add or delete a convenience center (Hanover)
- Possibly adding 1 or 2 more convenience centers (Prince George)
- Adding a PBR yard waste composting facility (Hanover)
- Possible changes to existing convenience center (Colonial Heights)
- Expansion to Community Services Board paper processing facility (Hanover)
- Privately owned C/D/D facility in next 10-12 years (Chesterfield)
- Additional convenience center (Chesterfield)
- Shoosmith Bros., Inc. is planning to add cells at their existing landfill
- Transfer stations will be needed at the Springfield Road and Charles City Road public use areas. These may include recycling and yard waste management. (Henrico)
- An organic (biosolids & yard waste) processing facility for the Henrico Wastewater plant
- The disposal facilities being utilized by the contracted owner/operator of the transfer station we are using should have sufficient capacity. We do not anticipate any additional solid waste management facilities within the City of Richmond.
- Adding a yard waste composting facility at the Chesterfield Southern Area

2014 Response Summary

- Possible expansion of Ashcake CDD landfill (Hanover)
- Possible construction of private Transfer Station and Recycling Facility (Hanover)
- No additional needs (Prince George, Charles City, Hopewell, City of Richmond)
- Possible additional eastern convenience center (Goochland)
- Additional capacity (a second convenience center) required (Powhatan)
- Possible expansion for Tri-City Regional Landfill for local needs (Petersburg)
- Possible Transfer Station to include recycling at Charles City Road (Henrico)
- An organic (bio-solids & yard waste) processing facility for the Henrico Water Reclamations Facility (Henrico)

4. *What expansion do you anticipate to existing solid waste management and recycling programs?*

2004 Response Summary

- All recycling programs offered at the existing convenience center would be included at

- the new convenience center (Goochland)
- Some limited demand for the City to expand the recycling program to include curbside recycling (Hopewell)
- Expansion of private refuse collection (Hanover)
- Expansion of curbside program with County growth (Chesterfield)
- Expansion of Pay-As-You-Throw collection program (Chesterfield)

2014 Response Summary

- Expansion of private refuse collection (Hanover)
- Private industry expansion into commercial recycling (Hanover)
- County plans to oversee pilot curbside program for 130 home development (Prince George)
- No expansion plans for landfill airspace (Chesterfield, Charles City, Powhatan, Henrico)
- Possibility of multi-family/commercial collection (Goochland)
- Expend recycling in City (Petersburg)
- Starting curbside recycling (Hopewell)

5. *Are there additional technologies or programs not currently in operation or available in your locality to be explored?*

2004 Response Summary

- Additional private collection companies needed (Prince George)
- E-waste recycling
- Florescent Light tube recycling
- Recycled Content Procurement program
- Expansion of commercial recycling opportunities
- Addition of multi-family housing to curbside program (Chesterfield)
- Electronics recycling
- Waste To Energy? (Richmond)

2014 Response Summary

- Food Waste Composting (Hanover)
- More Recycling Efforts (Charles City)
- Addition of RFID tags (Richmond)
- Companies Wiping computer hard drives on a large scale (Chesterfield)
- Landfill Gas collection at Tri-City Regional Landfill (Petersburg)

6. *Are there additional issues or comments specific to your jurisdiction that you feel the CVWMA should consider in the development of the SWMP?*

2004 Response Summary

- Regional collection and disposal of yard waste, brush... (Colonial Heights)
- Litter – Regionalization of anti-litter campaigns

2014 Response Summary

- Connection between storm water issues and solid waste
- Litter – Regionalization of anti-litter campaigns
- More Public Education regarding recycling

6.2 PLANNING

Diversification of solid waste management practices and technology needs to be explored in the regional planning process to enable the Region to collectively meet the State recycling mandates and reduce reliance on landfill disposal. In 2015, the region will generate over 960 thousand tons of municipal solid waste (including recyclables), of which 50 percent was disposed of in landfills.

Although landfill costs have historically been relatively inexpensive in the CVWMA area compared to other disposal methods, increased regulatory standards, liability questions, and public opposition to the siting of these facilities make it critical that other waste management strategies be pursued that reduce the reliance on landfill disposal. Furthermore, a significant portion of the region's excess landfill capacity is controlled by the private sector.

Current relatively cheap costs of landfill disposal and the heavy private sector investment in these facilities will render alternatives to landfills less attractive from a purely economic standpoint. A change in the economic conditions might cause localities to consider other options such as new landfills within their jurisdiction or alternative waste disposal means.

Specific programmatic objectives need to be established in the regional planning process. The region lacks any consensus on how much of its waste stream or what specific categories of waste will be targeted for reduction and diversion from final disposition in landfills. The waste stream is made up of distinct components that can be managed and disposed of separately. Therefore, the integrated waste management approach requires that programmatic objectives be established for the waste stream in the development and evaluation of waste management alternatives.

The regional solid waste management planning effort should continue to concentrate on front-end strategies with appropriate implementation (regulatory) and waste stream control options to divert waste from landfills, leaving the consideration and evaluation of back-end alternatives, such as new landfills and waste-to-energy techniques, to future plan updates. The service area has sufficient landfill capacity to meet expected waste disposal needs through the 20-year planning period given current demographic projections, economic conditions, recycling efforts, and regulatory situation. A change in any of these might result in the consideration of other options. Some individual localities will run out of space during the planning period. With this fact in mind, the concentration of regional and local efforts should be on front-end (prior to waste transfer and final disposal) waste management strategies that will

reduce, in absolute terms, the amount of waste entering the region's landfills and prolong the life of these facilities.

These waste diversion strategies should consider a range of implementation (regulatory) options to accomplish the objectives of these strategies. The options explored in the planning process should range from voluntary and incentive-based programs to disincentive-based and mandatory programs.

Waste diversion strategies and major regional waste projects require some degree of control over the solid waste stream. At present, fully 40 percent the region's collected residential waste and almost all of the commercial and industrial waste is outside of local control. The economic viability and the effectiveness of various recycling and regional waste management programs may rest on the degree of waste stream control.

In the future, as available landfill capacity is used or becomes unavailable, resource recovery and other long-term volume reduction options may need to be seriously considered to manage the waste that cannot be diverted from traditional landfills through waste reduction, reuse, and recycling strategies.

Existing waste collection services are generally adequate and do not need to be addressed from a programmatic standpoint in the regional planning process, except to encourage increased productivity in municipal systems and to identify where new services are needed.

A mix of public and private waste collection haulers serves the region. The municipalities, which provide these services, will continue to investigate ways to increase the productivity of their collection systems. The remainder of the waste collections service is provided by the private sector, which is market driven and highly competitive.

Therefore, the regional planning process needs to focus at the macro-level on the planning for services where needed rather than on the micro-level, which addresses detailed improvements needed to existing services. However, the magnitude of control of waste stream collection by the private sector requires that the regional planning process carefully consider the effects of any proposed new recycling and waste collection programs on private haulers. The need for specific regulatory and institutional changes to insure such programs will be effectively implemented by these haulers should also be considered.

The appropriate balance between the roles of the private and public sectors in solid waste management should be fully explored in the planning process. The policies of the Central Virginia Solid Waste Management Plan emphasize the need for private sector involvement and participation in solid waste management. Approximately 70 percent of the region's waste is collected by private companies under contract with local governments or directly with individuals and firms. Most of the service area's waste is landfilled at private facilities.

Although the marketplace is providing services and solutions to the region's solid waste management needs in an efficient and cost-effective manner, too much dependence on this market, particularly for waste disposal, may entail some risk due to the uncertainty of future costs and availability of landfill space. However, these risks may be lessened by the amount of private landfill space already existing, and planned landfill capacity in new regional landfills located just outside the service area.

One problem with reliance on the private sector in the waste collection area is the lack of control of some aspects of the waste stream, which may be needed for various local/regional recycling and other waste management programs. However, it is believed that this problem is not significant in this region.

The appropriate governmental level (i.e. authority or local) for delivery and coordination of solid waste management services needs to be fully explored in the regional planning process. A major reason for the establishment of the CVWMA was to achieve economies of scale in the provision of recycling services (and other waste management services) and greater marketing power in the secondary materials marketplace. Local recycling programs would allow for more customized approaches and accountability to local officials. Duplication of local programs at the regional level or vice versa may not be cost-effective.

It is important that these programmatic responsibilities be rationally developed and that the cost differences between local and regional alternatives for various recycling and other waste management programs be identified in the alternatives evaluation process.

Public information and education programs are needed to adequately address the full spectrum of solid waste management issues and to improve the success and participation rates of waste management initiatives. Public education pieces and public service announcements specific to the region, supplying regional facts, specific information about recyclable materials, locations of facilities, dates of events, and promotion of special programs, must continue to be developed. Public education programs include presentations to students and community groups.

Wherever possible, the responsibility for these public information and education programs should be developed and/or coordinated at the regional or multi-governmental level. However, no consensus exists on an appropriate balance between regional and ongoing local educational efforts. Specific attention should be given to developing such a consensus.

6.3 SOLID WASTE INFORMATION AND DATA

Adequate and reliable information on solid waste collection, disposal, recycling, source reduction and reuse activities is needed. In order to more accurately determine solid waste management and recycling activity in the service area and make more reliable waste generation estimates and projections, reporting of waste generation and disposal characteristics must be improved.

More reliable and accurate information on the composition of the region's waste stream is needed. The existing estimates of waste composition were based on Environmental Protection Agency national statistics. It would be highly useful, if some statistically accurate level of sampling of landfilled wastes were conducted within the service area to develop a more accurate and reliable database.

6.4 SOURCE REDUCTION AND REUSE

Public and private waste reduction and reuse programs appropriate for meeting solid waste management needs of the service area need to be defined. Source reduction and reuse are particularly cost-effective management techniques, since they reduce the amount of waste

entering the waste stream. Specific regional and local programs worthy of support should be identified and evaluated, particularly their potential impacts on recycling programs. One aspect of this program should focus on waste exchanges, which link waste generators with waste users.

Information on current source reduction and reuse programs and activities is needed. The current level of source reduction and reuse in the service area is unknown. Although some level is certainly occurring, further work and investigation are necessary to provide a better understanding of existing efforts in this area.

6.5 RECYCLING

Additional markets must be secured for recyclables, and existing public and private efforts expanded to pursue a cost-effective mix of recycling programs that target portions of principal recyclable materials for diversion from the waste stream. To be effective, recycling markets must be developed and secured, and industrial and national barriers to recycling must be overcome. Without available markets that will accept the recyclables, recycling programs will become more difficult to sustain. At local and regional level political and social changes must be sought that encourage the use of secondary materials and the development of industries that use or process these materials.

Although the region's current recycling rate enables the region to meet the state's recycling mandates, decisions must be reached during the planning process on what level of waste diversion is desirable to divert further waste from going to landfills, meet public and political expectations, and to respond to possible changes in the state mandated recycling rates or definitions. The current recycling rate, as strictly calculated under the State regulations, is approximately 58.4 percent (2013 Rate). The region may have additional opportunities for recycling its waste products that have not as yet been pursued such e-waste.

Any recycling programs and corresponding target levels should be based on a thorough evaluation of the cost-benefits of these programs, particularly compared to alternative waste reduction and disposal strategies.

The costs and benefits of recycling programs should be balanced with other environmentally sound disposal methods in addressing the region's solid waste management needs. Recycling is a stated public policy in the Commonwealth of Virginia and has widespread public support; however, any cost-effective integrated solid waste management program to address waste management needs must consider that recycling will not address all the disposal needs of the region, nor will waste reduction strategies.

The volatility of recycling markets, the economic disadvantage of some secondary materials versus primary materials in the production process, the institutional, social, and legal barriers to recycling, and the relative low-costs of landfills and availability of landfill capacity and siting space in the region make it more difficult to pursue rigorous and highly ambitious recycling programs. Full consideration should be given to the costs and benefits of each waste management strategy.

6.6 SPECIAL WASTES MANAGEMENT

Expansion of programs and markets for reuse, recycling, and proper disposal of special

wastes such as tires, motor oils, batteries, e-scrap are needed. All of these wastes have some degree of environmental consequences, particularly those wastes that are discarded without proper disposal.

Some localities are neither currently participating in the Safe Garage (used oil, oil filters, antifreeze and paints) Program, nor do they have their own locally managed program. Other localities however, have their own locally managed program.

Although recycling of batteries is close to 80 percent, the hazardous nature of the batteries requires that they be recycled or disposed of properly in a certified disposal facility.

Currently there is no ongoing e-cycling program in any of the localities within the Region. It is anticipated that this issue will be addressed.

Programs to properly manage and dispose of tires are needed. While many of the localities are participating in the tire recycling program or have their own program, some tires are still being stockpiled or improperly dumped; however, more adequate information is needed on the amount of tires stockpiled or dumped.

Data are lacking on land-clearing, construction debris, demolition, and ash wastes. Little data currently exists in the region concerning many of the aforementioned special wastes or how much of these wastes are being reused or recycled.

Non-landfill techniques for the disposal of Class A wastewater sludge have proven to be effective for the recycling of these wastes; however, health and environmental concerns require that these practices to be closely monitored. Almost all of the municipal wastewater sludge within the Region is being land applied to fertilize farmland. Future regulatory changes may impact on this process. At that time the Region will consider options to include (but not limited to) mulch facilities to combine yard waste and the sludge for the disposal of the sludge.

6.7 RESOURCE RECOVERY

Waste-to-energy alternatives need some future consideration for disposal of a portion of the service area waste stream as a possible long-term option. Although existing landfill capacity and the impacts of recycling programs will make new landfills, except in some specific local situations, optional for the region, an opportunity may arise for considering a major waste-to-energy facility(ies) for meeting the areas needs beyond the 20-year period or sooner should existing reserve landfill capacity not be available, economically viable or problematic for some unforeseen reason or should problems occur in the recycling programs.

The Richmond Tri-cities Area Resource Recover Economic Feasibility Study, completed in 1988, found that waste-to-energy technology was feasible for the region. However, since that time, the expansion of cost-effective landfill capacity in the region, the emphasis on recycling strategies by the State and public, the problems with this technology and opposition from environmental groups have led this Region to drop this option as a near-term waste management alternative.

A report by the firm of Smith Barney (Pollution Control Monthly, February 1991) states that no matter "how the landfill and recycling segments develop," waste-to-energy will remain a

necessary part of the solid waste management system. It goes further to state that if recycling is "rationally planned, it can make both economic and environmental sense. But as the bills for local recycling programs begin to come in, many communities with particularly aggressive recycling goals may begin to reevaluate those objectives, and perhaps, take another look at the waste-to-energy option."

Despite serious environmental concerns about this technology, approximately 14% of solid waste is burned at 102 facilities spread over 31 states. These facilities generate 2,800 megawatts of electricity and serves disposal needs of more than 37 million people across the United States.

6.8 VOLUME REDUCTION AND INCINERATION

The reduction of waste volume through incineration or other techniques does not appear to be a viable option for the region at this time. Incineration of waste without any resource recovery is wasteful and provides little societal benefits to offset the potential adverse environmental aspects of this technology. Furthermore, the abundance of projected existing landfill capacity under current conditions minimizes the necessity and economic feasibility of any type of volume reduction technique. Other volume reduction technologies, such as mass composting and mixed waste recycling, have certain problems and may not be very cost-effective when linked to various types of front-end recycling programs. Some jurisdictions may initiate small scale composting such as the vermi-composting in Hanover County.

However, the uncertainties and volatility of the recycling markets and potential unforeseen actions that might affect the availability of economically viable landfill capacity may make it necessary to consider other options.

6.9 LANDFILLING

The existing public and private landfill capacity available to the region should satisfactorily handle the area's needs throughout the 20-year planning period. Public and private landfills within the service area had an estimated capacity of over 26 million tons in 2013. Assuming a conservative growth of waste coming to these landfills from outside of the region and the use of several landfills outside the Region, the service area will still have available capacity in 2034. This highly conservative estimate assumes no increase in the current recycling rate, nor any increased capacity that can be achieved at existing landfill sites.

Most of this landfill capacity is privately owned and may not prove to be economically feasible for use by a locality due to transportation costs and other factors. Reliance on private landfills entails some risks due to uncertainties; therefore, it is important that any management alternatives proposed in the planning effort provide sufficient flexibility and contingencies to deal with unexpected and changing conditions.

Some localities may require additional landfill space during the 20-year planning period. Although the region will have surplus landfill capacity, some localities within the service area will need to make decisions during the planning period on securing additional or new landfill space. The following is a breakdown of the individual MSW landfill needs of each locality:

- Charles City County: It is anticipated that the County's solid waste disposal needs can be met with existing processes and facilities. Unforeseen regulatory actions, demographic

changes, and/or economic conditions (e.g. tipping fees) could result in the need for the County to consider other options such as securing additional or new landfills or other solid waste disposal means.

- Chesterfield County: Barring unforeseen regulatory actions, demographic changes, and/or economic conditions (e.g. tipping fees), the County's waste disposal needs will be met by the Virginia Waste Services Landfill (Shoosmith Bros. Landfill) or some other contracted private landfill.
- Goochland County: Currently contracting with CVWMA through 2023 for waste disposal of approximately 7,500 tons collected at the two Convenience Centers which is with Waste Management. It is anticipated that this arrangement will continue throughout the planning period.
- Hanover County: Currently contracting with the Shoosmith Bros. Landfill in Chesterfield. It is anticipated that this capacity or other contracted private landfill capacity will continue to meet the County's needs barring unforeseen regulatory actions, demographic changes, and/or economic conditions (e.g. tipping fees).
- Town of Ashland: A private Contractor is collecting the Town of Ashland's municipal solid waste through a contract with the CVWMA which is currently with County Waste. Ashland will continue to contract its collection and disposal needs.
- Henrico County: The County requires approximately 110,000 tons to be landfilled annually. MSW collected at the County Convenience Centers, Transfer Station, and by County Residential Collections will be disposed of at Republic Services' Old Dominion Landfill
- New Kent County: Currently contracting with the CVWMA through 2023 for waste disposal of approximately 6,000 tons collected at their four Convenience Centers which is currently with Waste Management. It is anticipated that this capacity will continue to meet the County's needs barring unforeseen regulatory actions, demographic changes, and/or economic conditions (e.g. tipping fees).
- Powhatan County: Currently contracting with CVWMA through 2023 for waste disposal of approximately 6,500 tons collected at their Convenience Center which is currently with Waste Management. It is anticipated that this capacity will continue to meet the County's needs barring unforeseen regulatory actions, demographic changes, and/or economic conditions (e.g. tipping fees).
- City of Richmond: The City has a contract with a private contractor for the disposal of MSW which is currently with Waste Management. It is anticipated that this or a similar arrangement will continue throughout the planning period.
- City of Hopewell: No anticipated needs since the City contracts through the CVWMA for the collection and disposal of MSW with CFS. It is anticipated that this or a similar

arrangement will continue throughout the planning period

- Prince George County: The County's 2,000 annual tons of waste collected at the convenience center is contracted to go to the Tri-City Landfill in Petersburg. It is anticipated that this capacity or other contracted private landfill capacity will continue to meet the County's needs barring unforeseen regulatory actions, demographic changes, and/or economic conditions (e.g. tipping fees).
- City of Petersburg: Based on the City's current estimated annual waste tonnage of approximately 14,000 tons it is estimated that the Tri-City Landfill (formerly owned by Petersburg) will take all the City's trash over the term of this Plan as specified in the City's host agreement with the landfill..
- City of Colonial Heights: Barring unforeseen regulatory actions, demographic changes, and/or economic conditions (e.g. tipping fees), the City has its waste disposal needs under contract with CVWMA, which is currently with CFS, to collect and dispose of the trash. It is anticipated the City will continue to contract with a waste company to meet its needs.

The four (4) active C/D/D landfills in the Region (623 C/D/D Landfill, Ashcake C/D/D Landfill, East End Landfill (TEEL) and Taylor Road Landfill) are all privately owned. It is anticipated that the available capacity at these facilities and C/D/D recycling facilities in conjunction with the C/D/D capacity available at other landfills such as the Charles City County Landfill will meet the Region's needs.

A privately owned and operated C/D/D landfill is currently (2006) being proposed for the Skinquarter area in Western Chesterfield County. As of this update (2014) this landfill has not been opened due to changed economic conditions and existing Regional capacity.

The addition of C/D/D landfill capacity in the region will serve to divert C/D/D materials from sanitary landfills and thus potentially increase their useful life.

Additionally, Hanover County 301 yard waste composting facility has a composting capacity.

7. PREFERRED REGIONAL WASTE MANAGEMENT SYSTEM

7.1 INTRODUCTION

The preferred regional waste management system was selected following an analysis of the existing system and an evaluation of input from the local jurisdictions and the TAC. This chapter discusses the management system for only the municipal solid waste (MSW) stream that includes residential and commercial wastes. Currently, the private sector is successfully managing the construction and debris and the industrial waste streams and is expected to continue to do so. The preferred MSW management system consists of the following components:

- Source Reduction and Reuse, Recycling
- Waste Collection and Transfer & Waste Disposal

Discussion of the waste management system is divided into sections corresponding to these components.

Source reduction and material reuse are discussed as a means for reducing the amount of MSW generated. These components rely heavily on educational and promotional programs. These programs and their results are limited in scope.

Recycling has been selected to continue to be the primary component of the waste management system for reducing the waste stream prior to disposal. There are several reasons for this decision. They are:

- State legislation mandates localities and solid planning units to recycle:
- Numerous recycling programs exist within the CVWMA region, including the Authority's own curbside and drop-off programs; and,
- A level of acceptance for recycling exists among residents of the region.

The selected program provides for the continuing collection of principal recyclable materials (PRMs) consisting of paper products, glass, aluminum, ferrous materials, and plastic. PRMs are collected from regional drop-off centers and from household collection routes.

Collection and transportation represent major costs in the disposal of solid wastes. These components of the waste management system are handled primarily by the private sector in the CVWMA region with some involvement by local governments in the more urban areas. The preferred waste management system continues the existing combination of waste collection and transportation provided by the public and private sectors.

7.2 PREFERRED WASTE MANAGEMENT SYSTEM COMPONENTS

7.2.1 Source Reduction and Reuse

Source reduction and reuse components selected for the preferred waste management system address only the MSW portion of the waste stream. These programs entail minimal input from the CVWMA staff relying instead on assistance from the Departments of Environmental Quality, the Virginia Cooperative Extension Service, local schools, local litter control and recycling coordinators, recycling organizations, businesses, and other volunteer groups.

Program objectives include increasing, on a voluntary basis, the number of households leaving grass clippings on lawns, and/or composting leaves and grass. Program objectives also include changing consumer purchasing habits to focus on minimal packaging; the purchase or exchange of reusable and used products (through yard sales and product exchanges); and the purchase of products made from recycled or recyclable materials. Other program objectives include facilitating charity collection programs and encouraging the reuse or reduction of special wastes. Some source reduction and reuse will occur, even without an aggressive formal program.

Because of the minimal involvement by the CVWMA staff with these program components and unknowns associated with a reliance on volunteer help, estimates of program costs are not included with this plan. It is known, however, that success of these programs is tied to the amount and quality of community outreach and public education provided. Fortunately, many citizens are eager to reduce the waste stream and there are existing networks of communication within and among local jurisdictions for waste stream reduction programs. This plan assumes that the role of the CVWMA staff will be to coordinate on a regional basis, to the extent possible, the various groups and localities participating in source reduction and reuse. The overall direction in this area will be to encourage waste reduction and reuse by the general public and by the private and public sections where possible.

7.2.2 Recycling

The objectives of the recycling program are to reduce the amount of MSW requiring disposal in landfills, and to save energy and resources that would go into making new products from the same materials. The recycling component of the regional waste management system is divided into residential and commercial programs. During 2013, recycling programs underway in the CVWMA region have diverted 570,998 tons of recyclable materials from the MSW stream. These recyclable materials include 505,831 tons of the primary PRMs, which includes 139,155 of yard waste. Of this total, CVWMA and the local jurisdictions actively managed 100,235 tons of recyclable materials including:

- 34,041 tons collected through the curbside program
- 5,118 tons collected at the drop-off centers
- 67,401 tons of yard waste
- 2,833 tons of other recyclables

Commercial recyclers performed the remaining portion of the area's total waste diversion.

Residential: The preferred recycling program selected for the residential waste stream provides for collection of the PRMs that include: aluminum, paper products, glass containers, plastic bottles, and steel cans. Yard wastes will also be collected from some city neighborhoods and suburban areas of the region. The CVWMA will continue to coordinate residential curbside and drop-off programs. Individual localities will supplement this with their own programs as they recognize the need. Existing programs will be expanded, as appropriate and new programs will be instituted as needed. Map 6 identifies generalized locations of projected urbanized areas to help identify potential program expansion for planning purposes.

The CVWMA residential recycling component calls for a mix of offerings available to the participating jurisdictions including:

- Regional drop-off centers for the collection of recyclable materials
- Bi-weekly curbside collection of recyclable materials

Currently, the CVWMA curbside recycling program is available to approximately 230,000 households in the Region. It is anticipated that this total will increase, as new subdivisions are built within or contiguous to existing curbside collection areas. The general nature of the methodology to identify and make population density estimates as depicted in Map 6, preclude more precise data at this time.

Continued success of the recycling programs depends largely on the rate of participation. Efforts will continue to increase participation rates for existing programs. One way to measure success of the program is by how much it reduces the waste stream, the higher the participation, the greater the reduction in the waste stream.

Commercial: The recycling program selected for the commercial waste stream will target cardboard, office paper, yard waste, glass, metal, and other materials. Commercial recycling rates are sensitive to cost and to levels of education and promotion within communities.

For the most part, commercial and industrial recycling will be carried out on a voluntary basis by the private sector. The goal of the CVWMA is to continue to meet the state mandated recycling levels by establishing reasonable target levels within the various components of the waste stream. The target level for commercial recycling is 10 percent of the commercial waste stream. As stated above, rates of commercial recycling are sensitive to public education and promotion aimed at the private sector.

The strategy for the plan's commercial and industrial recycling programs is to rely on the free market and on state agencies and volunteer organizations supported by the CVWMA staff or local jurisdictions to make this component of the plan successful. The CVWMA will work with various trade organizations, local recycling coordinators, and volunteers to facilitate commercial recycling opportunities and provide education as requested. The CVWMA will also work with commercial haulers to identify potential markets for their services.

The planning district commissions, CVWMA and its member governments will attempt to collect and refine data to evaluate the success of programs and the rate of commercial and industrial recycling.

Private curbside recycling efforts are being initiated by several private contractors in the CVWMA Region. It is anticipated that these efforts will continue during this planning period and beyond.

7.2.3 Waste Collection and Transportation

The existing system of solid waste collection and transportation throughout the region is to be continued through the planning period. The system is divided between the private sector, which operates under both free market and franchise conditions, and the public sector.

The assumption of this plan is that collection of recyclable materials under the preferred waste management system will reflect the system of solid waste collection that is in place. Techniques of collection and service providers will remain essentially the same.

However, as publicly owned landfills are phased out over the next 20 years, it may become necessary for the CVWMA or its member jurisdictions to provide one or more additional transfer stations / convenience centers.

7.2.4 Waste Disposal

The method of disposal selected for the preferred waste management system is landfilling. The present system of landfills is projected to be able to provide disposal capacity throughout the period covered by this plan. Surplus capacity exists in existing facilities within or contiguous to the service area. Over the course of the planning period the Region will continue its transition from a mix of public and private landfills utilized for Regional waste disposal to all private landfills. The two remaining public landfills will be closed during the planning period.

7.3 COSTS AND ASSUMPTIONS

Annual costs for the preferred waste management system, expressed in 2014 dollars are estimated to be about \$54.2 million. Due to the variety of programs and methods for funding them by the various jurisdictions and the role of the private sector, estimating annual costs of the preferred waste management system is not exact. The following section provides a breakdown of some of the costs of the solid waste management system by selected component costs. Where appropriate, the assumptions used to compute those estimated costs are included.

Estimated annual operating costs include MSW and recycling programs provided to jurisdictions by the CVWMA and other programs established by the jurisdiction and the private sector where information is available. As mentioned previously, costs for the source reduction and reuse and commercial components of the program are not estimated because of the limited involvement anticipated for the CVWMA staff.

It should be noted in the following analysis, where program costs are averaged for households,

that an average household size of 2.53 persons was used for the entire CVWMA region. Where program costs are averaged by population, it is estimated that each person generates 4.38 pounds of MSW per day according to the EPA. Estimates for all annual costs are given in present (2014) dollars. They are derived from a combination of existing program costs, industry standards, and the best professional judgment of the CVWMA staff and its consultant.

7.3.1 Preferred System - Recycling

Residential: Services for drop-off centers, curbside collection, operation of yard waste processing facilities and other CVWMA recycling programs will continue to be contracted to private firms under separate contracts to the CVWMA where they are competitive with the costs of publicly owned or operated facilities. Anticipated revenues from sale of recycled materials are subtracted from program costs. Some localities such as Hanover, Henrico, and Chesterfield may operate their own yard waste processing facility. In addition to CVWMA programs, some localities may operate their own recycling programs.

Curbside Recycling – The cost of the CVWMA curbside recycling program for collection and processing of PRMs is approximately \$4,454,057 annually plus overhead cost (FY 2014) in six jurisdictions. This represents \$1.45 per household per month for bi-weekly service. Current cost for the curbside collection and processing of recyclable materials average about \$179 per ton for the 34,041 tons collected.

An average of 35.5% of eligible homes set out materials in the curbside program and the average set out is about 28 pounds per home. Actual participation in the program is believed to be higher since not all participants set out every collection day.

Drop-Off Recycling – Cost factors for the CVWMA drop-off center programs include: land, improvements, equipment, transportation, maintenance, material processing, administration and education. Current costs for the CVWMA drop-off program to the participating localities is approximately \$82 per ton of recycled material and approximately 5,118 tons was collected in FY 2014 for a total cost, net of revenues from the sale of recyclables of \$419,676. This includes container rental, collection, and transportation, processing and marketing of the material.

In addition to the curbside collection and the drop-off program the CVWMA has procured and negotiated favorable contracts with vendors for the collection and processing of other recyclable materials. Each member jurisdiction selects from the menu of programs best suited for the locality and the contract fees are born by the locality through the CVWMA. Other programs to meet specific needs are managed locally.

- **Appliances / Metals:** The locality pays a monthly container rental fee, a per ton processing fee and a per haul collection fee. The value of the material, tied to a monthly market index, is subtracted from the cost. Depending upon market conditions this program may be a cost or a revenue stream.
- **Propane Tanks:** The vendor pays a small fee to the CVWMA who in turn reimburses the locality for each propane tank collected.

- CFC/HCFC: The participating jurisdiction pays a fee for each unit (air conditioners, refrigerators etc.) from which the CFC/HCFC s are extracted and recycled prior to the unit being recycled. Some jurisdictions extract and recycle the this material in-house.
- Waste Tires: The vendor provides the participating localities with a trailer where used tires are stored. When the trailer is full the vendor switches out the trailer and recycles the tires. A per ton fee is paid by the participating locality for this service.
- Used oil and Antifreeze: The locality pays a small annual site fee for each site collecting these materials. The contractor collects the materials from the sites on an as-needed basis, processes it, and markets it at no additional cost.
- Paints and Used Oil Filters: A collection and processing fee is charged to the locality for each 55-gallon drum of paints and for each 55-gallon drum of oil filters collected.
- Agricultural and Yard Waste Recovery and Grinding: The participating locality incurs an hourly rate for grinding and processing of yard waste or a per ton fee to recycle leaves at various farming facilities in the region.

Market conditions play a role in the cost of many of the CVWMA and local recycling programs as the contracts for materials such as OCC, mixed paper, metals and ONP contain revenue sharing clauses with floor and ceiling prices tied directly to market indexes.

Commercial: Costs for the commercial component of the recycling program are not itemized in this plan. Involvement by the CVWMA staff in the foreseeable future is anticipated to be minimal. There will be reliance on the free market and on volunteer and trade organizations, commercial recycling and state agencies to make this component of the program successful.

7.3.2 Preferred System - Jurisdictional Recycling Costs

Efficient implementation of the preferred recycling program among the individual jurisdictions requires selection of the program components that are most appropriate based on the overall needs the jurisdiction. The programs are selected by the local jurisdiction that pays the costs or fees associated with the program.

7.3.3 Preferred System - Collection and Transportation

Costs for collection and transportation of recyclable materials are included with the overall recycling program costs. Costs for collection and transportation of the remainder of the MSW (including non-recovered recycled materials) are calculated separately.

Collection includes that portion of the solid waste program that gets solid waste and/or recyclables from the generator to a transfer or processing facility prior to disposal. For the low-density component of the program, it includes the operation of MSW convenience center sites. In medium density areas, it includes the household collection process. In high-density areas, MSW collection includes the operation of dumpster sites.

Transportation takes up where collection leaves off. It includes the movement of MSW from any transfer station or processing facility to a landfill. It also accounts for long hauls between collection routes and landfills.

7.3.4 Preferred System - Waste Disposal

Materials not diverted from the waste stream through source reduction, recycling and reuse will be landfilled. Landfilling costs in the CVWMA region currently average approximately \$25/ton delivered.

This cost is reflected in the tip fees charged by the jurisdictions and the private sector for the use of their facilities. Under the preferred waste management system, approximately 480,000 tons of MSW will be landfilled annually at an estimated cost of \$12 million (current dollars) delivered plus collection and transportation estimated cost of \$23.8 million.

7.3.5 Preferred System - Total Costs

The annual estimated costs of the preferred waste management system for MSW and recycling is estimated to be approximately \$54 million, excluding costs for the waste reduction and reuse components of the system. The CVWMA manages approximately \$14 million annually (2014) of the MSW and recycling programs in the region. The remaining costs were estimated based on information collected from localities and the private sector for other recycling and MSW programs assuming an average cost per ton and collection costs compared to that of CVWMA programs. Table 8 below estimates annual costs by component.

Table 8

Estimated Annual Costs – Preferred Waste Management System

System Component	Component Cost
Recycling Programs	\$18.4 million
MSW – (collection, transportation and disposal)	\$35.8 million
Total	\$54.2 million

7.3.6 Avoided Landfill Costs

Materials diverted from the waste stream prior to disposal, through recycling or some other means, reduce the amount of wastes that ultimately end up in a landfill. Decreasing the amount

of material requiring final disposal increases the operating life of landfills and may defer costs associated with permitting and construction of facility expansions and of new facilities.

There can be some cost savings in the short term, but they should be carefully calculated. The reasons for caution include the following: costs for landfills are mostly up-front, capital costs associated with site acquisition, design, permitting, and construction, these are long-term, financed costs. The only real savings realized in the short-term are the landfill operation and maintenance costs. In addition, a jurisdiction only saves money by not landfilling if the alternative is less expensive.

At an average cost of \$25/ton disposal (not including transportation and collection), the CVWMA jurisdictions saved approximately \$2,505,875 in FY 2014 by recycling the 100,235 tons of material that would have been landfilled

7.3.7 Cost Comparison of Preferred to Existing System

Total costs for the waste management systems employed by the CVWMA jurisdictions are difficult to estimate. This is due to the wide variety of waste management systems used by the jurisdictions, and because of the various methods used by the jurisdictions to fund these programs and account for system costs. Under the preferred waste management system, the total cost of landfilling is to continue at this level. The same is true of the other programs and practices. The existing solid waste management system is meeting the needs of the jurisdictions and is exceeding the state mandated recycling level. Since the preferred waste management system is a continuation of the existing system, costs are not anticipated to be significantly different from current costs.

8. IMPLEMENTATION ISSUES

In this chapter, issues related to the implementation of the preferred solid waste management system and the Central Virginia Solid Waste Management Plan are explored. Specific recommendations and policy concerns are proposed for consideration and for future updates of the Plan.

For discussion purposes, implementation issues are aggregated into the following categories: institutional; legal and regulatory; funding options; Plan implementation and maintenance; and monitoring program for evaluation of the Plan and recycling programs.

8.1 INSTITUTIONAL ISSUES

The following institutional issues are examined related to Plan implementation: regional versus local recycling programs; ownership of solid waste management facilities; and various management options for waste collection and transfer operations. In addition, barriers to the implementation of the Plan are discussed and specific recommendations are proposed.

8.1.1 Local Versus Regional Programs

A significant issue is the appropriate level (regional or local) of recycling programs to implement the preferred regional waste management system.

Jurisdiction Programs: Individual jurisdictions may contract their recycling programs out to private waste management firms or provide the service directly. If each individual locality were to contract out its program, the costs of the combined individual programs would be similar to those for a regionally operated program, since larger waste haulers would be able to provide economies of scale benefits. Some of the smaller, more rural localities might have trouble contracting out some of these services due to the relatively small quantities generated.

The major advantage of local programs is that an individual jurisdiction may tailor a program to their specific needs. This flexibility allows local programs to have a different focus and achieve a different rate of recycling.

Authority (Regional) Programs: Under a regional program, a single regional entity (CVWMA) provides or contracts with private waste management firms for the provision of some recycling programs within localities. Although this approach may eliminate some of the customization available to locally sponsored programs, some flexibility still exists to tailor regional programs to meet local preferences and needs. These programs are offered as a menu of choices that the jurisdiction may either opt in or out of providing flexibility to the local government.

Regional programs provide opportunities for economies of scale that smaller local programs may not offer. Capital-intensive facilities, such as recycling drop-off centers and material recovery facilities, may thus be less expensive on a per ton basis. Economies of scale are also evident in processing equipment, collection equipment, operating personnel, and marketing.

However, an advantage of a regionally sponsored recycling program is that the risks from marketing and program implementation are shared by all localities. The volatility of the recycling markets makes revenue streams for recycled materials highly unpredictable. Working

under the umbrella of a single agency, such as the CVWMA, the region gains a better posture for marketing of recyclable materials. Commodity revenues are greater for larger quantities. Furthermore, market stability can be enhanced with consistently large quantities of recycled materials available for purchasing.

Recommendation: The existing system where CVWMA provides a menu of choices to participating jurisdictions appears to be functioning well. This, coupled with local jurisdiction's use of customized programs that they have developed with individual contractors has been very successful in achieving state recycling mandates. No changes are proposed to the current system.

8.1.2 Ownership Of Facilities

An important institutional issue pertains to the ownership of solid waste management facilities. Specifically, this issue focuses on the relative merits of public versus private ownership and local versus authority ownership.

Public Ownership: If solid waste management facilities are publicly owned, the public entity bears all the operational risks and costs with the objective of providing a waste management service at a low cost to the public. Public ownership provides some certainty about future costs and availability of service.

One way to avoid some of the disadvantages of public ownership is public-ownership with private contracted operations, such as the arrangement the City of Richmond and several of the Counties use for their transfer stations/convenience centers. A service contract with a private operator could be on terms acceptable to the jurisdiction and provides competition in selecting the best provider. Some of the operating risks such as liability, fuel costs and market risk are transferred to the private sector.

Private Ownership: Private ownership or public/private contracting, particularly for landfill facilities, is a trend that is expected to continue in the CVWMA area. This option transfers many risks to the private sector, although some risks to local governments remain.

There are several disadvantages of private ownership including higher financing cost; profit must be included in the project and the financial stability of the contractor. The government has little control over the marketplace, financial soundness or the operations of a privately owned facility. Therefore, in the case of a solid waste facility such as a landfill, government cannot be certain about the availability of future disposal capacity and tipping fees.

Recommendation: Based on the preferred regional solid waste management system discussed in Chapter 7, the issue of ownership of facilities needs to be addressed in three critical areas of the Plan: recycling; transfer operations; and, landfill disposal.

1. Recycling Facilities: The evolution of recycling programs and lack of publicly owned facilities generally have worked toward private ownership of recycling facilities, except for small publicly-owned recycling drop-off centers. Therefore, the continued involvement of the private sector in recycling programs should help implement the preferred system, with the private sector providing necessary equipment and processing centers. Should this situation change and the private sector either become uneconomical, operate outside jurisdictional needs or capacity becomes an issue, the public sector may need to provide its own material recovery facilities.

These could be coupled with other existing waste operations such as drop off sites or transfer stations or they could be constructed on publicly owned property. Examples of this are Hanover County's yard waste composting center and CSB paper processing facility.

2. Transfer Facilities: With reliance on the private sector to provide waste collection and disposal services and the increasing closure of public landfills, it will be increasingly necessary to provide transfer facilities to consolidate and transfer solid waste to out of jurisdiction landfills. Several of these facilities exist and it is anticipated that others may be constructed on the site of closed public landfills or other publicly/privately owned property.

3. Landfill Facilities: Existing public landfills will be closed during the planning period and more reliance on private landfill facilities within and in proximity to the CVWMA service area will occur. This increased reliance on private landfills raises uncertainties about the future availability and costs for landfilling in these private facilities. Therefore, it is highly recommended that the CVWMA and its jurisdictions secure public disposal capacity in private and/or public landfills to meet these future needs as soon as possible.

8.1.3 Collection and Transfer Operations

The following basic options for collection and transfer of waste are currently used to some degree in the service area and are recommended for continuation under the preferred regional waste management system: free market; franchise operations; and public operation.

Free Market: Jurisdictions within the CVWMA have historically relied upon the free market for collection and disposal of much of the service area's waste. Approximately 18 percent of the MSW generated in the service area is municipally collected. The current economic recession is placing considerable pressure on local jurisdictions with municipal operations to explore privatization of their residential waste collection and disposal programs.

The free market system is expected to provide incentives for higher quality collection services and lower costs down through competition. The rate charged to the consumer for these services is related to the frequency and type of collection service and transfer/disposal costs. Concern exists about the validity of this assumption for all areas of the region.

Any savings these firms may realize in lower tipping fees due to the decrease in the amount of waste delivered to landfills resulting from source reduction and recycling programs may not be passed on to the consumer. If this were to be the case, the average consumer being served in these areas would see no savings from his/her recycling activity

8.1.3.1 Franchise Operations. Franchise operations are either direct or indirect.

1. Direct Franchise: Direct franchising is used in other states to reduce the overall cost of residential waste collection by the locality. Under this mechanism, an exclusive right is awarded through a competitive bidding system to one hauler to provide residential collection services within a specified area for a specified duration and rate. The private hauler is required to bill customers directly for services at the bid rate. The jurisdiction monitors the hauler's performance.

The private hauler is responsible for landfill disposal of the collected refuse at a location of its choice or one directed by the locality. The locality can require that the private hauler provide for

collection of recyclables, which would increase recycling participation rates for curbside services.

Direct franchise collection is intended to provide for more rational competition between private haulers. It addresses the problem of having dozens of private haulers competing for the business of individual households in the same neighborhoods, resulting in inefficient collection routes, duplication of services, and repetitive collection truck traffic.

Although localities have authority to do direct franchising, no jurisdiction or solid waste authority within the Commonwealth has or is likely to implement such a system.

2. Indirect Franchise: The other franchise option is indirect franchise through government contract. This method is the most common method of privatization of public operated residential refuse collection programs within the CVWMA service area.

This option is similar to the direct franchise option, except that exclusive right for collection service in the entire locality is given to one firm through a competitive procurement process. In contracts of this type, the locality can direct the hauler to deliver the refuse to its own publicly owned landfill, to a designated transfer station site under control of that jurisdiction, or in the case of large waste management companies, to one of that company's landfills. Delivery of residential MSW to a transfer facility usually necessitates the need for separate contract with a regional private landfill owner for subsequent transfer and disposal of the collected waste.

8.1.3.2 Public Operation. Some municipal governments in the CVWMA service area initiated their own residential waste collection services years ago since private refuse hauling companies were not available to provide this service. All localities have the choice to operate their own program or contract for these services.

Recommendation: The existing system is functioning well, and no significant changes are proposed. Improvements may be possible however and CVWMA, working closely with local governments will investigate the private residential waste hauling practices in the CVWMA's service area and develop specific options for consideration by local governments.

8.2 LEGAL AND REGULATORY ISSUES

The following legal and regulatory issues were identified for examination: waste stream flow control; voluntary versus mandatory recycling; material bans; and waste prohibitions.

8.2.1 Waste Stream Flow Control

Flow control is a means to regulate by local ordinance the delivery to designated waste management facilities of waste generated or disposed of in that jurisdiction. Section 15-28.01 of the Code of Virginia permits local governments to adopt ordinances requiring flow control, if a public hearing is held and it is found that (1) private or regional disposal facilities are either unavailable, inadequate, unreliable, or not economically feasible to meet current and future waste disposal needs, and (2) flow control is needed for financial considerations. (This flow control does not apply to recyclable materials, either source-separated or separated from the mixed waste stream, or to construction debris to be disposed of in a landfill.) In addition, localities within the CVWMA have been given enabling the authority to implement flow control to require waste to be sent to resource recovery facilities.

The primary reason for flow control is financial (i.e., protect public investment). It allows localities to borrow money for a solid waste management facility, since it reduces risk and uncertainty. It may also help municipalities to contract for waste disposal to ensure waste flow is delivered.

In 1992, Congress directed the Environmental Protection Agency to develop and submit a report to Congress on Solid Waste Flow Control as a means of municipal solid waste management. The EPA found that flow controls played a limited role in the solid waste market as a whole. However, Flow Control authority played the largest role in financing and funding of waste-to-energy facilities. The EPA found in 1995, that 58 percent of the waste-to-energy market was supported by flow control. The EPA also found that flow controls provided for an administratively effective mechanism for local governments to plan for and fund their solid waste management systems. Allowing local governments to control the disposition of locally generated municipal solid waste allows planners to more accurately determine how much waste has to be managed and how effective local waste management plans are, further explaining flow control as an effective tool for planning and management.

In 1994 the Supreme Court, in the case of *Carbone Inc. v. Town of Clarkstown, New York* (No. 92-1402), found that municipal solid waste is interstate commerce, thus state and local flow control mandates violated the commerce clause of the U.S. Constitution, which states that only Congress can enact such provisions.

The preferred regional waste management system does not rely on flow control to be implemented due to the reliance on the private sector for waste management services and the competitive nature of disposal options. As long as a competitive situation for waste disposal exists, then flow control is not necessary

8.2.2 Voluntary Versus Mandatory Recycling

The success of any recycling program, whether mandatory or voluntary, relies heavily on the public's participation. Mandatory recycling programs may result in participation rates that are significantly higher than voluntary programs but there likely will be a correspondingly increased cost to the jurisdiction.

Supporters of voluntary programs argue that mandatory programs can infringe on people's rights, or at a minimum be needlessly strict, especially if recycling services are not convenient. Voluntary programs can be enhanced through economic incentives, such as user charges that consider the quantity of waste disposed (pay-as-you-throw). Such charges would be difficult to implement in the region due to the large portion of the waste stream collected by private waste haulers.

Enabling legislation exists to require separation of recyclable materials. The decision to implement mandatory programs is usually driven by limited disposal capacity; however, it may also be enacted to demonstrate a locality's commitment to recycling.

A mandatory program can also assure more stable and reliable materials flow than a voluntary program. However, a mandatory program can also result in saturated local material markets if markets are unstable or relatively undeveloped.

The enforcement of mandatory programs is also an issue. Generally, enforcement ranges from non-existent to a fully strict and actively enforced program. The higher the level and intensity of enforcement the greater the costs and administrative burden would be to local government.

8.2.2.1 Material Bans

One method to reduce the amount of MSW or toxic materials entering the waste stream is through material bans (this could be considered in this category of mandatory recycling programs). Currently in Virginia, no enabling legislation exists to allow localities to ban specific items from retail sale or use within their jurisdiction for the specific purpose of reducing MSW.

Bans have been enacted elsewhere in the United States at the statewide level and, where enabling legislation exists, at the local government level to reduce those waste materials which are perceived to be undesirable. Examples of these types of bans include plastic packaging, CRTs, disposable diapers, multiple packaging for individual products, foam plastic, and non-degradable items.

Another candidate for prohibition are yard wastes. The preferred regional waste management system calls for a voluntary yard waste program.

Section 15.1-11.5.1 of the Code of Virginia permits local governments to ban leaves and grass, but not other organics, from all landfills within their respective jurisdictions. (Local governments that own landfills have the right to ban any waste from those landfills.)

Recommendations: Based on the needs of the preferred regional waste management system, the following recommendations are presented:

The nature of mandatory programs supports the continued implementation of voluntary programs. If these programs become unsuccessful and/or if higher participation rates are needed to meet State mandates, then mandatory programs may be considered. However, it is important that all efforts should be made to adequately educate the public about recycling programs, make these programs conveniently available, and to consider appropriate incentives to promote recycling and reduction/reuse before relying on mandatory programs. This option is available to any jurisdiction that believes it is necessary.

Materials bans are beyond the limited scope of the regional planning effort and are not necessary to the successful implementation of the preferred regional waste management system.

The effectiveness of regional voluntary yard waste recycling programs is such that there does not appear to be a need for the prohibition of such wastes at landfill facilities at this time.

8.3 FUNDING ISSUES

Funding of the preferred regional waste management system rests primarily with the local governments and the customers who pay for commercial services. The major funding issues involve the increasing demand for local government to have available waste disposal, residential service, and recycling.

In identifying and assessing funding options available for recycling and other solid waste management programs, taxes, user charges, bonds, and miscellaneous sources of revenue were

considered. CVWMA member jurisdictions fund the recycling and solid waste programs in a variety of ways including user fees, taxes and litter grants.

8.4 CVWMA FUNDING

CVWMA's administration and general operating expenses are currently funded through per capita assessments of the participating localities. Individual programs are funded by participating localities based on contractually based fees for the services. It is assumed that funding for major capital projects (none are proposed in the preferred regional waste management plan) would be through revenue bonds, either issued by the Authority or a local government.

Local funding of CVWMA has proven adequate and state recycling mandates are being met so no change is proposed to the funding mechanism. Local jurisdictions will fund these programs by whatever means they determine best meets their needs.

8.5 PLAN MAINTENANCE AND AMENDMENTS

With adoption of the Plan, a framework for maintaining, updating, and amending the Plan needs to be established. This section presents a recommended institutional structure and key elements for this framework.

8.5.1 Policy Objectives

The following policy objectives were used as guidelines in developing the specific recommendations for the institutional framework and process:

- Local governments within the regional multi-jurisdictional and agency framework must be able to meet their obligations under Section 10.1-1411 of the Virginia Waste Management Act and Regulations for Solid Waste Management Planning, Amendment 1 (9 VAC 10-130-10 et seq.); and,
- The core strategies and actions of the adopted Plan should be implemented as agreed upon by participating local governments and PDCs; and,
- Plan consistency requirements for public solid waste management facilities and services should be as minimal and unobtrusive as possible; and,
- The Plan should be kept current, based on the best information available, and should accurately reflect changing conditions and public policy; and,
- The on-going planning process should facilitate and encourage effective public participation and input from elected officials.

8.5.2 Institutional Framework

The CVWMA would ensure the Plan is maintained and updated, including the establishment and maintenance of a database for monitoring performance.

In addition to its CVWMA project planning and programmatic responsibilities, the TAC would continue to provide technical assistance to the Authority's Board and staff on Plan development, maintenance, and implementation issues. The Citizen Advisory Committee would continue to provide a formal mechanism for citizen input.

8.5.3 Local Government Support and Commitment

Regional success in continuing to meet State and regional recycling goals through the implementation of the Central Virginia Solid Waste Management Plan is directly tied to the level of commitment and support from local governments.

8.5.4 Plan Maintenance

Plan maintenance refers to those activities required to monitor and evaluate progress in implementing the Plan and meeting recycling objectives. It includes the maintaining and updating of the solid waste system database and preparation of plan amendments and updates.

The CVWMA would ensure that all plan maintenance activities and the preparation of all plan updates and amendments are performed.

The CVWMA staff and its TAC would be actively involved in plan maintenance activities and the preparation of plan updates and amendments. The CVWMA and TAC would have specific responsibility for ensuring implementation of the adopted Plan through a consistency review process. The CVWMA and its staff would be responsible for specific project and operational planning and the evaluation of the authority's programs as they relate to meeting the objectives of the Plan. Local jurisdictions would be responsible for operational planning and the evaluation of programs and activities that the jurisdiction operates apart from the CVWMA.

8.6 IMPLEMENTATION MILESTONES

Implementation of the Plan over the 20-year planning period will require periodic review and examination. These events will occur at regularly scheduled intervals. Also, additional review will be performed should any extraordinary events occur. It is intended that these reviews will enable the CVWMA Board of Directors and staff to keep abreast of trends in solid waste management and in modifications to strategies and programs as they affect operations of the CVWMA. All periodic reviews will be the responsibility of the CVWMA staff, with assistance and input from others as appropriate.

Annual Reviews:

- DEQ regulations require annual computation and reporting of recycling rates. Data will be calculated by staff and reported to the Technical Advisory Committee for review and input. Once their comments are received, staff will make an annual report to the full CVWMA Board of Directors. It is expected that this will occur at the Board of Director's April meeting.
- During and at the conclusion of each session of the General Assembly, staff will prepare reports on the actions of the General Assembly, as those actions pertain to the issue of solid waste management. This report will be submitted to the Technical Advisory

Committee and the full Board of Directors. Five-Year Review:

- At the conclusion of each five-year period after DEQ's notification of the acceptance of the Plan, CVWMA staff will initiate a review of waste disposal capacities. That review will examine the waste generation estimates for the next five years, as determined by the latest and most reliable waste generation rates and will compare this with the capacity of the landfills currently in use by CVWMA contractors and prepare a report. The purpose of this report is to verify that adequate landfill space for the next five years will remain available to the members of the Authority, as well as to give an indication of potential need to identify additional landfill capacity or alternative solid waste disposal techniques.

Periodic Review:

- The United States Department of Commerce conducts a full census every 10 years. As soon as the initial results of the census are available, staff will work with the Richmond Regional and Crater PDCs to compare the results of the census with the population projections contained in this Plan. The new census numbers will then be used in subsequent reviews as the population data for preparing solid waste quantity estimates. Should a review of the census counts prove at considerable variation to the estimates contained within the adopted Plan, staff would prepare an interim document to project future solids waste volumes for comparison with landfill capacities.
- Over the life of the Plan, it is possible that additional members may be added to the CVWMA. Should this occur, staff would prepare an analysis of the waste generation quantities from the prospective member to provide assurance that the waste disposal resources available to CVWMA are sufficient to provide adequate service to the potential member.

8.7 AMENDMENTS TO THE APPROVED PLAN

The Solid Waste Management Plan will become of record when the Plan is approved by the Central Virginia Waste Management Authority Board of Directors, adopted by the two Planning District Commissions and has been reviewed and approved by the (Virginia) Department of Environmental Quality. This updated Plan is intended to cover the 20-year period from 2014 through 2034.

In the future, there may arise a need to amend the Plan. Amendments would be needed for items not shown in the adopted plan, such as changes in the physical features of the solid waste management system, changes in technologies and techniques for the disposal of solid waste, or the boundary of the Central Virginia Waste Management Authority area. DEQ regulations have divided amendments to an approved plan into two classifications: major and minor. The process for all amendments is set forth in DEQ regulations (9 VAC 20-130-175 and 9 VAC 20-130-220).

8.7.1 Major Amendments, Including Changes to Boundary

Major Amendments to an Approved Solid Waste Management Plan as defined by Amendment 1, 9VAC 20-130-175 include:

- a. Any addition, deletion, or cessation of any solid waste disposal facility;
- b. Any increase in landfill capacity; Any change that move toward implementation of a state management strategy that lower in the waste management hierarchy; Action plan(s), including an action plan to address a planning unit's recycling rate that has fallen below the statutory minimum; or Any change to membership in the approved area.

Requests for major amendments for items 1) and 2) above may be initiated by CVMWA, the TAC, or by member jurisdictions. CVWMA staff, in consultation with the CVWMA Technical Advisory Committee, will prepare a staff report on the proposed amendment. The proposed amendment in summary form will be advertised and the written staff report made available to the public for review and inspection at the CVWMA offices, as well as the offices of each Planning District Commission.

A formal public hearing by the CVWMA Board of Directors will be held, at which time members of the public may make their comments known. After due consideration of comments received, the CVWMA Board shall take action. If the Board approves the amendment, then, the amendment will be sent to the two Planning District Commissions. It would be necessary for all three bodies, the CVWMA Board and the two PDCs, to approve a proposed amendment before any further action would be taken on it. Once all three bodies have approved the amendment, it would be submitted to the DEQ for its review and approval. Once approved by the DEQ, the amendment would become a permanent part of the adopted plan and go into effect.

Requests for a major amendment to change membership, that is, to change the boundary, of the Central Virginia Solid Waste Planning Area, may be made by any member of the CVWMA or by any governing body wishing to join the Planning Area. The process for amending a Regional Planning Area is delineated in 9 VAC 20-130-220.

8.7.2 Minor Amendments

Minor amendments shall include:

- a. Any addition, deletion, or cessation of operation of any facility that in not a solid waste disposal facility;
- b. Any change that move toward implementation of a waste management strategy that in higher in the state management hierarchy; or
- c. Any non-substantive administrative change such as a change in name. may include but are not limited to changes that move toward implementation of a waste management strategy that is higher in the waste management hierarchy (e.g., from landfilling to recycling), and non-substantive administrative change.