

VERMONT MATERIALS MANAGEMENT PLAN:

Moving from Solid Waste towards Sustainable Management

Effective date June 18, 2014

“Materials management is an approach to serving human needs by using and reusing resources most productively and sustainably throughout their life cycles, minimizing the amount of materials involved and all the associated environmental impacts.”

– *Sustainable Materials Management: The Road Ahead (USEPA 2009)*



Photographs clockwise from top left: baled plastics, food scraps fed to chickens, and compost windrows being turned.

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VERMONT MATERIALS MANAGEMENT PLAN

Introduction

While progress has been made in reducing and diverting solid waste since the passage of Vermont's first robust solid waste management law (Act 78 in 1987), the amount of waste that Vermonters generate is significant at 5.18 pounds per person per day which leaves much room to improve upon waste reduction efforts. At the same time the diversion rate, amount of material kept out of landfills or incinerators, has stagnated in the mid 30% range for the last ten years. Vermont's Agency of Natural Resources (ANR, or the Agency) is promoting a new strategy designed to improve management of materials that become waste. This *sustainable materials management* strategy focuses on using materials throughout the entire lifecycle of a product or material with the intent of preventing overall waste, increasing reusability, and increasing recycling and organics diversion. The benefits of managing materials sustainably transforms the waste management industry into an industry that has even greater influence on local economic development, ability for communities to build a working landscape, and decrease Vermont's greenhouse gas (GHG) emissions that contribute to climate change.

The Universal Recycling law (adopted as Act 148) is an "act relating to establishing universal recycling of solid waste," passed into Vermont law in 2012. The impetus for the Universal Recycling law was the stagnating rate of waste diversion (30 – 36%) in Vermont over the past decade. The Universal Recycling law seeks to improve the capture and diversion rates for these valuable materials to prevent them from being landfilled. By phasing out landfilling of certain materials (recyclables, food scraps, and leaf and yard debris), ensuring parallel collection (collection of these materials at the same location as trash collection), and incentivizing diversion through variable rate pricing (commonly defined as "pay-as-you-throw"), more of these materials can be diverted from the landfill.

The Universal Recycling law also seeks to provide increased choices and convenience to Vermont residents and businesses, leading to more consistent statewide materials management services such as recycling and composting. By requiring separation and diversion of materials (waste, recycling, organics), the law creates an incentive to invest in materials management strategies. Finally, implementation of the law is phased over nearly a decade, allowing time to establish collection services and processing facilities for managing mandated recyclables and food, leaf, and yard materials. (See Appendix A).

STATUTORY AUTHORITY

As mandated by Vermont law (10 V.S.A. § 6604), "the secretary [of the Agency of Natural Resources] shall publish and adopt, after notice and public hearing..., a solid waste management plan which sets forth a comprehensive statewide strategy for the management of waste..." The statutory language also requires that the Plan be revised at least once every five years.

For purposes of moving towards a sustainable materials management vision, the Secretary of the Agency of Natural Resources is renaming the Solid Waste Management Plan to the Materials Management Plan. This is adopted in accordance with statutory requirements of 10 V.S.A. § 6604 and serves as the solid waste management plan, under the document title Vermont Materials Management Plan (MMP).

History of Plan Adoption. The initial Plan was adopted in 1989, with a Revised Plan adopted on August 31, 2001. The 2001 Plan was then readopted in 2006. Re-adoption resulted after thorough evaluation indicated that critical issues had not changed significantly, and that existing goals and action items continued to be an effective strategy to mitigate and manage waste generation. Additionally, it was determined that resources would be utilized best if they were dedicated to supporting ongoing efforts rather than focus on adopting a new Plan.

In 2007, a legislative mandate required ANR to evaluate the effectiveness of the current Plan and to develop a new vision for materials management for Vermont, based on the findings. (Section 293b of the 2007 Budget Bill, Appendix A). Following submittal of the *Solid Waste Report to the Legislature - January 2008*², ANR was required to convene a working group of stakeholders. The Solid Waste Working Group (SWWG) was tasked with evaluating the legislative report, and to compile a list of recommended actions necessary for accomplishing goals identified in the report.

Between June and December 2008, the SWWG met six separate times. The SWWG reviewed the *Solid Waste Report to the Legislature - January 2008*, as well as recommendations set forth by the *Life Beyond Garbage*³ report, and the Vermont Solid Waste District Managers Association (VSWDMA). Contributions made by the SWWG were a driving force behind the rewriting of the MMP. Additional background to the MMP development and relevant data can be found on ANR's website.⁴

VISION

The vision which is the basis of Vermont's Materials Management Plan (MMP) is:

*To prevent waste from being generated,
To promote sustainable materials management, with a preference for highest and best uses,
To minimize reliance on waste disposal (landfilling and incineration), and
To conserve resources, minimize energy consumption, and reduce greenhouse gas (GHG) emissions and other adverse environmental impacts.*

Waste prevention. This can be accomplished through better product design, heightened producer and consumer responsibility, and improved awareness of material reduction and reuse options. ANR can influence this trend by promoting improved design and manufacturing of products with a goal towards producing less and for using materials that can be reclaimed and reused. Everyone contributes to waste generation and when individuals are better informed and have convenient options, they are able to make better choices when making purchases, as well as when managing the materials once they are done using them. Prevention efforts should be driven by the recent State Waste Composition Study completed in 2013. Results indicate organic materials, paper, and special wastes comprise the most significant portion of the waste stream for residential as well as industrial, commercial, and institutional (ICI) sectors.⁵

² Solid Waste Report to the Vermont Legislature. January, 2008.

http://www.anr.state.vt.us/dec/wastediv/solid/documents/Solid_Waste_Report.pdf.

³ Life Beyond Garbage: Vermont Waste Prevention and Diversion Strategies. May, 2008.

<http://www.anr.state.vt.us/dec/wastediv/r3/WPplanning/VT%20Waste%20Prevention%20Report%20May%202008.pdf>.

⁴ VTANR, Waste Management & Prevention Division, Solid Waste Management Program, Publications and Reports.

http://www.anr.state.vt.us/dec/wastediv/solid/Pubs_and_Reports.htm.

⁵ DSM Environmental Services, Inc. and Mid Atlantic Solid Waste Consultants, (May 2013), *State of Vermont Waste Composition Study*. Note: Definition of "special wastes" in Appendix A, pages 5 and 6, of the WCS differs from Vermont Solid Waste regulations 6-801 through 6-803 found <http://www.anr.state.vt.us/dec/wastediv/solid/documents/SWRule.final.pdf>.

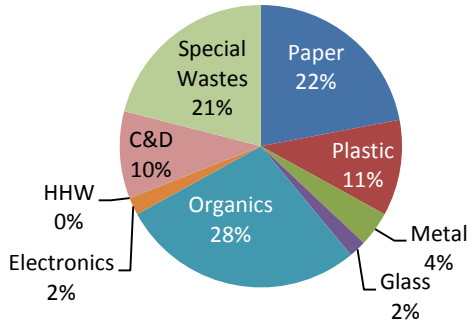


Figure 1. Residential MSW Composition (% by weight), VT 2011

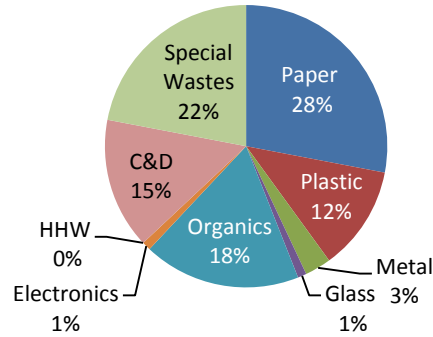


Figure 2. ICI MSW Composition (% by weight), VT 2011

Promote highest and best use. Vermonters must change their thinking about waste and materials management. Rather than looking at products and materials only from an “end-of-life” perspective (limited to the options for managing the product when the consumer with done using it for its primary purpose), it is important to shift thinking toward a lifecycle approach. Reducing the amount of waste generated can be achieved by addressing the processes that go into creating a product or a material, as well as the durability and recyclability of the product itself. This means considering the environmental impacts throughout the life of a product. Doing so can result in a reduction of raw material extraction as well as a reduction of adverse impacts on the environment and energy consumption.

Organic materials such as food scraps comprise such a significant portion of the waste stream, are responsible for a majority of GHG emissions in landfills, and are a valuable resource for various beneficial uses. The Universal Recycling law has prioritized diversion of food scraps through a preferred hierarchy.

Minimize reliance on landfilling. Landfilling of materials is an indication of an inefficient management system. Landfilling is recognized as environmentally problematic and as a waste of natural resources. Beyond current and future environmental impacts from emissions, leachate, and toxins, landfills have a finite lifespan, and constructing additional disposal capacity is becoming more difficult. Yet, almost 25 years after developing a hierarchy that emphasizes waste reduction, reuse, and recycling, Vermonters continue to throw away over 400,000 tons of materials per year.⁶ For this reason and to the extent feasible, move Vermont towards a zero waste future.

Vermont Food Recovery Hierarchy

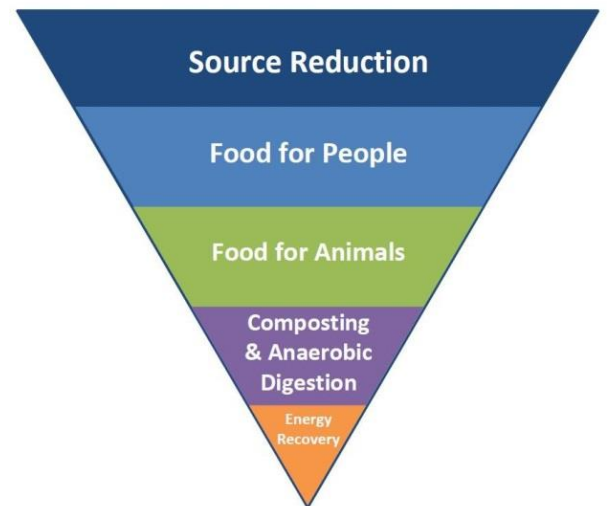


Figure 3. Vermont’s food recovery hierarchy.

Minimize adverse environmental impacts. The benefits of preventing waste go beyond the State’s goals of reducing waste generation and toxicity. Waste prevention helps meet the other State goals of reducing energy use and GHG emissions by decreasing the extraction of natural resources and manufacture of materials with virgin materials. Less consumption of resources reduces the entire burden on the ecosystem. Land, soil, and water are conserved, and the air is less impacted by emissions.

This document – the Materials Management Plan (MMP) – includes recommendations from multiple reports and studies regarding Vermont waste generation and materials management system. The reports and studies include

⁶ Vermont Agency of Natural Resources, *Annual Solid Waste Diversion & Disposal Reports*, (2011), <http://www.anr.state.vt.us/dec/wastediv/solid/DandD.htm>

ANR Solid Waste Report to the State Legislature (2008),⁷ *Life Beyond Garbage: Vermont Waste Prevention and Diversion Strategies* (2008),⁸ the Solid Waste Working Group Report to the Vermont Legislature (2009),⁹ 2011 Diversion and Disposal Reports,² the State of Vermont Waste Composition Study (2013),¹⁰ and the Systems Analysis of the Impact of the Universal Recycling law on Solid Waste Management in Vermont (Systems Analysis).¹¹

MARKET ASSESSMENT

The Universal Recycling law requires an assessment of the feasibility of diverting particular material categories from the landfill. These waste categories are defined as “marketable recyclables, leaf and yard waste residuals, food residuals, construction and demolition residuals, household hazardous waste, and other categories that the Secretary identifies that may be diverted to meet the waste reduction priorities of the Plan.” Concurrent with the feasibility assessment, the law requires that the MMP include “a survey of existing and potential markets for each waste category that can be diverted from disposal.” The following narrative represents this evaluation, or survey, of these materials and markets that may be used to meet the priorities of the MMP.

Marketable recyclables. Traditional marketable recyclables - aluminum cans, plastic containers, paper, glass containers, etc. - are subject to fluctuations in the global market. This is well known to those in the recyclables industry that experienced a market drop in these commodities in 2008. It is not unusual for the saleable rate of these materials to be influenced by economic and political factors outside of Vermont and, increasingly, outside of the United States (U.S.). In the spring of 2013 through the fall of 2013 the international recycling market was shaken as China, a leading importer of recycling shipments, initiated Operation Green Fence, which significantly increased their inspection and rejection of dirty and contaminated loads of recyclables. While this has sent ripples through the recycling industry and supply chain, it has provided some opportunity for U.S. based recycling companies by leveling the playing field for quality and environmental protection standards.

Even with this somewhat unpredictable market, recycled materials are valuable commodities especially as industry moves towards developing products from recycled materials rather than virgin materials. For example, high cost and consumer interest to buy “green” products has influenced the divergence from the use of virgin materials by manufacturers to as much recycled material as possible. This shift in manufacturing towards more recycled content results in an increased market demand for certain materials such as scrap paper and aluminum.

With any commodity, virgin or recycled, the market will exist wherever the price drives that commodity. The plastic soda bottle tossed in a recycling bin in Vermont today may ultimately become carpet in Georgia. The plastic bottle tossed in the same bin tomorrow may become textile fiber in China. Since recyclable materials are brokered, and with a global recycling economy, it is difficult to know where Vermont materials will be marketed and shipped. The 2012 data from the Chittenden Solid Waste District showed paper recyclables being shipped to

⁷ Vermont Agency of Natural Resources, *Solid Waste Report to the Vermont Legislature*, (2008), http://www.anr.state.vt.us/dec/wastediv/solid/documents/Solid_Waste_Report.pdf

⁸ Vermont Waste Prevention Steering Committee, *Life Beyond Garbage: Vermont Waste Prevention and Diversion Strategies*, (2008), <http://www.anr.state.vt.us/dec/wastediv/r3/WPplanning/VT%20Waste%20Prevention%20Report%20May%202008.pdf>

⁹ Solid Waste Working Group, *Solid Waste Working Group Report to the Vermont Legislature*, (2009), <http://www.leg.state.vt.us/reports/2009ExternalReports/240685.pdf>

¹⁰ DSM Environmental Services, Inc. and Mid Atlantic Solid Waste Consultants, (May 2013), *State of Vermont Waste Composition Study*, <http://www.anr.state.vt.us/dec/wastediv/solid/documents/finalreportvermontwastecomposition13may2013.pdf>

¹¹ DSM Environmental Services, Inc. and Tellus Institute, *Systems Analysis of the Impact of Act 148 on Solid Waste Management in Vermont*, (2013), http://www.anr.state.vt.us/dec/wastediv/solid/documents/FinalReport_Act148_DSM_10_21_2013.pdf

recycling facilities in New York and Quebec, and some being exported overseas. Plastics were mainly handled and exported through brokers, while aluminum was sent to a recycling facility in New York, and glass aggregate was down-cycled into road and construction projects here in Vermont.

Leaf, yard, and food residuals. In Vermont, organic materials such as leaf, yard, and food residuals lend themselves to more regional diversion markets. Most leaf and yard residuals that are not managed onsite or landfilled (a fairly small amount, about 3% according to the 2013 Waste Composition Study) are used as fuel (some is being chipped at the McNeil Generation Facility in Burlington), mulch, animal bedding, or in composting. Compared with many marketable recyclables, leaf and yard debris tends to have a low market value, limiting the distances the raw material can be feasibly transported.

Most pre and post-consumer food residuals that are not landfilled are being donated to food pantries, fed to animals, or composted, with a portion used for anaerobic digestion. Of all of these uses, composting is the most common use for these materials in the state. For the most part, composters are paid a tipping fee per ton for accepting and processing food residuals. Additionally, outputs such as electricity and heat (in the case of anaerobic digestion), finished products such as meat or eggs from animals fed on food residuals, or compost from food residuals are valuable and marketable products. As the organics bans and mandates go into effect, food residuals will become more convenient to collect. Having dedicated material diversion will help incentivize development of collection and processing infrastructure. To a lesser extent, this will also be the case for leaf and yard debris, which has the potential to be a convenient carbon feedstock for composting.

Currently, the markets for finished compost are mostly local, although interstate commerce for compost is a growing market. Compost prices vary depending on the quality, grade, and volume of compost purchased. Average prices for one cubic yard of finished compost are typically between \$30 and \$65 each. Vermont has over a dozen active composting facilities, most of which accept and process at least some amount of leaf, yard, and food residuals. The Universal Recycling law will increase the amount of organic materials being composted in the state and make more material available for use in the marketplace. In anticipation of this market development, supporting the continued development of markets for compost will be important to ensure the long term viability of the industry in the state.

Construction and demolition residuals. Construction and demolition (C&D) materials management is more complex. The C&D material stream contains marketable recyclables such as containers and cardboard; reusable building components such as doors, windows, and fixtures; recyclable components such as drywall and asphalt roofing; and fractions of the material stream that can potentially be separated for aggregate, biomass fuel, or landfill cover. Potential markets for C&D materials may be local or regional or, as is the case of marketable recyclables, national or international. Some markets for these materials currently available in the state are the McNeil Biomass Energy Generation Station in Burlington; the nonprofit ReSource that operates three household goods and building materials stores in Burlington, Barre, and Morrisville; and various other similar stores such as the ReCover store and Vermont Salvage in White River Junction. Additionally, a private sector C&D processing facility has been established in Chittenden County. This facility serves as a consolidation point for materials such as drywall, asphalt shingles, clean wood, and other C&D materials, depending on market demand.

Household hazardous waste. Due to their inherent toxicity and threat to human health and the environment, there is a limited market demand for household hazardous waste (HHW) products. Markets related to HHW are predominantly associated with material that has value as fuel such as used oil. Revenue may be received for used oil but most other HHW material is costly to handle, transport, and recycle or dispose. Latex paint which is not a hazardous waste but is collected in some HHW programs can be processed for recycling and marketed. Additional revenues are attributed to the hazardous waste contractor who is paid for removal of the waste and also to the processor of the waste. The processor of HHW charges the contractor a fee based upon type of material and whether it can be recycled for another use. In the case of used motor oil, there is a market to re-blend this fuel

and reuse it for various applications. For other materials such as certain cleaning solvents, the only option is for the waste to be treated and disposed of in a hazardous waste landfill.

One of the most common household hazardous waste products is paint. Programs to recycle unwanted leftover latex paint have been implemented in several states across the United States. One of the earliest examples is in Vermont at the Chittenden Solid Waste District (CSWD). CSWD filters, blends, and resells reusable latex paints collected through their HHW facility and roving events. Through a new statewide paint stewardship program, more latex paint will be captured for CSWD's program and others.

Domestic paint manufacturers will offer limited amounts of recycled latex paint for sale in their retail locations, but will not blend it with their virgin paint, citing that the quality is not as high. There are currently no recycling options for oil based paint, but it is collected through HHW events and facilities and will also be collected as part of the new statewide paint stewardship program. Oil based paint can be processed for fuel blending.

PRIORITIES:

As required by statute, the MMP promotes the priorities established in 10 V.S.A. §6604(a)(1).

IMPLEMENTATION GOALS & OBJECTIVES

In order to meet the statutory priorities of 10 V.S.A. §6604(a)(1) and be responsive to legislatively mandated working groups convened in 2008 and 2009, the Agency has established the following implementation goals and objectives for the MMP:

- Expanded education and outreach to schools, businesses, and the general public
- Extended producer responsibility & product stewardship
- Reduction in the statewide disposal rate (pounds per person per year)
- The reuse, recycling, and composting of materials to reduce the amount needing to be landfilled
- Reduction of toxicity in the waste stream
- Improved availability of statewide infrastructure and services for waste reduction and diversion (strive for convenient, consistent, and cost-effective services)
- Improved measurement and progress of performance standards
- Development of sustainable financial structures to manage materials

Finally, ANR recognizes the importance of partnerships among agencies, industry, local communities, and stakeholders. Maintenance of existing partnerships, as well as fostering new partnerships, is a theme integrated throughout the MMP.

PLAN STRUCTURE

The MMP is organized in two sections, the General and the Material Specific. The General section identifies the overarching goals and action items for sustainably managing materials in Vermont. The Material Specific section is further divided into five chapters that focus on material streams recognized by the Vermont legislature to be of vital importance. These material streams include:

- Recyclables,
- Organics,
- Construction and Demolition Materials,
- Household Hazardous Waste, Conditionally Exempt Generator Waste, Electronic Waste, and Universal Waste
- Sludge, Septage and Miscellaneous Residual Waste.

Recommended actions to improve the management of each of these material streams are presented within the framework of six identified tools of action:

- Public Outreach and Education
- Extended Producer Responsibility & Product Stewardship
- Government Leadership
- Infrastructure Improvements
- Mandates and Disposal Bans
- Performance Standards



Figure 4. Vermont’s standardized recycling symbols developed in partnership with the Act 148 Work Group. The symbols were unveiled in November 2013.

General: Materials Management in Action

While there has been significant progress in the management of disposed materials in Vermont since the passage of Act 78, it is clear that more must be achieved. The purpose of the Materials Management Plan (MMP, or Plan) is to provide a framework for the State and its citizens to prevent waste from being generated, and expand reuse, recycling, and composting efforts to attain Vermont's statewide goals.

Specifically, the MMP outlines the programs and services that will guide the reduction of the amount and toxicity of solid waste in Vermont. Clear and definitive performance standards for both the state and local solid waste management entities (SWMEs) will provide benchmarks to measure progress toward achieving MMP goals.

These performance measures are outlined in tables at the end of this section and are included at the end of every additional material specific section. While the chapters contain six different tools of action, the tables themselves include education and outreach and convenience goals with documentation requirements associated with each that must be completed throughout the planning period by ANR and the solid waste planning entities following approval of the MMP.

To the extent that the content is not required by the Universal Recycling law, only the items contained in the performance standards for each section along with their paired deliverable and deadline need to be completed by the SWMEs. The tools of action contained in each chapter are recommendations that SWMEs may choose to undertake as methods to reduce waste and meet the requirements of the Universal Recycling law and performance standards of this MMP. Those SWMEs that choose not to implement these recommendations will not be penalized but, those that go beyond the performance standard requirements will stand out as leaders in the state.

Public Education and Outreach

Education and outreach are essential aspects of a materials management system to ensure understanding and support of new or existing Vermont programs and laws. Education and outreach efforts will supply essential information that consumers and businesses need to make environmentally responsible choices in their daily lives. A campaign to inform and promote sustainable materials management and the Universal Recycling law will consist of two parts, education in schools and outreach to the general public. ANR will:

1. Conduct sector-specific outreach and training.
ANR will partner with SWMEs, and work to partner with the Agency of Education, School Boards, and Vermont Principals Association to identify and offer elementary and secondary education programs. These programs will be designed to provide age-appropriate information and concepts on sustainable materials management and environmental awareness in Vermont schools. This may include teacher assistance on incorporating sustainable materials management into their educational units. Additionally, SWMEs will offer technical assistance to set up or expand waste diversion programs for each school within their jurisdiction.
2. Educate and engage citizens about the benefits of waste reduction and sustainable materials management. To accomplish this, ANR will work to develop partnerships with public and private organizations to launch thorough public education campaigns with the goals to:
 - a. Influence the behavior of consumers and businesses, and
 - b. Improve awareness and use of sustainable materials management services and practices such as recycling and composting.

Extended Producer Responsibility & Product Stewardship

Extended producer responsibility (EPR) requires that a producer's responsibility for its products and packaging extend to post-consumer management. This shifts the financial and management responsibility, with government oversight, from the public to the consumers and producer, providing incentives to producers to consider the end-of-life management in the design of their products and packaging. Existing Vermont EPR programs include: fluorescent (mercury) lamps and thermostats, electronics, automobile switches, dry cell batteries and paint. A voluntary product stewardship (PS) program collects rechargeable batteries (lead and nickel cadmium) which are landfill banned. The oldest product stewardship program in Vermont is the Bottle Bill, which has been in existence for more than 40 years.

Vermont's EPR programs have been effective in diverting toxic materials from landfills and providing convenient options for Vermonters. In the first year following implementation of the mercury lamp EPR program, 37% of mercury lamps were recycled, which is significantly higher than the national average of less than 5%. In 2012, 25 pounds of mercury were recovered by the thermostat EPR program. As a result of thermostat program, Vermont has the highest per capita rate of recycling in the nation for thermostats. Following implementation of the electronic waste EPR program enacted in 2010, 4.8 million pounds of covered electronic devices were collected during the first year of the program. This exceeds the legislative goal of 3.4 million pounds per year, and it represents a higher per capita rate of collection than any other state. For bottle bill materials, while only 2% of the waste stream, the current rate of return is approximately 75%. No statistics are available yet for Vermont's paint recycling law, which was passed in 2013 and will be implemented in 2014.

However, there are still critical components of the waste stream to consider for management through EPR. For example, the *System Analysis* report notes that over 100,000 tons of paper and packaging materials have been landfilled, even though this is material that could have been captured in the current recycling system. ANR will host a stakeholder process convening during 2014 to direct legislative consideration of additional programs to increase diversion of difficult-to-manage materials and offset the expenses incurred by solid waste management entities and taxpayers.

ANR will evaluate the potential for additional EPR and product stewardship programs, with the assistance of a stakeholder process, as a tool of sustainable materials management. The intent for all EPR and product stewardship is to nurture a shift in the waste management system from one subsidized by the taxpayer to one that places greater emphasis on producers and consumers to drive environmentally sound product design and disposal.

Government Leadership

Government's role in materials management is indispensable in driving proper stewardship of the environment. It is important that state and local government agencies lead by example and implement the sustainable materials management strategies that are promoted within this MMP. Additionally, ANR proposes several steps to remove unnecessary barriers and streamline procedures for SWMEs, institutions, businesses, and individuals that are sustainably managing materials. These steps include:

1. **Reviewing Vermont statutes relevant to materials management.** The objective is to suggest revisions to reflect the updated methods of managing materials in Vermont. The passage of the Universal Recycling law was an early success of this idea. The Universal Recycling law increases expectations, choices, and incentives for thorough materials management that will decrease the amount of waste being disposed, and improve the rate of diversion of valuable materials from landfills.
2. **Proposing a simplified, yet more meaningful, process by which SWMEs report to ANR.** A key element will be the documentation of the performance standards identified in this MMP, as well as the requirements of the Universal Recycling law.

3. **Exploring financial incentives.** Incentives will be explored that will promote the development of materials management infrastructure and services, to further the goals of Vermont’s Universal Recycling law. Funding priorities will include programs, new projects, and upgrades to new and existing facilities that further the objectives of the Universal Recycling law and the Plan.
4. **Reviewing the Environmentally Preferable Purchasing programs** established by the Division of Purchasing & Contract Administration and providing suggestions to improve outdated aspects.
5. **Participating in discussions involving climate change and greenhouse gas (GHG) reductions.** A systems view of materials management – from resource extraction to manufacturing, transportation, use, and end-of-life management will be proposed. A key issue will be the link between disposed materials and GHG emissions. Data from state-specific as well as external studies will be used to explore management options for materials commonly found in Vermont’s waste stream. Attention will be given to potential GHG reduction and avoidance opportunities at the state and local level.
6. **Promoting the use of the Disaster Debris Management Plan (DDMP).** The DDMP is an annex to the State Emergency Management Plan, now in draft form. The DDMP will characterize resource availability and proximity, encourage mutual aid agreements, identify pre-approved Temporary Debris Storage and Reduction Sites (TDSRSs), and explore contracting with pre-qualified debris response contractors in the event of a disaster. The DDMP will identify roles in debris management for the ANR, other State Agencies, Solid Waste Entities, and Municipalities. The DDMP will also provide a framework for organizing the rapid, safe, and cost effective separation, removal, collection, recycling and disposal of disaster related debris; and minimizing debris-related threats to public health, safety, and the environment.
7. **Investigating the benefits and feasibility of adopting servicizing programs.** Servicizing is a business model in which the functionality or service of a product is sold, rather than the product itself. The intent of such programs is to share resources amongst a community and to combine services into one source that can provide regular maintenance, provide the tools or products for use, and replace them when needed. Examples of servicizing include office supply services (similar to Vermont’s state contract with Ricoh) that provide access to reliable multi-function devices (printer, copier, and scanners) without the requirement for the user to maintain its operational status, relocation or replacement, or end-of-life management.

Infrastructure Improvements

Successful implementation of the Universal Recycling law and the sustainable materials management vision is contingent upon infrastructure that can support consistent services throughout the state. ANR is committed to ensuring all Vermonters have safe, consistent, convenient, and cost-effective options for materials management.

1. With emphasis on increasing reuse and recycling, ANR will work with SWMEs and the private sector to improve consistent access to key services across the state. As required by the Universal Recycling law, a comprehensive statewide review has been conducted to identify existing and potential expanded materials management infrastructure. ANR will consider infrastructure needs by looking at the current available capacity of permitted facilities and the projected populations of Vermont communities.
2. Economic incentives such as possible grant funding will be explored and prioritized. Creating incentives and funding opportunities will stimulate the development and expansion of infrastructure capable of managing increases in diverted materials.

Mandates and Disposal Bans

Mandates and disposal bans can drive society to reduce, reuse, recycle, and divert materials to help ensure resources are not wasted. The Universal Recycling law advances Vermont to the forefront of sustainable materials management by banning the disposal of several material types over the next few years, and mandating the collection services for said materials statewide. Mandatory programs at the point of collection and material bans go hand-in-hand to minimize disposal. If disposal bans are utilized to prevent a type of material from being discarded in landfills, then point of collection programs must be in place to accommodate the separated materials. ANR will continue to advance for this approach for other materials that comprise a large portion of the waste stream and those that are toxic. Specifically, ANR will:

1. Provide recommendations and guidance to prepare for, develop, and implement mandatory programs and disposal bans.
2. Improve data collection of waste in Vermont. In order to advance programs and services, data must be collected and analyzed to gauge progress towards meeting reduction and diversion goals. ANR currently requires data collection of certified facilities and provides analysis to assess the effectiveness of materials management throughout the state. To facilitate this, Vermont's Solid Waste Program has launched Re-TRAC Connect, a web-based data management software package (Emerge Knowledge, 2012) that will standardize and streamline the collection, organization, and analysis of data collected from Vermont's certified facilities. ANR will continue to evaluate the potential of this data management system and determine whether it meets Vermont's needs.
3. Provide guidance for variable rate pricing (VRP; commonly called unit based pricing, \$ave As You Recycle, or Pay As You Throw) that municipalities must implement by July 1, 2015. This materials management method links the amount of waste disposal fees that must be charged to the volume or weight of solid waste disposed. Tax subsidies may not be utilized to offset waste disposal fees, as this may 'mask' actual costs and result in a dilution of the financial incentive for which this program is designed. ANR will provide guidance and a model ordinance that can be adopted by SWMEs and municipalities to ensure variable rate pricing programs are implemented by commercial haulers and facilities operating within their jurisdiction.
4. Solid Waste Implementation Plan (SWIP) Review - Pursuant to 10 V.S.A. § 6604, ANR shall publish and adopt a waste management plan that sets forth a comprehensive statewide strategy for the management of waste. Vermont municipalities are required to adopt a SWIP. The SWIPs document the materials management facilities in municipalities and services and articulate how discarded materials will be managed. ANR has established statewide materials management goals and performance standards which are contained in the MMP. Individual SWIPs must be consistent with the MMP as they relate to state goals and performance standards and must describe how each of the performance standards will be met. Municipalities and SWMEs will be expected to prepare and obtain approval of a SWIP within 12 months of the adoption of the MMP. ANR will provide guidance on how to prepare a SWIP. SWIPs approved under the 2006 Vermont Solid Waste Management Plan must be revised to conform to the MMP.

Performance Standards

By developing a set of clear expectations of parties involved in waste management, Vermont will be able to make definitive progress towards its waste reduction goals. Having demonstrable requirements will facilitate the achievement of goals identified in the MMP. Performance standards contained in this MMP were created with explicit legislative authority as established in the Universal Recycling law, and are defined at the end of each material chapter. The standards will not measure progress on every activity outlined in this MMP but rather ensure progress through indicator measurements that integrate many of these activities.

To be successful materials management services need to be consistent throughout the state, convenient to users, and cost-effective. In addition, there must be an increased awareness of the services available to businesses, institutions, and the public through public outreach efforts. As such, the standards set forth in this MMP will evaluate advancement in these two key cumulative measures (convenience and outreach) by both the state and SWMEs to provide an indicator of overall progress.

The overall effectiveness of the programs and services required in this MMP will be determined by evaluating the degree to which each statewide goal was met. Results from MMP implementation can provide essential feedback on the Plan's efficiency, effectiveness, and performance that will direct improvements needed for future materials management plans. Additionally, progress by ANR will also be evaluated on specific elements of education and outreach, and convenience that occur at the statewide level.

The SWMEs will be responsible for meeting a set of standards and deliverables that measure actions applied at a local level. Failure by the SWMEs to meet the standards may result in a determination that a SWME is not in conformance with the MMP.

POSSIBLE ENFORCEMENT ACTIONS

SWMEs found to not be in conformance face consequences that may include:

- a. An enforcement action pursuant to 10 V.S.A. Chapter 201 or 211
- b. The loss of grant eligibility,
- c. Preclusion to secure solid waste management facility certification, and
- d. A requirement to manage all disposed materials out of state.

Performance Standards – General	
Agency-level Standards	Documentation & Deadlines
Statewide Goal	
<p>Vermont will reduce the disposal rate of municipal solid waste (MSW) by 25% from 413,517 tons to approximately 306,772 tons by end of the Plan term. The per capita disposal rate of MSW will be reduced from the current 3.62 lbs. per person per day to 2.69 lbs. per person per day. This will be achieved through implementation of the Universal Recycling law and a variety of new and existing efforts designed to educate and to offer services to Vermont citizens and organizations in the proper management of materials. These programs and efforts form the basis of the General and subsequent specific materials management sections of the MMP.</p> <p>Additionally ANR will seek to increase the statewide diversion rate of all MSW from approximately 36% to approximately 50% with full implementation of the Universal Recycling law requirements. That is expected no earlier than 2020.</p>	<p>Documentation: The disposal and diversion rates of solid waste are posted on the Solid Waste Program website.</p> <p>Deadline: Annually</p> <p>Documentation: A Statewide Waste Composition Study will reflect ability to decrease disposal rate and improve diversion rate of recyclables and compostables.</p> <p>Deadline: Once every five years</p>
<p>Reporting</p> <p>ANR will develop an annual reporting form for solid waste management entities (SWMEs) to use for annual reporting of diversion and disposal rates for their region as it pertains to the materials discussed in the subsequent chapters of the MMP; this form may be developed in ANR’s preferred reporting program. Individual SWME diversion and disposal rates will assist ANR in evaluating SWMEs that require technical assistance to improve program offerings and organization.</p>	<p>Documentation: Diversion and disposal reporting form for SMWE use.</p> <p>Deadline: Within one year of MMP adoption, and reviewed annually thereafter to make necessary adjustments if appropriate.</p>
<p>Education and Outreach</p> <p>ANR will advertise the MMP by:</p> <ul style="list-style-type: none"> • Posting it on the Vermont’s Waste Management Division website within a month of being adopted. • Submitting one newspaper op-ed to a regional newspaper/publication within a month of being adopted, introducing the MMP and how it affects individuals and businesses in the state. <hr/> <p>Within the first year, ANR will implement a state-wide public outreach campaign to inform the residents and businesses of the preferred practices for materials management. This will include information about the impending mandates and bans.</p> <hr/> <p>Within the first year, ANR will identify preferred practices in current school programs, and develop training tools and educational resources for a statewide school waste reduction education plan. Additionally, informational resources will be made available to SWMEs to use in their outreach and education efforts to schools, businesses, institutions, and municipalities.</p>	<p>Documentation: Description and assessment of the outreach programs and efforts made to engage various stakeholders will be documented in the required biannual (once every two years) report to the legislature. The number and type of sectors as well as an estimated number of people will be part of the reported data.</p> <p>Deadline: Biannually</p> <p>Documentation: Compendium of resources to be provided to all SWMEs to then be distributed to the schools with which they work.</p> <p>Deadline: Within one year from the date of MMP adoption</p>

Performance Standards – General

Agency-level Standards

Documentation & Deadlines

ANR will ensure that all SWMEs implement a variable rate pricing system. ANR will present a model program in 2014 to guide SWMEs in the mandated development of a variable rate pricing system.

Documentation: Review each SWME’s variable rate pricing system design and provide technical assistance to improve programs that do not meet ANR guidelines found in the *Variable Rate Pricing Guide*.

Deadline: ANR will release the model and guide within the first year of Plan term and will review and provide assistance with SWME’s VRP systems throughout the Plan term as needed.

Documentation: Model programs will be provided as a guidance document which will be distributed to SWMEs, permitted haulers, and facilities.

Deadline: Within six months of MMP adoption.

Convenience

The Universal Recycling law currently exempts commercial haulers with collection vehicles that have a one ton curbside rating or less. Unless removed from the law, this exemption will allow a subset of commercial haulers to avoid compliance with the recycling and organics collection benchmarks if they meet the one ton exemption. A number of SWMEs require any hauler transporting municipal solid waste for commercial purposes to be registered. To create a level the playing field for all solid waste haulers and facility owners, ANR recommends eliminating the one ton exemption. ANR will work to revise its solid waste management regulations and recommend statutory changes to eliminate gaps that allow haulers collecting solid waste in Vermont to avoid the Universal Recycling law requirements by disposing out of state.

Performance Standards- General		
Solid Waste Management Entity-level Standards		Documentation to ANR & Deadlines
Solid Waste Implementation Plan	Vermont municipalities, either individually or as part of a solid waste management entity (SWME), are required to adopt an approved SWIP within one year from date of MMP adoption. SWIPs document facilities/services and articulate how solid waste will be managed. SWIPs must be consistent with the MMP in overall planning expectations, the state goals, and performance standards.	Documentation: Revised SWIP to reflect the expectations and standards set forth in the MMP. Deadline: Within one year from the date of MMP adoption.
Reporting	SWMEs will track and report diversion rate biannually and disposal rate annually for their region as it pertains to the materials discussed in the subsequent chapters of the MMP. SWMEs must use the report developed by ANR. Report must contain the data for the calendar year and be submitted to ANR using ANR’s preferred reporting program by July 1 st .	Documentation: Report to ANR on ANR provided forms/online documentation method. Deadline: Annually for disposal rate and biannually for diversion rate, by July 1st.
Education and Outreach	Within six months of SWIP approval, each entity will post their approved SWIP on their SWME website.	Documentation: Link to website. Deadline: Within six months of SWIP approval.
	Within three months following MMP adoption, each entity will submit one newspaper article or op-ed piece to local newspaper introducing their SWIP, and how it affects individuals and businesses in entity jurisdiction.	Documentation: Electronic or scanned copies of article. Deadline: Within 3 months of MMP adoption.
	Within six months of SWIP approval, each entity will conduct a survey of constituents on current knowledge; including variable rate pricing, recycling, organics, C&D, HHW/CEG, electronic waste, and universal waste. Conduct the same survey during the last year of the Plan term and assess outcomes. ANR will provide SWMEs with a survey template to create consistent statewide results.	Documentation: Compiled Survey results must be provided on ANR template. Although surveys may be expanded and include questions beyond those included in the template. Deadline: Within six months of SWIP approval

Performance Standards- General	
Solid Waste Management Entity-level Standards	Documentation to ANR & Deadlines
<p>Education and Outreach</p> <p>Each entity will hold 2 public meetings during the SWIP term to get feedback on new and existing programs; the first meeting must be held before the end of the second year of the SWIP term, the second meeting in the fifth year. Strategies to increase attendance should be used such as multimedia announcements at least 2 weeks before the event and again two days before the event. Use of local communication tools such as the Front Porch Forum should be considered as one of the multimedia tools used. Could consider offering door prizes, such as backyard composter.</p> <p>Each entity will implement a multi-media public outreach campaign within the first year to inform the residents and businesses in their jurisdiction of preferred practices for materials management. Include information about the minimum standards of impending mandates and bans, resources available from SWME, and how to contact the SWME.</p>	<p>Documentation: Electronic copies of sign-in sheets; list of questions and concerns addressed at meeting.</p> <p>Deadline: First meeting before end of second year from the date the SWIP was approved. The second meeting shall be during the fifth year from the date the SWIP was approved</p> <p>Documentation: Provide copy of outreach materials, link to website, and any mailing lists to ANR, though direct mailings are not required.</p> <p>Deadline: Within one year of SWIP approval</p>
<p>Each entity will develop and maintain a webpage linked to a homepage for the SWME that lists regional management options for waste materials (A through Z). This webpage must be published within the first year, and remain up-to-date throughout the SWIP term.</p>	<p>Documentation: Link to webpage.</p> <p>Deadline: Within six months of SWIP approval.</p>
<p>Convenience</p> <p>In accordance with statute, adopt and implement variable rate pricing for MSW from residential customers. Having an effective rate setting program gives generators the control, and therefore option to choose to reduce amount of materials disposed, as well as opt for a subscription based system or a drop-off option.</p> <p>SWMEs will collect contact information for all commercial solid waste haulers and a list of services they provide that are operating within their region and will update that information annually. SWMEs may elect to establish licensing or registration programs.</p>	<p>Documentation: Description of program, including how haulers and facilities have been brought into compliance and copies of any ordinance passed.</p> <p>Deadline: July 1, 2015</p> <p>Documentation: List of commercial haulers and contact information for region.</p> <p>Deadline: July 1, 2015 and annually by July 1st for the duration of the SWIP.</p>

RECYCLABLES

Although recycling is third in the order of importance according to the classic waste hierarchy (i.e. reduce, reuse, and recycle), it remains a key component of materials management. Recycling products and packaging has many benefits, including:

- Conservation of limited natural resources,
- Reduction in greenhouse gas (GHG) emissions by minimizing extraction, processing, and transportation of raw materials, and manufacturing materials already in existence,
- Decrease in energy consumption,
- Reduction in landfilling and incineration, and
- Financial gain from selling recyclables as commodities.
- Increase in employment opportunities

Public Education and Outreach

Increasing convenience and improving the communication of what can and cannot be recycled is essential to increasing the participation rate. Education and outreach may begin in our schools but the value and importance of these efforts extends to other sectors. Waste prevention relies on an informed citizenry to be successful. The general public and businesses need simple and consistent information about why waste prevention is important and how to actually go about achieving it. Outreach, education, and technical assistance are the cornerstones of effective waste prevention. To accomplish this,

1. ANR will collaborate with other groups and state agencies to develop a waste reduction program for schools throughout the state that will cover recycling, organics source reduction and diversion, and toxics reduction.
 - a. Tools and resources will be developed or existing curricula (available from SWMEs, other states, or the USEPA) for teachers to impart the fundamentals of waste management at home and school.
 - b. The solid waste management entities (SWMEs) will provide assistance as needed in the establishment and maintenance of waste reduction programs and to connect schools with available resources. ANR recommends that such a program include:
 - i. A designated Waste Reduction Advisory Committee. The group may be comprised of students, teachers, administrative staff, facilities/cafeteria staff, and parents that make decisions and recommendations for the school recycling program and will ensure sustainability of the waste reduction program.
 - ii. A written school policy stating the commitment to a school-wide recycling program. This could include an initial waste evaluation completed by the SWME with school-specific performance measures for increased rates of diversion, source reduction, and reduced rates of disposal. Costs to the school should be tracked in order to show cost savings as a result of waste reduction.
2. The Universal Recycling law requires that recycling services be offered along with trash collection and effective July 1, 2015 bans mandated recyclables from landfill disposal. ANR will educate and inform the commercial sector and the general public about the recycling ban. Efforts will target facilities, haulers, and residents, and will be performed in conjunction with the SWMEs.
3. ANR supports efforts to promote access to recycling away from home. All public facilities are required by the Universal Recycling law to offer access to recycling where there is access to trash disposal. SWMEs will assist

with this aspect of recycling by working to educate consumers, businesses, and organizations on the benefits of recycling away from home.

4. ANR supports efforts for recycling and composting to be offered at events. ANR proposes to offer waste reduction tools for events to SWMEs. SWMEs will provide technical assistance to event planners in their region to increase diversion efforts.

Extended Producer Responsibility & Product Stewardship

Vermont's EPR programs have been effective in diverting toxic materials from landfills and providing convenient options for Vermonters. However, there are still critical components of the waste stream to consider for management through EPR. ANR will host a stakeholder process over the next year to direct legislative consideration of additional programs to increase diversion of difficult to manage materials and offset the expenses incurred by SWMEs and taxpayers. Targeted products will be determined through internal research and a stakeholder process.

Extended producer responsibility and product stewardship in Vermont has historically targeted products with hazardous components. Vermont's beverage container redemption program is an example of product stewardship of non-hazardous products. ANR will work with stakeholders to carefully consider the potential for additional EPR and product stewardship programs.

Government Leadership

Each state agency, in cooperation with the Department of Buildings and General Services (BGS) and with assistance from the Waste Management and Prevention Division, will continue to enhance programs for the collection of all mandated recyclable materials generated in state offices and institutions. A clear and consistent recycling infrastructure will be established throughout state buildings to increase and sustain recycling rates. A strong demonstration of 'lead by example' will result in achieving rates that are higher than the statewide average.

1. Several factors influence the success of a recycling program, such as the placement of bins throughout each office space. For example, in the ANR space at National Life, fewer trash containers were distributed throughout work spaces while recycling bins were placed with greater frequency and a wider distribution. With aid from clear and well placed signage and container labeling, the goal is to have many more options to recycle rather than dispose of waste. Once the effectiveness of this pilot has been tested, to the extent feasible ANR will work with BGS to promote a similar system in other state office buildings. This effort will include encouraging each state office building or complex to establish a voluntary Waste Reduction Advisory Committee to educate other staff, encourage diversion of recyclables and organics, troubleshoot issues, and act as a point of contact to ANR to help maintain and track diversion efforts over time. Opportunities will be explored to include such things as recurring training opportunities provided through Human Resources for employees wishing to become more involved in the recycling program in their office or agency.
2. Inconsistency in recycling messages and practices causes confusion and indifference, and therefore results in mistakes, contamination, and low capture rates. Standardization of bins and bin labels in all state buildings can greatly enhance awareness and reduce confusion. ANR will coordinate with BGS where feasible to evaluate and complete this effort in time to meet the legislative requirement of the Universal Recycling law to provide parallel collection in public buildings or on public land by July 1, 2015.
3. ANR will coordinate with BGS where feasible to evaluate the efficiency of two different collection programs in state offices: single stream and separated recyclables. Cost, contamination, and diversion rates will be key factors in consideration.

4. ANR will work with state purchasing officials to increase the procurement of products with post-consumer recycled material (i.e., 'closed loop recycling').
5. Establish convenient recycling opportunities in all public spaces in state owned buildings and lands. At the very minimum, parallel collection must be available by locating a recycling container next to every trash container.

Infrastructure Improvements

Increasing recycling rates will require improved and additional infrastructure and services. Convenience is a major factor in getting businesses and residents to divert waste materials. Priority will be placed on developing recycling opportunities in underserved parts of the state.

1. ANR hired a consultant to perform an analysis of recycling center locations and infrastructure including Material Recovery Facilities, transfer stations, and other opportunities to aggregate recyclables. This information is available in the Systems Analysis.
2. Existing gaps in current infrastructure will be addressed through the Universal Recycling law implementation of mandates and disposal bans. ANR will work with SWMEs, the private sector, haulers, and economic development agencies to address these gaps through education, infrastructure expansion, and, when necessary, enforcement.
3. ANR will promote available internet databases for materials exchange in Vermont and around New England. Materials exchange databases include the Vermont School and Property Exchange System (SPEX)¹², the Vermont Buildings and General Services Surplus Property website which sells a variety of materials¹³, and the Reuse Marketplace¹⁴.

Mandates and Disposal Bans

The 2012 data evaluated in the Vermont Waste Composition Study (2013) revealed that 39% of the residential municipal waste stream (MSW) was recyclable and 44% of the industrial, commercial, and institutional (ICI) waste stream was recyclable. This shows the estimated amount of recyclables sent for landfilling comprises almost half of the waste stream. In addition, statewide the 2011 Diversion and Disposal Report shows the total **diversion rate** for combined residential MSW and ICI waste as 36%.¹⁵ Both calculations show a need for increased diversion. Since traditional recyclables, such as paper, plastic, aluminum, cardboard, and glass, have established or growing markets and have the potential to be recycled well beyond existing levels, ANR's goal is to increase the total diversion rate from 36% to 50%.

The recovery rate is different from the diversion rate. Recovery rate is used when referencing particular segment of materials generated, such as recyclables. A diversion rate is the amount of materials kept from the landfill out of the entire amount of material types generated. The diversion rate includes management strategies such as reuse and composting, while the recovery rate refers to recyclables only. Refer to Glossary of Terms for further explanation.

1. The Universal Recycling law establishes statewide disposal ban on traditional recyclable materials effective July 1, 2015.

¹² School Property Exchange System (SPEX). <http://www.spexvt.com>.

¹³ VT Buildings and General Services. Surplus Property. http://bgs.vermont.gov/business_services/surplus.

¹⁴ The Reuse Marketplace. <http://www.reusemarketplace.org/>.

¹⁵ 2011 is the year for which Vermont diversion and disposal data was used for the *2013 Waste Composition Study*, and the *Systems Analysis of the Impact of Act 148 on Solid Waste Management in Vermont, Final Report*. October, 2013.

This will include: Aluminum and steel cans; aluminum foil and aluminum pie plates; glass bottles and jars from foods and beverages; polyethylene terephthalate (PET) plastic bottles or jugs; high density polyethylene (HDPE) plastic bottles and jugs; corrugated cardboard; white and colored paper; newspaper; magazines; catalogues; paper mail and envelopes; boxboard; and paper bags.

2. The Universal Recycling law mandates a parallel system of waste collection. This will require residential curbside collection to include recyclables for no extra fee. Haulers can charge for commercial collection. This option of parallel collection services will also be required at all transfer stations. (10 V.S.A. §6607a (g)(1)(A); 10 V.S.A. §6607a(h); and 10 V.S.A. §6605(j)(1).

Performance Standards- Recyclables	
Agency-level Standards	Documentation & Deadlines
Statewide Goal	
<p>Based on data from the 2013 Waste Composition Study and the 2011 Statewide Diversion and Disposal report, and the Systems Analysis, the current materials recovery rate for recyclables is approximately 48%. Materials included are: fibers, aluminum, steel cans, plastics and glass. According to the Systems Analysis, the recovery rate is projected to increase to 63% through the implementation of the Universal Recycling law. This increase in the recovery rate for recyclables will result from several actions on “mandated recyclables” that will go into effect over the next few years, but also accounts for the portion of potentially recyclable materials that is NOT included in the definition of “mandated recyclables.” For example, ANR will encourage the diversion of textiles from the waste stream by requiring that convenient disposal options exist in each solid waste management entity (SWME).</p>	<p>Documentation: An analysis of the volume and nature of wastes disposed of in Vermont Deadline: The 5-year revision of the MMP.</p>
<p>Education and Outreach</p> <p>Within the first year, ANR will implement a statewide public outreach campaign to inform the residents and businesses of the preferred practices for recyclable materials, including information about the impending disposal ban of mandated recyclables and will work with SWMEs to develop consistent messaging. Components of this campaign will provide tailored information for sectors with specific recycling issues.</p>	<p>Documentation: Description and assessment of the outreach programs Deadline: Biannual report to the legislature.</p>
<p>Within the first year, ANR will identify preferred practices in current school recycling programs, and develop training tools and educational resources for a statewide school waste reduction program.</p>	<p>Documentation: Compendium of resources to be provided to SWMEs to then be distributed to the schools with which they work. Deadline: Within one year of MMP adoption</p>
<p>Convenience</p> <p>Ensure all municipal solid waste facilities accept mandated recyclables for collection by July 1, 2014 (this includes both private and publicly owned and operated facilities).</p> <hr/> <p>Ensure all commercial municipal solid waste haulers offer curbside collection of mandated recyclables by July 1, 2015.</p> <hr/> <p>Ensure that recycling containers are provided along with waste containers at public spaces owned or controlled by municipal or state government by July 1, 2015.</p>	<p>Documentation: Continue to offer current list of certified facilities and haulers in Vermont. Work with ANR’s Enforcement Division to ensure all certified facilities and haulers are in compliance. Report to legislature on services offered in Vermont. Deadline: July 1, 2014 for facilities; July 1, 2015 for haulers and for public space recycling.</p>

Performance Standards- Recyclables

Solid Waste Management Entity-level Standards

Documentation to ANR & Deadlines

Education and Outreach

The goal of this standard is to increase the number of schools that are recycling in compliance with the Universal Recycling law. All schools are expected to comply with the Universal Recycling law and SWMEs are expected to provide guidance and assistance to schools on a continual basis. Work with schools to implement school-wide waste reduction programs (covering recyclables, organics, and HHW) helping to ensure compliance with public space recycling requirements and that materials diverted meet quality control standards set by processing facilities used. Prioritize working with those schools that do not have such programs in place. Such a program could include a waste evaluation conducted by the solid waste management entity (SWME), the formation of a committee, a formal policy, a way to measure the effects of the program on waste composition and amount reduced/diverted, and potential connection to available resources at state agencies. SWMEs will work with at least 10% or 2 schools (whichever is greater) within their jurisdiction each year—, ensuring that at least 50% of the schools in their jurisdiction are reached by the end of the SWIP term. SWMEs will continually conduct the same percentage of direct contact with schools to ensure the effectiveness of existing and established waste reduction programs.

Documentation: List of schools contacted and visited and the status of their compliance with the Universal Recycling law requirements (e.g. schools involved in recycling efforts/program); and informational materials provided.
Deadline: Annually, by July 1st.

Implement an ongoing multi-media public outreach campaign to inform the residents and businesses of the preferred practices to recycle materials. Include information about the disposal ban of mandatory recyclable materials. Components of this campaign will provide tailored information for sectors with specific recycling issues.

Documentation: Provide copy of outreach materials, link to website, social media, ads placed, events held/attended, and any mailing lists to ANR, though direct mailings are not required. Provide list of solid waste facilities and haulers operating within region.
Deadline: Annually, by July 1st.

Convenience

The goal of this standard is to increase the number of businesses/institutions (hospitals, nursing homes, colleges, correctional facilities, and other large waste generators) that are recycling in compliance with the Universal Recycling law. All businesses, institutions, and residents are expected to comply with the Universal Recycling law and SWMEs are expected to provide outreach on a continual basis. Conduct outreach to at least 2% or 20 businesses/institutions (whichever is greater) in the region per year to increase their recycling and access to recycling in their public spaces. This could include in-person or phone and email outreach regarding

Documentation: List of businesses and institutions contacted or visited and the status of their compliance with the Universal Recycling law requirements and informational materials provided.
Deadline: Annually, by July 1st.

materials banned from disposal, waste reduction resources available, waste evaluations, and green certification programs. Prioritize working with those businesses and institutions that do not have such programs in place and who generate large quantities of recyclables. SWMEs will have reached at a minimum at least 10% of the businesses and institutions in their region by the end of the SWIP term.

Provide technical assistance for waste reduction at public and private events (e.g., festivals, craft shows, weddings, parties, sporting events). Work with haulers and event organizers on signage and collection containers to ensure adherence with landfill bans.

Documentation: Post event waste reduction information, signage, and posters on SWME website. Provide ANR with a list of events assistance was provided to and that took advantage of the outreach materials and assistance provided.

Deadline: Annually, by July 1st.

SWMEs will include options for textile reuse and recycling in their SWIP. Collection locations can be privately or publically owned, however, if the only collection location closes or decides to cease collection during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME is responsible for providing collection and will provide a collection option for its residents. SWMEs will provide outreach surrounding the collection of textiles with a focus that textile recycling is not limited to usable clothing.

Documentation: List at least one permanent collection location for the reuse and/or recycling of textiles per SWME region on SWME website. Textile collection must include: rags, shoes, all linens and clothing. SWME shall also assist with the planning of at least one communitywide Drop and Swap Event for usable clothing or other collection option if no other option for textile reuse and/or recycling exists in their jurisdiction year round.

Deadline: Annually, by July 1st.

ORGANICS

The general term “organics” refers to material derived from living organisms such as leaf and yard debris, food scraps, clean wood, and paper and paperboard products (note: although considered organic, paper and paperboard products are most often managed as recyclables, and are addressed in the recycling chapter of this Plan). According to the USEPA, organic materials (food scraps, yard debris, and clean wood) are the largest single component of the total MSW stream in the United States (before diversion via recycling and composting). Even after diversion through recycling and composting, organic materials make up approximately 40% of MSW discards.¹⁶ The State of Vermont Waste Composition Study (2013) found that 28% of residential MSW disposed (after recycling and composting) and about 18% of industrial, commercial, and institutional (ICI) materials disposed were organic material.

Keeping organics out of landfills saves landfill space and significantly reduces methane gas—a greenhouse gas that can be 21 times more damaging than carbon dioxide.¹⁷ Organics diversion promotes job creation in composting and anaerobic digestion industries. Capturing organics also saves valuable natural resources for uses such as human and animal food consumption, food production through use of compost as a fertilizer, and energy generation through anaerobic digesters.

There are several ways to reduce the amount of organics entering the waste stream. Available methods include source reduction, donation, and diversion through animal feed, composting, and anaerobic digestion. However, several barriers – both perceived and real – need to be addressed to successfully minimize the amount of organic material entering landfills.

Key barriers to organics diversion include:

- Assumption that separation or composting will be dirty or produce odors,
- Costs for collection and time to source separate, and
- Infrastructure (organics management facilities and haulers offering organics collection services).

First, dispelling myths that food scrap separation and composting is unsanitary is a priority. . This will require education and outreach about home composting and other uses, as well as careful and well managed hauling services that help food scrap generators mitigate odors, avoid attracting pests, and help prevent trash contamination of food scraps.

Second, collection services come at a cost and source separation requires extra time and attention to keep food scraps free of trash. Food-based businesses have an opportunity to reduce their trash costs by diverting recoverable food to feed hungry people, to feed animals, or for composting or anaerobic digestion. Haulers are charged a tipping fee for the weight of landfill-bound waste they dispose of from customers. If organics are removed from a customer’s trash dumpster, the hauler has a significant weight savings, which saves them – and their customers – money on tipping fees. Some may also find cost savings on trash by reducing the size of their trash containers or the frequency that they are collected.

Lastly, the state currently lacks adequate and critical infrastructure, including organic management facilities and collection and hauling services, to handle the anticipated additional organic materials diverted through the Universal Recycling law. The Systems Analysis projected a need for off-site organics processing of 43,662 tons per year once the Universal Recycling law takes effect. Further, the report projects a current processing capacity (via existing composting facilities and animal feeding on farms) of approximately 22,000 – 35,000 tons per year.

¹⁶ US Environmental Protection Agency, *Municipal solid waste generation, recycling, and disposal in the United States: facts and figures for 2011*, (May 2013), (USEPA530-F-13-001),

http://www.epa.gov/osw/nonhaz/municipal/pubs/MSWcharacterization_508_053113_fs.pdf

¹⁷ Houghton, J.B.; Meira Filho, L.G.; Callander, B.A.; Harris, N.; Kattenberg, A.; Maskell, K., Intergovernmental Panel on Climate Change, *Climate Change 1995: The Science of Climate Change.*, 2 (1996).

The Universal Recycling law will eventually require solid waste haulers to offer organics collection services and, by banning food scraps and leaf and yard debris, will help create a demand for new organics management facilities statewide. This will provide new organic diversion options for food scrap generators and new business and job opportunities for haulers and organics management facilities.

The Universal Recycling law requires food scraps to be managed according to a food residuals management hierarchy that reflects the management priorities promoted by the USEPA:

1. Reduction at the source,
2. Diversion for food consumption by people,
3. Diversion for agricultural uses, including consumption by animals,
4. Composting, nutrient management, & digestion, and
5. Energy recovery.

Emphasis on reducing food waste through changes in food purchasing and preparation or repurposing is a major element of managing this waste stream. Despite technological advances such as active landfill gas collection, anaerobic digestion, and composting, the most efficient and environmentally sustainable alternative is reducing food waste at the source.

Following the Food Recovery Hierarchy (see Figure 3) in the Universal Recycling law, preference is given to capturing and directing good, edible food to feed hungry people. Food insecurity and hunger is an issue in Vermont as it is in other parts of the world. To the extent feasible, ANR and SWMEs should promote diversion of edible food to feed hungry people prior to considering other options lower on the food recovery hierarchy.

If the food cannot be captured to feed hungry people, consideration should be given to the feasibility of feeding food scraps to animals. While feeding pigs is an option there are restrictions to this practice and Vermont Agency of Agriculture guidance is available to explain these restrictions. Feeding chickens is also an option in use by commercial composters, farmers, and residents to retain the nutrient value of food scraps. If feeding animals is not an option, food scrap generators should utilize composting or anaerobic digestion to manage these materials.

These levels of the hierarchy indicate that organic materials are a valuable resource and should not be wasted by landfilling. Careful management of food, first by minimizing food waste and then by separating and managing food residuals, has significant economic and environmental benefits.

Organic materials that have been processed through composting can be used as a nutrient-rich soil amendment. Compost increases the nutrient content of soils, enhances soil structure, and improves moisture holding capability. The basics of composting, even home (“backyard”) composting, are relatively straight forward. Organic materials destined for compost facilities will need to be free of contamination (trash and non-compostables) to produce a marketable end product. Options for composting range in size from home composting to neighborhood and community gardens to commercial small-to-large scale composting facilities (on or off farms).

Home composting has been practiced for generations as a way to turn kitchen, yard, and garden debris into a low cost natural fertilizer. For many years, Vermont solid waste management entities (SWMEs) have provided reduced-cost composting bins to encourage home composting.

Most commercial composting of organics is accomplished through facilities regulated by ANR. Currently, there are approximately 20 such facilities in Vermont.

Anaerobic digestion is an alternative technology to composting that is gaining traction. Anaerobic digesters break down organic material in the absence of oxygen to create “biogas.” Typical biogas is approximately 60% methane and can be used to produce electricity and heat.¹⁸ Byproducts of the digestion process are valuable as well. The residual solids, or “digestate,” can be used as a soil amendment or as animal bedding (the Vermont Agency of Agriculture, Food, and Markets should be consulted for guidance before using digestate from food scraps as animal bedding). There are close to 20 anaerobic digesters operating mainly on Vermont farms, and more are in the design phase. Anaerobic digestion has been an important component of processing sludge and septage at wastewater treatment facilities. Currently, there are 13 anaerobic digesters operating at wastewater treatment facilities in Vermont.

Public Education and Outreach

A successful organics campaign will include creating an outreach and educational strategy designed to increase awareness of the benefits of organic waste reduction and the requirements and bans associated with the Universal Recycling law for different stakeholder groups.

1. ANR will collaborate with other groups and agencies (including the School Board Association, the Vermont Superintendents Association, the Vermont Principals Association, the Vermont Agency of Education, and Vermont State Colleges) to develop a waste reduction program for schools that cover recycling, organics source reduction and diversion, and toxics reduction.
 - a. Tools and resources will be developed or existing curricula utilized for teachers to impart the fundamentals of waste reduction at home and school..
 - b. The SWMEs will provide assistance as needed in the establishment and maintenance of a school-wide waste reduction program and to connect schools to available resources. ANR recommends that such a program include:
 - i. A designated Waste Reduction Advisory Committee. The group may be comprised of students, teachers, administrative staff, facilities/cafeteria staff, and parents that make decisions and recommendations for the school organics program and will ensure the sustainability of the waste reduction program.
 - ii. A written school policy stating the commitment to a organics program. This should include an initial waste evaluation completed by the SWME with school-specific performance measures for increased rates of organics diversion, source reduction, and reduced rates of disposal. Costs to the school should be tracked in order to show cost savings as a result of waste reduction.
 - iii. A method of tracking waste diversion such as recording weekly gallons or pounds of food scraps diverted, with recurring reviews of progress made and program areas needing to be strengthened.
2. ANR will educate and inform the commercial sector (in collaboration with the Vermont Department of Health) and the general public about the benefits of reducing food waste and options for diversion. Efforts will target each sector (generators, haulers, processors, and end-users), and will be performed by the SWME and other

¹⁸ Vermont Agency of Agriculture, Food, and Markets, *Anaerobic Digestion Technology*, (2013), <http://216.92.55.88/energy/anaerobic/index.html>.

associations. Information about current and potential opportunities presented by the ban on organics and other organics requirements of the Universal Recycling law will be distributed to each sector.

3. Accepted Compost Practices (ACP) developed by ANR in collaboration with compost professionals and SWMEs shall be promoted statewide.
4. ANR will promote source reduction, such as EPA's Food Too Good to Waste¹⁹ pilot program, as well as food "rescue" and donation programs.

Extended Producer Responsibility & Product Stewardship

While ascribing end-of-life responsibility for traditional recyclables through EPR and product stewardship can be relatively straightforward, it's not as easy when it comes to organic materials such as food scraps or leaf and yard debris. The challenge is that there are many different levels at which organic materials are generated and distributed. There are also a number of different strategies for the management of organic materials. Approaches such as source reduction, redistribution, and diversion (e.g., composting and energy recovery) become significant aspects of stewardship leading to the sound management of organic wastes.

Some products that make their way into food scraps and other organics can be particularly challenging for organics managers and may be worthy of consideration for Product Stewardship programs. Persistent herbicides, namely those developed to control broad leaf plants, have negatively impacted many composters causing the compost they produce to stunt plant growth rather than encourage it. Biodegradable/Compostable products such as bags, cups, bowls, plates, packaging, and utensils have also caused issues over the years. Early generation so-called "biodegradable" plastics bags were simply regular plastic bags that would photo-degrade overtime when exposed to sunlight. This resulted in tiny particles of plastic littered throughout a compost pile, a significant concern for organics managers. More recently a compostable certification program run by the Biodegradable Products Institute (BPI) in collaboration with the US Composting Council (USCC) has developed standards (ASTM D6400 for films and ASTM D6868 for packaging) that help provide assurance to consumers, businesses, and organics managers of true compostability.

Government Leadership

ANR will work with BGS where feasible to evaluate and promote a "State Offices Organics Program" that could be accomplished with a three-pronged approach:

1. Each state office building or complex will be encouraged to establish a voluntary "sustainability" or "green team" to educate other staff, encourage diversion of recyclables and organics, troubleshoot issues, and act as a point of contact to ANR to help maintain and track diversion efforts over time. Recurring training opportunities may be provided through the Human Resources training programs for employees wishing to become more involved in the organics program in their office or agency.
2. Organics will be diverted from the waste stream in state and local government buildings by the end of the Plan term. Buildings that are utilized in part or in whole by the Agency will serve as a pilot, where organics diversion systems and preferred practices can be tested and optimized.
3. ANR will encourage state agencies to use compost produced in Vermont in landscaping applications such as grounds, road easements, and medians. Not only will this close the loop in diverting organics from landfills, it reduces the need for pesticide and fertilizer use. This Environmentally Preferred Purchasing (EPP) by the state will also stimulate the market by indicating State confidence in the numerous benefits compost provides as a soil amendment for landscaping and other uses.

¹⁹ The West Coast Climate & Materials Management Forum. Food: Too Good to Waste. <http://westcoastclimateforum.com/food>.

ANR will also develop a web-based, interactive map of food scrap generators and certified facilities capable of accepting organic materials with the purpose of assisting generators with finding and connecting with facilities and resources to help them divert organic material according to the phased in requirements of the Universal Recycling law. In addition to the map, ANR will provide a list of current organics haulers and collection and composting programs around the state on the DEC website.

ANR will conduct outreach to a wide array of organics stakeholders and develop partnerships and connections with various organizations to support the implementation of this new law. To this end, ANR has already established the Vermont Organics Partnership to disseminate and share information, establish priorities, and encourage action and participation by other agencies and organizations that can help with implementation and outreach. ANR is also currently participating in a number of active stakeholder groups including the Act 148 Working Group and the Farm to Plate Nutrient Management Task Force, now called the Food Cycle Coalition.

Infrastructure Improvements

An auxiliary benefit of government leadership in organics recovery will be to provide incentives to expand and improve organics management and collection infrastructure throughout the state. Convenient access to organics management facilities can significantly influence participation rates.²⁰ Currently, many areas in Vermont are without such a facility. While backyard composting is a viable option for many Vermonters, there is a need for more centralized small to large-scale organics management facilities to process other residential organic material and high volumes of organics from the commercial sector.

Building effective statewide infrastructure for organics management in Vermont will require site development, comprehensive management plans, modified hauling systems, widespread participation in organics diversion and collection, an increase in the availability of affordable carbon-based feedstocks, and an increasing market demand for compost. The Universal Recycling law required an assessment of facilities and programs necessary at the state, regional, or local level to achieve the priorities and the goals established in the MMP. The Systems Analysis, discusses the need for additional organics management facilities in the state, including small to large composting facilities, on-farm composting and animal feed operations, and anaerobic digesters (on and off farm). ANR promotes a diversity of management options using the food residuals management hierarchy established through the Universal Recycling law. To the extent feasible, ANR will work to encourage communication amongst various stakeholders that results in the most strategic and sustainable investments in organics management infrastructure.

Existing infrastructure includes the Vermont Food Bank, which redistributes food that is not saleable but remains consumable. This non-saleable food from growers, retailers, manufacturers, and suppliers is collected and distributed to those in need around the state. Still, according to the USEPA, the majority of non-saleable food is currently disposed of or composted, rather than redistributed. ANR will work with the Vermont Food Bank and other organizations as able to increase awareness and education about food rescue options. At minimum ANR will do this through its website and may conduct direct outreach or partner with other groups on similar outreach efforts to large manufacturers, supermarkets, wholesalers, farmers, food brokers, restaurants, caterers, corporate dining rooms, hotels, universities, and other food preparation and service establishments.

²⁰ Mckenzie-Mohr, Doug, *Fostering Sustainable Behavior*, New Society Publishers, (2011), <http://www.cbsm.com/pages/guide/preface/>.

Mandates and Disposal Bans

The Universal Recycling law requires a phased-in approach of organics diversion over time. Disposal bans will be in effect on leaf, yard, and clean wood debris by July 1, 2016, and on all food residuals by July 1, 2020. By instituting phased-in diversion on organics based on volume generated, and by requiring parallel collection of these materials at the same location where trash is collected, more of these materials can be diverted from disposal. The Universal Recycling law establishes a series of dates by which generators of organic materials must properly manage organic materials.

The Act requires larger food scrap generators to divert food scraps according to food residuals management hierarchy if a certified facility is within 20 miles, phased in over time by:

- July 1, 2014 for generators of more than 104 tons/year;
- July 1, 2015 for generators of more than 52 tons/year;
- July 1, 2016 for generators of more than 26 tons/year;
- July 1, 2017 for generators of more than 18 tons/year; and
- By 2020, all food residuals, including that from households, must be diverted with no provision for distance.

Performance Standards- Organics		
Agency-level Standards		Documentation & Deadlines
Statewide Goal		
<p>Vermont will reduce the disposal rate of organics from 94,660 tons to 63,817 tons (a 33% reduction) by the end of the Plan term. This figure was developed using projections for organics diversion and disposal for the year 2019 from the Systems Analysis. The 2013 Waste Comp. Study estimated 94,660 tons of organics were disposed in 2013.– By 2019, that number is estimated to have decreased to 63,817 tons assuming that 30,843 tons of organics are now being diverted as a result of the Universal Recycling law, the MMP, and SWMEs’ SWIPs (30,843 tons/94,660 tons = 33% reduction in disposal rate for organics).</p> <p>Additionally ANR will seek to increase the statewide diversion rate of all MSW from approximately 36% to approximately 50% with full implementation of the Universal Recycling law requirements. That is expected no earlier than 2020.</p>	<p>Documentation: An analysis of the volume and nature of wastes disposed of in Vermont; additionally, ANR will monitor organics diversion amounts through quarterly and annual diversion and disposal reports.</p> <p>Deadline: Included in the 5-year revision of the MMP; annual diversion and disposal reports</p>	<p>Documentation: ANR will compile information on current organics management facilities operating in the state. This effort will be done in collaboration with the Vermont Agency of Agriculture, Food and Markets.</p> <p>Deadline: Annually</p>
<p>Education and Outreach</p> <p>Within the first year, ANR will implement a state-wide public outreach campaign to inform the residents and businesses of the preferred practices for organic materials, including information about the impending disposal ban of organic materials and the food residuals hierarchy. Components of this campaign will provide tailored information for sectors with specific organics issues. ANR will work with various agencies and organizations to distribute information and education as widely as possible. This would include, but not be limited to, website materials, newsletters, mailings, and presentations at statewide, regional, and local stakeholder meetings.</p>	<p>Within the first year, ANR will identify preferred practices in current school organics programs and develop training tools and educational resources for a statewide school waste reduction program.</p>	<p>Documentation: Description and assessment of the outreach programs will be documented.</p> <p>Deadline: Biannual report to the Vermont legislature.</p> <p>Documentation: Compendium of resources to be provided to all solid waste management entities (SWMEs) to then be distributed to schools with which they work.</p> <p>Deadline: Within one year of MMP adoption</p>
<p>Convenience</p>	<p>Ensure all solid waste facilities offer collection of leaf and yard debris by July 1, 2015.</p>	<p>Documentation: Continue to offer current list of certified facilities and</p>

Performance Standards- Organics	
Agency-level Standards	Documentation & Deadlines
Ensure all solid waste facilities offer collection of food residuals by July 1, 2017.	<p>haulers in Vermont. Work with ANR's Enforcement Division to ensure all certified facilities and haulers are in compliance. Report to legislature on services offered in Vermont.</p> <p>Deadline: Biannual report to the Vermont Legislature; July 1, 2015 for facilities; July 1, 2016 for leaf and yard; and July 1, 2017 for food residuals.</p>
Ensure all haulers offer curbside collection of leaf and yard debris by July 1, 2016.	
Ensure all haulers offer curbside collection of food residuals by July 1, 2017.	

Performance Standards- Organics	
Solid Waste Management Entity-level Standards	Documentation to ANR & Deadlines
<p>Education and Outreach</p>	<p>The goal of this standard is to increase the number of schools that are diverting organics in compliance with the Universal Recycling law. All schools are expected to comply with the Universal Recycling law and SWMEs are expected to provide guidance and assistance to schools on a continual basis. Work with schools to implement a school-wide waste reduction program (covering recyclables, organics, and HHW) helping to ensure that materials diverted meet quality control standards set by processing facilities used. Prioritize working with those schools that do not have such programs in place. Such a program could include a waste evaluation conducted by the solid waste management entity (SWME), the formation of a committee, a formal policy, and a way to measure the effects of the program on waste composition and amount reduced/diverted. Waste evaluations could be utilized to establish baseline data for each school to measure progress. SWMEs will work with at least 10% or 2 schools (whichever is greater) within their jurisdiction each year, ensuring that at least 50% of the schools in their jurisdiction are reached by the end of the SWIP term. SWMEs will continually conduct the same percentage of direct contact with schools to ensure the effectiveness of existing and established waste reduction programs.</p>
	<p>Documentation: List of schools contacted and visited and the status of their compliance with Act 148 requirements (e.g. schools involved in an organics diversion program etc); and informational materials provided.</p> <p>Deadline: Annually, by July 1st.</p>

The goal of this standard is to increase the number of businesses, institutions, and residents that are diverting organics in compliance with the Universal Recycling law. All businesses, institutions, and residents are expected to comply with the Universal Recycling law and SWMEs are expected to provide outreach on a continual basis. Implement an ongoing public education and outreach campaign to inform the residents, businesses, and institutions (hospitals, nursing homes, colleges, correctional facilities, and other large waste generators) of the better ways to manage organic materials. Include information about:

- upcoming deadlines for mandatory diversion of food residuals by size of generators;
- disposal bans of leaf and yard debris, clean wood, and food residuals including information about the Vermont Food Recovery Hierarchy; and
- locally available services and resources for diversion such as food rescue sites/organizations, organics management facilities and drop-off sites, haulers that offer organics collection services, SWME training or technical assistance services, or other organizations offering similar services such as trainings for food business staff on source separation of food scraps.

Components of this campaign will provide tailored information for sectors with specific organics diversion needs and issues.

This campaign shall prioritize and target outreach to larger food waste generators (businesses and institutions) first following the phased in requirements of the Universal Recycling law and prioritize working with generators that do not have organics diversion efforts or programs currently in place. SWMEs will conduct outreach to 2% or 20 (whichever is greater) food based businesses and institutions within their jurisdiction each year, ensuring that at a minimum 10% of the business and institutions are reached by the end of the SWIP term.

Documentation: Provide copy of outreach materials, link to website, social media, ads placed, events held/attended, and any mailing lists to ANR, though direct mailings are not required. Provide list of businesses and institutions contacted or visited and their current organics diversion status.
Deadline: Annually, by July 1st.

Performance Standards- Organics	
<i>Solid Waste Management Entity-level Standards</i>	Documentation to ANR & Deadlines
<p>Provide technical assistance for waste reduction at public and private events (e.g., festivals, craft shows, weddings, parties, sporting events). Work with haulers and event organizers on signage and collection containers to ensure anticipated adherence with landfill bans.</p>	<p>Documentation: Post event waste reduction information, signage, and posters on SWME website. Provide ANR with a list of events assistance was provided to and that took advantage of the outreach materials and assistance provided. Deadline: Annually, by July 1st.</p>
<p>Contact and collaborate with local food redistribution groups and networks to conduct outreach and education to food businesses and institutions about the opportunities to donate quality food within the region to feed people. Groups include the Vermont Foodbank, food shelves, churches, and other nonprofit and community groups that accept and distribute donated food items.</p>	<p>Documentation: Provide description and function of food donation network in region. Detail efforts to contact food donation groups and to coordinate outreach and education to those who may have food to donate to feed people. Deadline: Annually, by July 1st.</p>
<p>Convenience</p> <p>Each SWME shall demonstrate to ANR through their SWIP that year round collection options exist in their region for leaf and yard debris. Collection locations need not be operated by the SWME. Collection locations can be privately or publically owned, however, if the only collection location closes or decides to cease collection during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME is responsible for providing collection and will provide a collection option for its residents. At minimum the SWME region or town must be served by at least one collection location, which must have operating hours on at least one week day and one weekend day per week.</p> <p>SWMEs will provide outreach surrounding the collection of leaf and yard debris including the location of facilities that accept these materials.</p>	<p>Documentation: List at least one permanent collection location for these materials within the SWME region. If one permanent facility is unavailable, the SWME shall ensure a location is made available to the public with convenient operating hours recurring throughout the calendar year to collect them. Provide description of efforts made toward these goals. Deadline: Annually, by July 1st.</p>

CONSTRUCTION & DEMOLITION MATERIALS

It is estimated that of total waste landfilled nationally, up to 25% is construction and demolition (C&D) materials. Though this estimate may vary by study and state, it represents a significant segment of the waste stream destined for the landfill. The Systems Analysis Report estimated that 192,750 tons of C&D materials were generated in Vermont in 2011.²¹ Although considerable strides have been made in waste reduction and recycling, the focus of our state and local waste reduction efforts has been the municipal solid waste (MSW) stream. This is often at the expense of “other” wastes, such as C&D materials.

Discarded C&D materials are not uniformly generated by all residents and businesses, and in relatively small amounts in comparison to more urban areas. The materials themselves are often bulky or mixed with non-recyclable wastes. Due in large part to these factors, the markets for reuse and recycling of C&D are not as well developed in Vermont as are the markets for “traditional” recyclable materials. Further, partially as a result of the limited amounts of C&D generated, until 2013 there were no dedicated C&D processing facilities in Vermont. There are a few C&D processing facilities in adjacent states, but the hauling distances involved are often cost prohibitive. However, as of the writing of this Plan, a C&D processing facility began operating in November 2013 in Chittenden County. The facility is accepting mixed C&D and removing clean wood, drywall, asphalt shingles, carpet and other materials for salvage and recycling.. Some salvage of reusable materials occurs on a small scale in the state, and generally metals and cardboard are currently being removed from the C&D stream for recycling; however, the bulk of C&D materials are managed by disposal. With the addition of this C&D recycling facility and possibly others in the near future, more opportunities could open up for recycling and reuse rather than disposal.

Public Education and Outreach

Public education and outreach is always critical in promoting the priorities of reducing consumption and disposal. In cooperation with the solid waste management entities (SWMEs) and industry/trade organizations across the state, education and outreach efforts will supply essential information that consumers and businesses need to make environmentally responsible choices. Some of the objectives of this MMP as they relate to C&D materials education and outreach are as follows:

1. Promote Environmentally Preferable Purchasing (EPP) with outreach to architects, contractors, building supply stores, and associated trade groups.
2. Research and recommend C&D waste prevention and diversion preferred practices. Participate in national dialogue, keep current with market development, and encourage regional cooperation.
3. Offer training or inform builders of upcoming instruction opportunities concerning Environmentally Preferable Purchasing (EPP), planning for C&D diversion, and field methods of diversion.
4. Advertise the economic and environmental benefits of C&D waste reduction to design, construction, and hauling communities. Promote in-state options for recycling of C&D waste.
5. Educate generators on the availability of recycling markets, the option to sell materials directly back to market, or reduce disposal costs by diverting materials for reuse or recycling.

²¹ System Analysis of the Impact of Act 148 on Solid Waste Management in Vermont, Final Report. Table 19, Vermont C&D Waste Composition (material tonnages). October, 2013.

6. Foster a relationship with the “green building” community, such as with Leadership in Energy and Environmental Design (LEED), Efficiency Vermont, the Vermont Green Building Network, Building Professional Performance Association of Vermont, ReSource, Renew, and Construction Materials Recycling Association, and others.

Extended Producer Responsibility & Product Stewardship

ANR will consider EPR and product stewardship options with respect to C&D materials, including the following:

1. Foster relationships between deconstruction companies, used building materials retailers, contractors, and green building groups in an effort to promote EPR and product stewardship as growing standard in waste management.
2. Explore regional and national initiatives through a stakeholder process for EPR or product stewardship programs for additional C&D materials.

Government Leadership

ANR will collaborate with the Department of Buildings & General Service, where feasible, on the following efforts to reduce C&D waste:

1. Strengthen ANR ties with Department of Buildings and General Services (BGS) during the design phase of construction projects to assist in planning for progressive C&D materials management.
2. To the extent feasible, work with BGS to ensure that all State building projects have a progressive ANR approved Construction Materials Management Plan. Lead by example by cooperatively adopting forward thinking initiatives and integrating them into the Construction Materials Management Plan. Support the implementation of, and compliance with, the Construction Materials Management Plan. Look to BGS Design Guidelines for the efforts to reduce C&D on state construction sites.²³
3. Work with BGS where feasible to lead by example on innovative pilot projects and waste reduction efforts. The distribution of furnishing and fixtures from the Hurricane Irene impacted State buildings is an example of this effort.
4. Broadcast success stories in recurring newsletters, social media websites, industry media outlets, and the ANR website.
5. Development projects requiring an Act 250 permit and which involve greater than 10,000 square feet of construction or demolition currently must submit, as part of the permit application, a Construction Site Waste Reduction Plan to ANR for approval. By requiring applicants to consider C&D management, ANR has promoted waste prevention and diversion practice. This effort will be redoubled by:
 - a. Providing consistent and comprehensive Solid Waste Program review of those C&D Site Waste Reduction plans required by the Act 250 process,
 - b. Performing routine compliance audits, and
 - c. Providing waste reduction outreach and education to applicants, designers, developers, and contractors.

²³ BGS Design Guidelines. September 2013.

<http://bgs.vermont.gov/sites/bgs/files/2013%20BGS%20Design%20Guidelines%20072613.pdf>

6. Work collaboratively with surrounding states on encouraging C&D diversion, as a means to facilitate interstate markets development for recyclable materials. Work to devise mutually supported strategies (such as uniform definitions, waste reduction goals, uniform facility permitting standards) so as not to impede the flow of recyclable materials or send materials as waste to any one state.

Infrastructure Improvements

Currently there are few options for C&D materials management facilities in Vermont. The State has only a few facilities devoted to reuse and recycling. As with other recycling and reuse programs, the availability and convenient access to facilities such as material exchange centers, recycling depots, and direct to market buyers is vital to promoting and enhancing sound C&D materials management. This is also true of C&D waste management. Obstacles such as markets, distance, and the lack of dedicated facilities pose great challenges in the realm of C&D materials management in Vermont. With this in mind, over the Plan term, ANR will work with partners to:

1. Evaluate current C&D collection, recycling, processing, and disposal infrastructure. Based on that evaluation, target underserved areas to develop the necessary infrastructure further.
2. Facilitate relationships between sources of clean wood waste and potential users (such as industrial biomass boilers or composting facilities), which should enhance a local market for the material. ANR will connect generators of clean wood with users of clean wood.
3. Foster markets for used building materials by promoting and working with used building material stores. Facilitate the networking of contractors and developers with these entities as a resource for diverting, rather than disposing, C&D materials.
4. Encourage the recycling of waste asphalt shingles by working with generators, potential processors, and potential users of the end product.
5. Work with the Vermont Agency of Transportation (AOT) to implement the inclusion of recycled asphalt shingles into bituminous concrete specifications.
6. Encourage SWMEs, drywall wholesalers, contractors, and waste haulers to develop drywall recycling options on a systematic, statewide basis. The establishment of market outlets will be an anticipated outcome of this effort. Participate in regional and national dialogue with drywall manufacturers to put into place consistent take back and recycling programs.

Mandates and Disposal Bans

In cases where financial incentives (e.g. reduced tipping fees) are not effective, mandates and bans can be proposed. Outside of the option to institute mandates and bans, conditions on State contracts and grants can be imposed to stimulate attainment of standards.

Waste mandates and bans are designed to promote business and residential recycling and reuse efforts, conserve disposal capacity, and to reduce adverse environmental impacts. Mandates can stimulate the development of new or improved infrastructure to collect banned items. The Universal Recycling law establishes a ban on clean wood disposal effective July 1, 2016. This ban encourages separation and collection of clean wood waste at facilities. ANR will look at potential markets for this clean wood waste; options include using it as a carbon source for composters, as a fuel source for biomass boilers, or reuse.

ANR will explore the need for potential disposal bans on waste asphalt shingles and drywall. This will be contingent upon C&D recycling facilities being established in Vermont.

Performance Standards- Construction & Demolition Materials		
Agency-level Standards		Documentation & Deadlines
Statewide Goal		
<p>The goal is to reduce the tonnage of C&D materials requiring disposal during the Plan term by 10% of the 89,766 tons reported as landfilled and incinerated in 2011.</p> <p>High-quality data for the generation and disposal of C&D materials is relatively scant: it is often commingled and disposed with MSW, and therefore reported as MSW; it can also be reported as beneficial use material for landfill cover in and out-of-state. This makes it challenging to propose a quantitative statewide goal, but in order to show a commitment to reducing C&D waste disposed. ANR will work with solid waste management entities (SWMES), facilities, and haulers to improve the data collection and reporting of the generation and end-of-life management of C&D materials.</p> <p>While many businesses and residents in Vermont have ready access to services for traditionally recycled materials, this is not the case with C&D. ANR will continue to support the development of new market outlets for C&D materials (e.g., drywall, asphalt shingles, dimensional lumber) across the state. By removing barriers to market development, infrastructure development and operation can become more convenient and reliable for generators of C&D residuals.</p>		<p>Documentation: A description and assessment of any programs developed to divert C&D materials will be documented.</p> <p>Deadline: Biannual report to the legislature.</p> <p>Documentation: ANR will provide guidance documents to assist with project planning and environmentally preferred purchasing options that are available in Vermont and around the region.</p> <p>Deadline: Within two years of MMP adoption and updated annually thereafter.</p>
<p>Education and Outreach</p>	<p>ANR will implement a state-wide public outreach campaign to inform the residents and businesses of the preferred practices for C&D materials during the Plan Term. The major focus of this campaign will provide tailored information for sectors that generate C&D waste.</p>	<p>Documentation: Description and assessment of the outreach programs will be documented in the required.</p> <p>Deadline: Biannual report to the legislature.</p>

Performance Standards- Construction & Demolition Materials

Solid Waste Management Entity-level Standards

Documentation to ANR & Deadlines

Education and Outreach

Implement a multi-media public outreach campaign to inform the residents and businesses of the preferred practices for the reduction of C&D materials generated and for end-of-life management.

Documentation: Provide copy of outreach materials, link to website, and any mailing lists to ANR, though direct mailings are not required.
Deadline: Annually, by July 1st.

In order to provide a diversion option for clean wood which will be banned from landfill disposal July 1, 2016, all solid waste management entities (SWMEs) must establish a program for clean wood recycling prior to July 1, 2016. This shall include convenient collection point(s) for both DIY consumers and contractors. Collection points should be co-located with facilities that are collecting MSW and recycling to encourage proper management. Each SWME must ensure that there is at least one collection point available within their region.

Convenience

Coordinate with the Agency on efforts completed to develop markets and specifications for various C&D components such as asphalt shingles and drywall. Assist Agency in addressing local impediments to successful collection programs. Establish at least one collection location for asphalt shingles and drywall by end of the SWIP term in each SWME’s jurisdiction. Collection locations need not be operated by the SWME. Collection locations can be privately or publically owned, however, if the only collection location closes or decides to cease collection during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME will provide a collection option.

Documentation: Provide description of efforts made toward these goals. Include data which represents volumes collected and management options pursued.
Deadline: Annually, by July 1st.

HOUSEHOLD HAZARDOUS WASTE, CONDITIONALLY EXEMPT GENERATOR WASTE, ELECTRONIC WASTE, AND UNIVERSAL WASTE

The USEPA describes HHW as “Leftover household products that contain corrosive, toxic, ignitable, or reactive ingredients that pose a threat to the environment and public health. These chemicals are costly to collect and manage separately from municipal solid waste.” Such products include automotive fluids, batteries, household chemicals, and electronic products with hazardous components disposed by households.

Vermont Solid Waste Rules define HHW as “waste that would be subject to regulation as hazardous waste if it were not from households” (6-201 Definitions). Although HHW is exempt from state and federal regulation as hazardous waste, Vermont statute requires the Solid Waste Program to address the volume and toxicity of the waste stream. Vermont has worked carefully to integrate programs designed to segregate hazardous waste from solid waste and to achieve the reduction of toxic materials both at the source of production and at the point of waste generation.

Conditionally Exempt Generator (CEG) waste is hazardous waste from a business, municipality or other entity other than that generates less than 220 pounds of hazardous wastes per month. Waste collected from CEGs must be managed under Vermont Hazardous Waste Management Regulations (VHWMR) and therefore should be segregated from HHW.²⁴ If CEG waste is co-mingled with HHW, then all waste is managed as hazardous waste and the exemption for household hazardous waste management may not be utilized. This Plan will refer to both HHW and CEG wastes Universal Waste refers to any of the following hazardous wastes that are handled under streamlined provisions in order to facilitate proper management: batteries, pesticides, thermostats, PCB-containing fluorescent light ballasts, fluorescent lamps, mercury-containing devices and cathode ray tubes (CRTs).

Electronic Waste includes computers, computer monitors, computer peripherals, printers, televisions and devices containing a cathode ray tube. Electronic devices contain toxic materials (including lead, mercury, and chromium), as well as precious metals (such as gold) that should be managed responsibly, recovered, and recycled when possible.

Solid waste management entities (SWMEs) work with ANR to manage HHW. Since 1992, SWMEs and municipalities in Vermont have been required to include provisions in their Solid Waste Implementation Plans (SWIPs) for the management of this waste as “unregulated hazardous waste.” The 2001 State Solid Waste Management Plan established the requirement for SWMEs to hold a minimum of two household hazardous waste collection events per year. Since this initial requirement was created over 12 years ago, some SWMEs have gone above and beyond the minimum, increasing the number of events offered per year to as many as 25. Others have built fixed and fully permitted facilities that are open seasonally or year round. Those SWMEs that do not offer similar services have been restricted by their own budgetary constraints to offer only two events per year. To help offset costs of HHW collections for all SWMEs, ANR has provided annual SWIP grants based on per capita population of the region served. Those with permitted fixed facilities are able to consolidate materials, which lowers recycling and disposal costs. Fixed facilities, depending on hours of operation, can be more convenient for residents and CEGs than seasonal events. However, those with fixed facilities have increased staffing costs and as well as the upfront cost to purchase, site, and build a facility.

Since the writing of the state’s last Solid Waste Management Plan, both SWMEs and ANR have evaluated the best way to manage HHW. Factors considered include safety to the environment and residents, training for SWME staff handling materials, overall costs for services, and convenience of disposal for residents. Gauging the need for hazardous waste collection and discerning real participation rates is challenging. Comparing the number of participants accessing HHW events/facilities with US Census Bureau population data shows a participation rate of 10% of Vermont’s households.

²⁴ Vermont Agency of Natural Resources, *Hazardous Waste Management Program: Regulations & Statutes*, (2013), <http://www.anr.state.vt.us/dec/wastediv/rcra/regs.htm>, and Subchapter 9: Universal Waste Management Standards, http://www.anr.state.vt.us/dec/wastediv/rcra/hazregs/VHWMR_Sub9.pdf.

This may appear to be a low rate but is consistent when compared nationally with other states that have HHW collection programs. The challenge is to discern what the actual participation rate is. In the performance standards section, this Plan outlines recommendations in order to evaluate how much waste is being generated/purchased, how educated residents and businesses are about proper disposal, and how convenient access to disposal is.

ANR will focus future state initiatives on reducing HHW generation through public education and outreach and EPR and product stewardship of HHW.

Vermont has multiple successful product stewardship programs in place for products including electronics waste mercury containing bulbs, mercury thermostats and mercury containing automotive switches. A paint stewardship program is poised to be implemented in 2014. The Extended Producer Responsibility & Product Stewardship section of this chapter discusses these programs in further detail.

Public Education and Outreach

Public education and outreach is important to promote the proper disposal of HHW/CEG waste and to increase participation both at fixed facilities and collection events. Well planned education and outreach activities can generate awareness of the environmental and health risks associated with HHW/CEG waste. It can also promote changes in behavior when making product choices and identifying proper disposal of hazardous waste products. ANR will explore opportunities to educate and inform both the general public and small businesses about the opportunities for HHW/CEG waste management.

1. ANR will collaborate with other groups and agencies to develop a waste reduction program for schools throughout the state that will cover recycling, organics source reduction and diversion, and toxics reduction.
 - a. Tools and resources will be developed for teachers to impart the fundamentals of waste reduction and management at home and school..
 - b. The SWMEs will provide assistance as needed in the establishment and maintenance of a school-wide waste reduction program. ANR recommends that such a program include:
 - i. A designated School Waste Reduction Advisory Committee. The group may be comprised of students, teachers, administrative staff, facilities/cafeteria staff, and parents that make decisions and recommendations for the school toxics reduction program and will ensure the sustainability of the school waste reduction program.
 - ii. A written policy stating the commitment to a school-wide toxics reduction program. This could include an initial materials evaluation completed by the SWME and establishing a connection with Vermont Environmental Assistance Office (EAO). EAO can offer assistance with school lab chemical clean outs. Evaluations will offer school-specific performance measures for reducing the presence of toxics on campus, and the proper end-of-life management of unavoidable toxics. Costs to the school could be tracked in order to show cost savings as a result of waste reduction.
 - iii. Procurement policies outlining School District wide purchasing of non-toxic environmentally preferred products to be used in schools. This may be accomplished independently or with assistance from ANR.
 - iv. A method of tracking hazardous waste purchases to identify where purchasing adjustments can be made.

2. Continue to look for opportunities to educate and inform the commercial sector and the general public about the benefits of proper disposal and toxic use reduction.. Efforts will be performed by the SWMEs and state agencies..
 - a. Promote participation in Vermont’s Stewardship Programs for mercury thermostats, fluorescent bulbs, electronic waste, and paint.
 - b. Develop a comprehensive list that provides detailed information about HHW collection events and permanent collection facilities that is easily accessible by the general public via website and mailings to town offices.
 - c. ANR will require all SWMEs to offer outreach to businesses as to what services are available such as Vermont EAO to help them reduce the amount of hazardous waste they generate and how to safely handle and dispose of it. EAO can assist with a waste audit and resources to ensure the business is following regulations and promoting waste reduction practices.. Audits educate the commercial sector about proper recycling and disposal and are also effective in helping businesses reduce the amount of waste they generate.

Extended Producer Responsibility & Product Stewardship

Hazardous waste generated in the household such as cleaners, batteries, mercury containing devices, paints, pesticides, and automotive products have been at the forefront of environmental concern for many years. The practice of managing these products and the associated costs have prompted regulators to more closely examine the manufacturer’s role in the funding of the proper disposal or recycling of their waste products. Extended producer responsibility and product stewardship programs have addressed many barriers of cost and convenience to the general population. Many states, including Vermont, have successful program for proper recycling of such products as fluorescent bulbs, mercury thermostats, paint, and electronic wastes through regulated programs. These extended producer responsibility programs have been adopted at an increasing rate and have allowed for convenient options for disposal.

In the first year following implementation of the mercury lamp EPR program, 37% of mercury lamps were recycled, which is significantly higher than the national average of less than 5%. In 2012, 25 pounds of mercury were recovered by the thermostat EPR program. As a result of thermostat program, Vermont has the highest per capita rate of recycling in the nation for thermostats. Following implementation of the electronic waste EPR program enacted in 2010, 4.8 million pounds of covered electronic devices were collected during the first year of the program. This exceeds the legislative goal of 3.4 million pounds per year, and it represents a higher per capita rate of collection than any other state. No statistics are available yet for Vermont’s paint recycling law, which was passed in 2013 and will be implemented in 2014.

EPR and product stewardship programs not only offer collection services in more convenient locations, but they also shift the burden of disposal costs from taxpayers and municipalities to manufacturers and the consumer.

To encourage cost-effective and convenient management of HHW, ANR will:

1. Evaluate the use of extended producer responsibility and product stewardship programs, for the sound management of HHW/CEG waste.
2. Evaluate the need for additional extended producer responsibility and product stewardship programs in Vermont through a stakeholder process.

Government Leadership

Government leadership is important in promoting sound management of hazardous and universal wastes.

ANR supports the following efforts:

1. Keep abreast of and support procurement policies for Vermont state government that adheres to Environmentally Preferable Purchasing (EPP) for all state agencies and coordinate with Building and General Services on the existing policies. This is intended to encourage the elimination of priority toxic substances such as arsenic, lead, and mercury in products purchased by the state, public, and private sectors. Show leadership in purchasing and using non-toxic, environmentally sound products in state buildings.
2. Promote the use of Electronic Product Environmental Assessment Tool (EPEAT) standards for state procurement policies for computers and computer related products, adhere to recommended operation and maintenance standards, and abide by strict end-of-life management practices.
3. Ensure continued education and preferred practices are conducted by State owned and operated auto repair shops. Previous efforts made by ANR's Environmental Assistance Office (EAO) have shown great success with adoption. The EAO will continue to be available as a resource to businesses in Vermont looking for assistance with management of their waste.
4. Promote addressing the issue of high hazard wastes (such as explosives and chemically unstable/reactive waste) at the state emergency response level. Some high hazard events have risen to a level that required State involvement. While some progress has been made on this effort, high hazard wastes remain a topic of discussion both in the public and private sectors.
5. Utilize existing training courses for use by municipal officials and staff that focus on proper HHW/CEG collection and management, and evaluate overall understanding and comprehension standards for necessary updates and improvements to education efforts. EAO currently offers periodic HHW/CEG training workshops around the state at no charge.

Infrastructure Improvements

Historic Solid Waste Management Plans and legislative reports have considered establishing an increased number of fixed HHW/CEG facilities in an effort to enhance accessibility and convenience. To date, there are five permanent facilities, which operate in Addison County, Chittenden County, Northeast Kingdom (seasonal), Northwestern Vermont, and Rutland County. These 5 permanent facilities combined with seasonal events show an overall 10% participation rate statewide by Vermont residents. The 2013 Waste Composition Study found 0% HHW in the samples of residential MSW, but by weight it is estimated that 423 tons are still being disposed of in MSW. This shows that while strong efforts have been made to keep HHW out of the waste stream, there is still room for improvement. Since HHW poses such serious risks to human health and the environment, it is imperative that no HHW is disposed of in the landfill.

Without better data, it is hard to define the actual need and demand for HHW disposal. Are residents sitting on piles of household hazardous waste because they do not have convenient disposal options? Are they pouring it down their drain because they have not received enough outreach? Or do they have little if any hazardous waste that they need to dispose of on a regular basis? In order to answer these questions, accurate data needs to be collected. This data will assist in defining what Vermont's goal should be for managing hazardous waste. Part of the phased-in performance measures of this Plan requires all SWMEs to survey residents of their region. Many areas of the state have very limited access to hazardous waste disposal and the requirements outlined in this Plan focus on ensuring access and convenience for every region of the state.

From the available data, reporting indicates that permanent facilities have higher participation rates. The following three SWMEs have provided data showing an increase in participation in instances where the management of HHW/CEG has progressed from periodic events to fixed facilities. The Northeast Kingdom Solid Waste Management District switched

collections from periodic events to a permanent facility between 2000 and 2001. In that one year, they exhibited a 12% increase in participation and a 20% drop in disposal costs. The Addison County Solid Waste Management District (ACSWMD) also has data that documents a strong increase in participation rates subsequent to their fixed facility coming online in 2005. ACSWMD shows that from 2005 to 2011, participation rates for HHW increased 43% and 44% for CEG waste. However, their staffing and facility costs have also increased. Chittenden Solid Waste District's increase in participation rates when their fixed facility (The Environmental Depot) experiences three times the participation rate compared to their "Rover" events in 2011, but their budget also shows increased costs for HHW operations.

The growth in participation rates may also be attributed to a designated operating schedule, predictable availability, and a strong education and outreach program for the previously mentioned permanent facilities. This MMP establishes a phased in implementation schedule (see Performance Standards) during which all SWMEs are required to improve accessibility by increasing: education and outreach efforts, the frequency of collection opportunities via events or facilities, available operating hours, and access to convenient disposal options.

Mandates and Disposal Bans

Hazardous waste released into the environment can contaminate our air and water. Regulations that place mandates and landfill bans on hazardous materials do so to prevent landfilling of these materials. In Vermont, landfill bans are in place on rechargeable batteries, lead acid batteries, button batteries, certain electronic devices, fluorescent bulbs, motor oil, paints, regulated medical waste, propane and other gas cylinders, dangerous wastes including explosives, and mercury-added products. Banned electronic devices include computers, peripherals, monitors, cathode ray tubes, televisions, printers, personal electronics such as personal digital assistants and personal music players, electronic game consoles, fax machines, wireless telephones, telephones, answering machines, VCRs, DVD players, digital converter boxes, stereo equipment, and power supply cords. There are also landfill bans on non-hazardous materials, such as tires²⁵ and household appliances. Other potential bans for both non-hazardous and hazardous containing products will be evaluated during the Plan term in order establish more cost effective and convenient options for collection.

²⁵ VT Agency of Natural Resources. Report to the Vermont Legislature on Problem Scrap Tire Piles. January 8, 2013.

Performance Standards- HHW, CEG, E-Waste, Universal Waste	
Agency-level Standards	Documentation & Deadlines
Statewide Goal	
<p>The goal is to reduce toxicity in the waste stream and to expand and provide convenient, cost-effective HHW/CEG management systems statewide. Such an expansion will include convenient access to year round HHW/CEG collection programs either through collection facilities or events, and/or EPR and product stewardship programs in close proximity to all residents.</p>	<p>Documentation: Description and assessment of the HHW/CEG collection programs throughout the state will be documented. Deadline: Biannual report to the Vermont legislature.</p>
<p>Within the first year, ANR will implement a statewide public outreach campaign to inform the residents and businesses of the preferred practices for hazardous wastes, including information about the disposal bans of these materials and ways to reduce generation. ANR will also include information on preferred disposal of pharmaceuticals at DEA or other law enforcement and pharmacy sponsored collections and prevention of disposal of pharmaceuticals into waste water systems.</p> <p>Within the first two years, ANR will work with SWMEs to identify survey criteria to evaluate the need and convenience for year round HHW disposal statewide. Each solid waste management entity (SWME) will be responsible for adhering to these criteria in order to identify what the need is for their region. Those who have completed a similar survey within the past 2 years may apply to ANR for an exemption. All SWMEs will be required to repeat the survey every 5 years.</p>	<p>Documentation: Description and assessment of the outreach programs will be documented. Deadline: Biannual report to the Vermont legislature.</p> <p>Documentation: Provide criteria for surveys and consolidate SWME responses to show statewide need. Deadline: Criteria will be provided in Year 1 to be used in Years 2-5.</p>
<p>Education and Outreach</p>	<p>Documentation: Compendium of resources to be provided to all SWMEs including sample curriculum to then be distributed to the schools with which they work. Deadline: Within the second year of MMP adoption.</p>

Performance Standards- HHW, CEG, E-Waste, Universal Waste		Documentation to ANR & Deadlines
Solid Waste Management Entity-level Standards		
Education and Outreach	<p>The goal of this standard is to increase the number of schools that are compliant with state and federal laws pertaining to proper end-of-life management of hazardous waste (including waste reduction and recycling) and to increase the number of schools that are utilizing environmentally preferable purchasing. Work with schools and ANR's Environmental Assistance Office to provide information and technical assistance on HHW/CEG handling, disposal, waste reduction, recycling and assistance accessing cost effective disposal options. Prioritize working with those schools that have not received these services before and that need assistance. Solid waste management entities (SWMEs) will work with 10% or 2 schools (whichever is greater) within their jurisdiction each year, ensuring that at least 50% of schools in their jurisdiction are reached by the end of the SWIP term. SWMEs will conduct the same percentage of direct contact, at least every two years, with schools to ensure the effectiveness of existing and established waste reduction programs.</p>	<p>Documentation: List of schools contacted or visited; annual list of schools actively involved in program; and informational materials provided. Deadline: Annually, by July 1st.</p>
	<p>SWMEs will work with school officials to reduce or eliminate as much of their hazardous waste streams as possible, and ensure proper end-of-life management of materials.</p> <hr/> <p>The goal of this standard is to raise awareness about proper end-of-life management of hazardous waste and pharmaceuticals (including waste reduction and recycling) and the options for businesses, institutions, and residents to utilize environmentally preferable purchasing. Implement an ongoing multi-media public outreach campaign to inform the residents, businesses, and institutions of the preferred practices for hazardous materials including pharmaceuticals. Prioritize outreach to, and working with those businesses and institutions that do not have such programs already in place. This will include connecting businesses and institutions with the ANR Environmental Assistance Office for HHW/CEG management assistance and other regulatory assistance. This will also include recommendations for disposal of pharmaceuticals at DEA or other law enforcement and pharmacy sponsored collections and prevention of disposal of pharmaceuticals into waste water systems. Include information about the disposal bans. SWMEs must work with 2% or 20 (whichever is greater) the businesses and institutions in their region per year on proper disposal and waste reduction information. SWMEs will at minimum have reached at least 10% of the businesses and institutions within their region by the end of the SWIP term.</p>	<p>Documentation: Provide copy of outreach materials, link to website, and any mailing lists to ANR, though direct mailings are not required. Deadline: Annually, by July 1st.</p>

Performance Standards- HHW, CEG, E-Waste, Universal Waste	
<i>Solid Waste Management Entity-level Standards</i>	Documentation to ANR & Deadlines
<p>Year 1 –By July 1, 2014: Each SWME shall provide a minimum of 2 HHW/CEG events per year or access to a permanent facility.</p> <p>Convenience</p> <p>Minimum requirements for events: There must be at least one event scheduled in the spring and one in the fall and must operate for a minimum of 4 hours. In the event that an SWME provides additional events above the minimum requirement, waivers to the minimum duration for each event may be considered and approved by ANR.</p> <p>Minimum requirements for facilities: Facilities must operate for a minimum of 4 hours per day open and on at least one week day and one weekend day per week.</p>	<p>Documentation: Provide date of events, list of collection points, track participation rates and submit required annual reporting. Annual reporting must include collection totals for CEG hazardous waste collected via events and/or facilities per HW program. Define all services offered. Report shall include an updated list of all collection points.</p> <p>Deadline: Annually, by July 1st.</p>

Performance Standards- HHW, CEG, E-Waste, Universal Waste

Solid Waste Management Entity-level Standards

Documentation to ANR & Deadlines

Year 2- By July 1, 2015:

Each SWME shall demonstrate to ANR through their SWIP that year round collection options exist in their region for the following materials: Batteries, fluorescent lamps, mercury thermostats, 1 and 20 pound propane tanks, electronics, paint, and used oil. Collection locations need not be operated by the SWME. Collection locations can be privately owned, such as auto parts stores collecting used oil or hardware stores collecting paint and fluorescent lamps. However, if the only collection location closes or decides to cease collection of a required material during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME is responsible for providing collection and will provide a collection option for its residents. All collection locations must have operating hours on at least 1 week day and 1 weekend day per week.

Convenience

Additionally, each SWME must provide a minimum of 2 HHW/CEG events per year or access to a permanent facility. Events and Facilities must collect all other HHW products that aren't listed in the year round collection section above.

Minimum requirements for events: There must be at least one event scheduled in the spring and one in the fall and must operate for a minimum of 4 hours. In the event that an SWME provides additional events above the minimum requirement, waivers to the minimum duration for each event may be considered and approved by ANR.

Minimum requirements for facilities: Facilities must operate for a minimum of 4 hours per day open and on at least one week day and one weekend day per week.

Documentation: Provide date of events, list of collection points, track participation rates, and submit required annual reporting. Annual reporting must include collection totals for CEG hazardous waste collected via events and/or facilities per HW program. Define all services offered. Report shall include an updated list of all collection points
Deadline: Annually, by July 1st.

Performance Standards- HHW, CEG, E-Waste, Universal Waste

Solid Waste Management Entity-level Standards

Documentation to ANR & Deadlines

Year 3- By July 1, 2016:

Each SWME shall demonstrate to ANR through their SWIP that year round collection options exist in their region for the following materials: Batteries, fluorescent lamps, mercury thermostats, 1 and 20 lb. propane tanks, electronics, paint, and used oil.. Collection locations do not need to be operated by the SWME. Collection locations can be privately owned, such as an auto parts store collecting used oil or a hardware store collecting paint. However, if the only collection location closes or decides to cease collection of a required material during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME is responsible for providing collection and will provide a collection option for its residents.

Convenience

Additionally, each SWME must provide a minimum of 3 HHW/CEG events per year or access to a permanent facility. Events and Facilities must collect all other HHW products that aren't listed in the year round collection section above.

Minimum requirements for events: There must be at least one event scheduled in the Spring and one in the Fall and must operate for a minimum of 4 hours. In the event that an SWME provides additional events above the minimum requirement, waivers to the minimum duration for each event may be considered and approved by ANR.

Minimum requirements for facilities: Facilities must operate for a minimum of 4 hours per day open and on at least one week day and one weekend day per week.

Documentation: Provide date of events, list of collection points, track participation rates, and submit required annual reporting. Annual reporting must include collection totals for CEG hazardous waste collected via events and/or facilities per HW program. Define all services offered. Report shall include an updated list of all collection points.
Deadline: Annually, by July 1st.

Performance Standards- HHW, CEG, E-Waste, Universal Waste		Documentation to ANR & Deadlines
Solid Waste Management Entity-level Standards		
Convenience	Year 4- By July 1, 2017:	
	<p>Each SWME shall demonstrate to ANR through their SWIP that year round collection options exist in their region for the following materials: Batteries, fluorescent lamps, mercury thermostats, 1 and 20 lb. propane tanks, electronics, paint, and used oil.. Collection locations do not need to be operated by the SWME. Collection locations can be privately owned, such as an auto parts store collecting used oil or a hardware store collecting paint. However, if the only collection location closes or decides to cease collection of a required material during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME is responsible for providing collection and will provide a collection option for its residents.</p>	<p>Documentation: Provide date of events, list of collection points, track participation rates, and submit required annual reporting. Annual reporting must include collection totals for CEG hazardous waste collected via events and/or facilities per HW program. Define all services offered. Report shall include an updated list of all collection points.</p>
	<p>Additionally, each SWME must provide a minimum of 3 HHW/CEG events per year or access to a permanent facility. Events and Facilities must collect all other HHW products that aren't listed in the year round collection section above.</p>	<p>Deadline: Annually, by July 1st.</p>
	<p>Further, each SWME must ensure that each household has access to a HHW/CEG event or permanent facility within a 15 mile radius and if a town or area of the SWME's region does not have access within 15 miles, the SWME will offer an additional HHW/CEG event in this town or area.</p>	
	<p>Minimum requirements for events: There must be at least one event scheduled in the Spring and one in the Fall and each must operate for a minimum of 4 hours. In the event that an SWME provides additional events above the minimum requirement, waivers to the minimum duration for each event may be considered and approved by ANR.</p>	
<p>Minimum requirements for facilities: Facilities must operate for a minimum of 4 hours per day open and on at least one week day and one weekend day per week.</p>		

Performance Standards- HHW, CEG, E-Waste, Universal Waste

Solid Waste Management Entity-level Standards

Documentation to ANR & Deadlines

Year 5- By July 1, 2018:

Convenience

Each SWME shall demonstrate to ANR through their SWIP that year round collection options exist in their region for the following materials: batteries, fluorescent lamps, mercury thermostats, 1 and 20 lb. propane tanks, electronics, paint, used oil. Collection locations do not need to be operated by the SWME. Collection locations can be privately owned, such as an auto parts store collecting used oil or a hardware store collecting paint. However, if the only collection location closes or decides to cease collection of a required material during the SWIP term, resulting in a lack of a collection option for that material in the region, then the SWME is responsible for providing collection and will provide a collection option for its residents.

Additionally, each SWME must provide a minimum of 4 HHW/CEG events per year or access to a permanent facility. Events and Facilities must collect all other HHW products that aren't listed in the year round collection section above.

Further, each SWME must ensure that each household has access to a HHW/CEG event or permanent facility within a 15 mile radius and if a town or area of the SWME's region does not have access within 15 miles, the SWME will offer an additional HHW/CEG event in this town or area.

Minimum requirements for events: There must be at least one event scheduled in the Spring and one in the Fall and must operate for a minimum of 4 hours. In the event that an SWME provides additional events above the minimum requirement, waivers to the minimum duration for each event may be considered and approved by ANR.

Minimum requirements for facilities: Facilities must operate for a minimum of 4 hours per day open and on at least one week day and one weekend day per week.

Documentation: Provide date of events, list of collection points, track participation rates, and submit required annual reporting. Annual reporting must include collection totals for CEG hazardous waste collected via events and/or facilities per HW program. Define all services offered. Report shall include an updated list of all collection points.
Deadline: Annually, by July 1st.

Through careful and comprehensive data collection with criteria provided by ANR, each SWME will establish a baseline participation rate. Such a baseline will serve to document relative success in future surveys. Expectations are tangible annual growth in participation rate or proof of a decrease in generation of hazardous waste by the residents and CEGs in that region.

Documentation: Provide improved data based upon survey criteria provided by ANR.
Deadline: Annually, by July 1st beginning within the second year of SWIP approval.

SLUDGE, SEPTAGE, AND MISCELLANEOUS RESIDUAL WASTE

“Residual wastes” is a term encompassing several materials. Primary among these is sludge, the semi-solid byproduct produced by the treatment of sewage in a wastewater treatment facility (WWTF), and septage, the partially treated material removed from an on-site septic system or holding tank. Secondary residual materials include wood ash, short paper fiber, and sludges produced by the biological treatment of dairy and the treatment of drinking water supplies. These material streams can all potentially be managed by application to agricultural lands as a valuable nutrient source or soil conditioner, rather than being disposed via landfilling or incineration. Sewage sludge that has been treated to reduce pathogens (such as through composting or other methods) and shown to meet the established standards for land application is generally referred to as “biosolids.”

In 2013, the most recent year for which data are available, Vermont’s WWTFs generated approximately 56,750 wet tons of sludge (at 15% solids), of which about 9,500 wet tons were treated to the biosolids standards and reused in agronomic settings (16.8% beneficial use).²⁶ Of the remaining sludge volume, approximately 46,000 wet tons was disposed by landfilling. Considering that a wet ton of sludge occupies a volume of about 1.3 cubic yards, in 2013 alone more than 60,000 cubic yards of sludge was placed in the two landfills operating in Vermont. Roughly 55% of Vermont residences utilize septic systems, the highest percentage in the U.S.,²⁷ and over 43 million gallons of septage was pumped from Vermont’s on-site septic systems in 2013. Of that amount, 76% was either incinerated at out-of-state facilities or was disposed at WWTFs that typically landfill the sludge they produce. The remaining 24% was either directly land applied following treatment for pathogen reduction or taken to a WWTF that otherwise uses the biosolids they produce.

Unlike household trash and other closely related streams of municipal solid waste, there is very little that individual Vermont residents can do to reduce the volume of residual wastes that are being disposed versus used. Other than septage removed from on-site septic systems, an activity which itself is not conducted by individual homeowners, residual wastes are almost exclusively produced and managed by municipal facilities or by private sector businesses. While wood ash and short paper fiber are generally managed by private sector companies that contract with the generators of these materials and then market these materials to third party customers, this is not the case for biosolids. Nearly 100% of biosolids are managed by land application for beneficial use, shipped directly to an incinerator, or sent to a landfill for disposal.

Public Education and Outreach

A successful effort to foster the increased beneficial use of residual wastes must include creating an outreach and educational strategy to increase awareness of the benefits of these materials.

ANR will:

1. Continue to look for opportunities to educate and inform the commercial sector and the general public about the sources and potential effects related to contaminants of emerging concern in wastewater biosolids,
2. Work with interested parties to examine and evaluate innovative and alternative uses for wastewater biosolids,
3. Encourage WWTFs and other governmental programs and non-governmental associations to offer tours and educational opportunities to local schools and universities, and

²⁶ Vermont Agency of Natural Resources Residuals Management Section

²⁷ U.S. Census Bureau, Housing and Household Economic Statistics Division (1990 data), (October 31, 2011), <http://www.census.gov/hhes/www/housing/census/historic/sewage.html>

4. Continue to look for opportunities to educate and inform the commercial sector and the general public about the beneficial uses and the opportunities for residual materials.

ANR will continue to look for opportunities to educate and inform the commercial sector and the general public about the beneficial uses of residual wastes. In concert with the ANR's efforts, it is expected that all solid waste management entities (SWMEs) will have implemented locally specific education and outreach programs for residual wastes.

Government Leadership

State government should lead by example. This could be accomplished by encouraging various state agencies to:

1. Use short paper fiber and exceptional quality (EQ) biosolids in reclamation or repair projects where a vegetative cover needs to be established,
2. Coordinate with AOT for the use EQ biosolids as a nutrient source on interstate highway medians, and
3. Assure that the wood ash produced in any state owned and operated facilities is diverted to agricultural uses rather than being disposed.

Infrastructure Improvements

Infrastructure for residual waste management is currently provided only by municipalities and private sector generators. Limited funding is available to municipalities that construct new biosolids management infrastructure as part of a WWTF upgrade, but no such public funding is available to the private sector generators or residual waste managers.

Performance Standards- Sludge, Septage, & Residual Wastes		Documentation & Deadlines
<i>Agency-level Standards</i>		
Statewide Goal		
<p>The beneficial reuse of residual wastes has historically been an objective for the management of these materials. The Universal Recycling law does not include any specific targets for the diversion of residual wastes to beneficial uses. However, a beneficial use rate of 75% remains the standard that ANR would like to see accomplished.</p>		<p>Documentation: Post available data. Deadline: Within two years of MMP adoption.</p>
<p>Education and Outreach</p>	<p>ANR will work with stakeholders through education and the exchange of information in an attempt to craft legislation that will provide additional financial incentives aimed at fostering increased beneficial use of residual materials.</p>	<p>Documentation: Possible legislation. Deadline: Beginning within two years of MMP adoption.</p>

Performance Standards- Sludge, Septage, & Residual Wastes		Documentation to ANR & Deadlines
<i>Solid Waste Management Entity-level Standards</i>		
<p>Education and Outreach</p>	<p>Implement a public education and outreach campaign to inform residents and businesses of the quality and beneficial uses of Vermont’s biosolids and residual wastes to help dispel negative public perceptions and to educate residents and businesses to not dispose of household hazardous wastes, pharmaceuticals, and other chemicals in wastewater and septic systems. This could include producing informational materials posted to SWME websites and mailed to residents and businesses, and programs that provide tours of local facilities (such as field trips for schools), especially those that are active in the beneficial use of residual wastes.</p>	<p>Documentation: Provide copy of outreach materials, link to website, and any mailing lists to ANR, though direct mailings are not required. Deadline: By the end of the SWIP term.</p>
	<p>It remains important for SWMEs to work with their respective municipalities, plant operators, and septic service providers to encourage the beneficial use of biosolids and septage. SWMEs will work with these local generators of residual wastes to explore, develop, and implement opportunities for beneficial use. Such efforts will be pursued and reported on an annual basis.</p>	<p>Documentation: Document and report efforts. Deadline: By the end of the SWIP term.</p>

Solid Waste Implementation Plan

By law municipalities are ultimately responsible for solid waste and materials management. State law requires that municipalities manage solid waste within their jurisdiction in conformance with the state solid waste management plan. This Vermont Materials Management Plan acts as the state solid waste management plan for purposes of meeting the requirements of 10 V.S.A. § 6604.

Municipalities (either as individual towns or through a district or alliance) need to adopt solid waste implementation plans (SWIP) that are in conformance with the MMP, and include all the elements required for consistency with the adopted MMP. All towns, districts and alliances are referred to as Solid Waste Management Entities (SWMEs). Existing approved SWIPs adopted in conformance with the 2006 Readopted State Solid Waste Management Plan will have to be revised to conform to the MMP. The Agency's goal is to make the revision process as simple as possible, and to provide clear guidance and assistance to towns, districts, and alliances.

Goal: All SWMEs revise their SWIP to be in conformance with the Vermont Materials Management Plan. Approved plans are implemented and achieve the goals set forth in the state plan and solid waste laws and regulations.

Action Plan: The Agency will provide a guidance document to assist SWMEs in preparing the revised SWIP. Within 12 months of the effective date of the MMP, all SWMEs, shall submit and obtain approval of a SWIP that includes all the elements necessary for conformance with the state MMP.

In order to be consistent with the MMP, SWIPs shall describe how the SWME promotes the following priorities of 10 V.S.A. § 6604(a)(1).

- The greatest feasible reduction in the amount of waste generated
- Materials Management, which furthers the development of products that will generate less waste.
- The reuse and closed loop recycling of waste to reduce to the greatest extent feasible the volume remaining for processing and disposal
- The reduction of a reliance on waste disposal to the greatest extent possible.
- The creation of an integrated waste management system that promotes energy conservation, reduces greenhouse gases, and limits adverse environmental impacts.
- Waste processing to reduce the volume or toxicity of the waste stream necessary for disposal.

Minimum SWIP requirements:

The SWIP shall address every performance measure with sufficient level of detail to ensure implementation. The Secretary shall not approve a SWIP unless the SWME demonstrates the following:

1. **Tasks** that will be undertaken to complete each performance measure as outlined in each chapter of the MMP.
2. **Timeline** for each task, as well as the deadline for completing the performance measure.
3. **Disposal rate for the SWME area.** Include the calculation of the total disposal and per capita disposal rate for municipal solid waste from the jurisdiction for which the SWME has authority.

4. Solid Waste Facilities Siting Criteria.

Describe any siting criteria that will apply to solid waste management facilities which may be proposed by any public or private entity in the SWME region. Siting criteria shall not be less stringent than those included in Vermont Solid Waste Management Regulations.

5. Specify Facilities included in the plan.

- A. Specify what existing solid waste facilities are “included in” the plan.
Under state law (10 V.S.A. Section 6605(c)), the Agency shall not issue a certification or recertification for a solid waste facility (except for a sludge or septage land application project) unless it is included in the municipal solid waste implementation plan. *Note: the plan should also include any known solid waste landfills which were closed since 1989 so that they can receive post-closure certifications.*
- B. Describe how proposed facilities will be reviewed for inclusion in the plan.
Explain the process to be used to determine if solid waste facilities proposed to be located in the SWME will be “included in” the solid waste implementation plan. The process may reference the siting criteria (developed under paragraph 8 above) and existing zoning ordinances, may require a host town agreement, or may defer to the requirements in the Vermont Solid Waste Management Rules for some or all types of solid waste facilities. The standard(s) for being “included in” the solid waste implementation plan should be clear.

6. Public Participation Plan

Describe the process used to ensure early and sustained public participation in development and implementation of the plan. Local citizens, businesses, organizations, and solid waste management facility owners should be notified of the opportunities to participate in the public process for plan development and implementation.

7. Ordinances

Include copies of any local ordinances pertaining to solid waste or materials management.

8. Conformance with Other Plans

Demonstrate that the Implementation Plan is in conformance with any municipal and regional plan adopted in accordance with 24 V.S.A Chapter 117. Demonstration may be in the form of a letter from the applicable regional planning commission and the municipal planning board regarding conformance of the solid waste implementation plan with the regional and municipal plan, copies of pertinent sections of the municipal or regional plan, or other documentation that proves conformance.

Implementation Report

Starting in 2015, all SWMEs must submit a complete and submit an implementation report annually by July 1st to ANR. The implementation report must include the following:

- A description of the status of meeting each performance standard and supporting documentation.
- An overall budget for the SWME which at a minimum should show costs for these categories: administrative, operating and facilities, and outreach and education.

Glossary of Terms

DISCLAIMER - The Glossary of Terms does not provide legal definitions of all terms. Instead, the intent is to provide consistent definitions of key words used in this Plan so that all readers have the same understanding of these terms as used in the context of this Plan.

Biogas: gas produced by the breakdown of organic material in the absence of oxygen.

Biosolids: primarily organic materials recovered from the wastewater treatment process and sewage sludge, both of which have been treated and shown to meet the standards such that it can be managed through beneficial use. Beneficial use includes land application or further treatment to produce compost or similar products. Disposal includes dewatering followed by landfilling or incineration.

Clean wood: dimensional lumber wood, trees, and other natural woody debris, including limbs, logs, that have not been painted, stained, treated, or glued.

Closed loop recycling: a system in which materials used to make one product are reclaimed and reused in the production process or the manufacturing of a new or separate product.

Commercial hauler: any person or company that transports:

- (A) Regulated quantities of hazardous waste; or,
- (B) Solid waste for compensation in a motor vehicle having a rated capacity of more than one ton.

Conditionally Exempt Generator (CEG): a generator of hazardous waste that is conditionally exempted from certain provisions of the Vermont Hazardous Waste Management Regulations.

Composting: the controlled biological decomposition of organic matter through active management to produce a stable, humus-rich material.

Construction and Demolition (C&D) debris: means waste derived from the construction or demolition of buildings, roadways or structures including but not limited to clean wood, treated or painted wood, plaster, sheetrock, roofing paper and shingles, insulation, glass, stone, soil, flooring materials, brick, masonry, mortar, incidental metal, furniture and mattresses. This waste does not include asbestos waste, regulated hazardous waste, hazardous waste generated by households, hazardous waste from conditionally exempt generators, or any material banned from landfill disposal under 10 V.S.A. §6621a.

Cradle-to-Cradle (C2C): a concept focusing on the lifecycle management of a particular product, the goal of which is to reduce waste and toxins generated at each step in the lifecycle of a product. The MMP embraces the materials management strategies identified in the C2C model.

Disposal: the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or onto any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any ground or surface waters.

Diversion Rate: the measurement of the amount of waste diverted (by composting, reusing, and recycling materials), divided by the sum of waste diverted and waste disposed (at disposal facilities, landfills and incinerators). Materials used for alternative daily cover at landfills do not constitute materials diverted from the landfill.

That is calculated by using the following equation:

$$\text{Diversion Rate (\%)} = \frac{\text{tons diverted}}{\text{tons diverted} + \text{disposed}} \times 100 = \frac{\text{tons reused} + \text{composted} + \text{recycled}}{\text{tons reused} + \text{composted} + \text{recycled} + \text{landfilled} + \text{incinerated}} \times 100$$

Electronic Waste (E-waste): a computer; computer monitor; computer peripheral; device containing a cathode ray tube; printer; or television from a covered entity. “Electronic waste” does not include: any motor vehicle or any part thereof; camera or video camera; portable or stationary radio; wireless telephone; household appliance, such as a clothes washer, clothes dryer, water heater, refrigerator, freezer, microwave oven, oven, range, or dishwasher; equipment that is functionally or physically part of a larger piece of equipment intended for use in an industrial, library, research and development, or commercial setting; security or antiterrorism equipment; monitoring and control instruments or systems; thermostats; handheld transceivers; telephone of any type; portable digital assistant or similar device; calculator; global positioning system receiver or similar navigation device; commercial medical equipment that contains a cathode ray tube, a cathode ray tube device, a flat panel display, or similar video display that is not separate from the larger piece of equipment; or other medical devices, as the term “device” is defined under 21 U.S.C. § 321(h) of the Federal Food, Drug, and Cosmetic Act, as that section is amended from time to time. (10 V.S.A. §7551(10)).

Energy recovery (as it relates to the Food Recovery Hierarchy): Energy recovery as it relates to the food residual hierarchy does not include disposal by incineration, waste-to-energy incineration, or other such processes.

Environmental Preferable Purchasing (EPP): products and services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw material acquisition, production, manufacturing, packaging, distribution, re-use, operation, maintenance, or disposal of the product or service. (Presidential Executive Order 13101; USEPA; generally accepted by industry).

Extended Producer Responsibility (EPR): a mandatory type of product stewardship that includes, at a minimum, the requirement that the producer’s responsibility for their product extends to post-consumer management of that product and its packaging. There are two related features of EPR policy: (1) shifting financial and management responsibility, with government oversight, upstream to the producer and away from the public sector; and (2) providing incentives to producers to incorporate environmental considerations in the design of their products and packaging.

Food Scraps/Residuals: source separated and uncontaminated material that is derived from processing and discarding of food and that is recyclable; may include pre-consumer and postconsumer food scraps, but does not necessarily include meat and meat-related products when the food residuals are composted by a resident on site.

Household Hazardous Waste (HHW): any waste from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas) that would be subject to regulation as hazardous wastes if it were not from households. Examples of HHW include: paint, cleaners, oils, batteries, and pesticides. Because they contain potentially hazardous ingredients, these wastes require special management.

Lifecycle: refers to a material throughout its entire lifespan, ‘from raw material extraction and conversion; to manufacture and distribution; through use, re-use, and recycling; to ultimate disposal. (USEPA - <http://www.epa.gov/nrmrl/std/lifecycle.html>)

Leaf and yard debris: source separated compostable, untreated vegetative matter, including grass clippings, leaves, kraft paper bags, and brush, which is free from non-compostable materials. It does not include such materials as pre-consumer and postconsumer food residuals, food processing residuals, or soiled paper.

Mandated recyclable: any of the following source separated materials: aluminum and steel cans; aluminum foil and aluminum pie plates; glass bottles and jars from foods and beverages; polyethylene terephthalate (PET) plastic bottles or jugs; high density polyethylene (HDPE) plastic bottles and jugs; corrugated cardboard; white and colored paper; newspaper; magazine; catalogues; paper mail and envelopes; boxboard; and paper bags.

Management facilities: Facilities that are permitted by ANR to accept materials for recycling, processing, or disposal.

Materials Management: refers to the lifecycle of materials as they trace their course through the economy, from raw material extraction to product manufacture, transport, use, source reduction, reuse, recycling, and disposal. (USEPA <http://www.epa.gov/statelocalclimate/state/topics/waste-mgmt.html>).

Municipal Solid Waste (MSW): combined household, commercial, and industrial waste materials generated in a given area.

Organic Materials: materials of a biological origin such as paper and cardboard, food, yard and garden waste, animal waste, biosolids and septage. For this MMP, biosolids and septage are discussed separately from other organic materials. Animal waste is not a subject addressed in this MMP.

Pay As You Throw: See reference for Variable Rate Pricing.

Parallel Collection: Parallel collection means that haulers that offer collection of refuse must also offer services for collection of mandatory recyclables by 2015, leaf and yard residuals by 2016, and food residuals by 2017; facilities that offer collection of refuse must also offer services for collection of mandated recyclables by 2014, leaf and yard residuals by 2015, and food residuals by 2017; where buildings or land are owned or controlled by state or municipal entities, a recycling container must be provided that is clearly labeled for recyclables as closely as possible to all trash containers except for those provided in the bathroom.

Per Capita Disposal Rate: the average amount of waste disposed (landfilled or incinerated) per person in a given year. Or, when expressed as an equation:

Per Capita Disposal Rate = $\frac{\text{(total tons landfilled + total tons incinerated) per year by a given town or district or state}}{\text{total population of that town or district or state (may be adjusted for seasonal population)}}$

Plan term: the period of time by which the Materials Management Plan designates the earliest and latest possible date at which a performance standard must be completed. This term is scheduled for a 5-year period beginning on the date of adoption.

Preferred Practices: means following the preferred pre-sorting, pre-treatment, or pre-disposal procedures required of the destination facility to mitigate contamination from unwanted materials. Refer to guidance the facility makes available or call your hauler or local solid waste management entity if you are unsure which facility that is.

Product Stewardship: the act of minimizing health, safety, environmental, and social impacts of a product and its packaging, and maximizing economic benefits of a product and its packaging throughout all lifecycle stages. The producer of the product has the greatest ability to minimize adverse impacts, but other stakeholders, such as suppliers, retailers, and consumers, also play a role. Product stewardship can be either voluntary or required by law.

Public Building: a state, county, or municipal building, airport terminal, bus station, school building, or school.

Public Land: all land that is owned or controlled by a municipal or state governmental body.

Recovered Materials: materials that have been removed from the waste stream to retain value by reuse or recycling. This is achieved through separation, or "diversion," from other materials destined for the landfill.

Recovery Rate: rate that is calculated by dividing the tonnage of certain recyclable materials diverted from disposal by the tonnage generated, with generation equal to the sum of tons diverted plus tons of the same materials disposed from the Waste Composition Study. The recovery rate includes aluminum, glass, plastics 1-7, steel cans, and fibers.

$$\text{Recovery Rate (\%)} = \frac{\text{tons of certain materials diverted}}{\text{(tons of certain materials diverted + tons of same materials disposed)}} \times 100$$

Recyclable Materials: solid waste which may be reclaimed and/or processed so that they may be used in the production of materials or products.

Recycling: the process of utilizing product residuals, packaging, or food scraps for the production of materials or products, but does not include processing solid waste to produce energy or fuel products.

Recycling Rate: the percentage of material recycled compared divided by the sum of recycled and disposed material, multiplied by 100. Or, when expressed as a formula:

$$\text{Recycling Rate (\%)} = \frac{\text{tons of materials recycled}}{\text{(tons of materials recycled + tons of waste disposed)}} \times 100$$

Re-TRAC Connect: a database used to manage all diversion and disposal reports for the State of Vermont. Data can be tracked and reports run based upon facility, material, or region.

Reuse: use of a material or product more than once before it is recycled or discarded as solid waste.

Septage: the liquid and solid materials pumped from a septic tank or cesspool during cleaning.

Sludge: any untreated solid, semisolid, or liquid generated from a municipal, commercial, or industrial wastewater treatment plant or process, water supply treatment plant, air pollution control facility, or any other such waste having similar characteristics and effects.

Solid Waste (SW): any discarded garbage, refuse, or septage, or sludge from a waste treatment plant, water supply plant, or pollution control facility and other discarded material including solid, liquid, semi-solid, or contained gaseous materials resulting from industrial, commercial, mining, or agricultural operations and from community activities but does not include animal manure and absorbent bedding used for soil enrichment or solid or dissolved materials in industrial discharges which are point sources subject to permits under the Water Pollution Control Act. Solid waste that is also hazardous waste is subject to further regulation under the Vermont Hazardous Waste Management Regulations.

Solid Waste Implementation Plan (SWIP): that plan which is adopted to be consistent with the State Materials Management Plan (MMP). This plan must include all the elements required for consistency with the MMP and an applicable regional plan and shall be approved by the Secretary. This implementation plan is the basis for state certification of facilities.

Solid Waste Management: activities that result in the storage, transportation, transfer, treatment of solid waste or recyclable material, or disposal of solid waste.

Solid Waste Management Entity (SWME): a term used to reference a town or groups of towns that have unified as a district, group, or alliance in order to share financial and human resources dedicated to managing the solid waste generated by organizations and residents residing within the particular town or group of towns.

Source-Separated or Source-Separation: the separation of compostable and recyclable materials from noncompostable, nonrecyclable materials at the point of generation.

Sustainable Materials Management Strategy: Materials management is focused on knowing and reducing the lifecycle impacts across the supply chain; using less material inputs (reduce, reuse, recycle); using less toxic and more renewable materials; and considering whether services can be substituted for products. (USEPA -

<http://www.epa.gov/epawaste/consERVE/smm/vision.htm#vision2>)

SWIP term: the term in which a Solid Waste Implementation Plan (SWIP) is approved by ANR until the time a new SWIP is approved following the adoption of a new MMP (referred to as a “solid waste management plan” by statute) or a revised SWIP is approved by ANR.

Systems Analysis: The Systems Analysis of the Impact of the Universal Recycling law on Solid Waste Management in Vermont (2013) is an ANR-contracted study report conducted by DSM Environmental, Inc. to complete some of the legislative requirements of Section 12 of the Universal Recycling law.

Tools of Action: following a series of Solid Waste Working Group (SWWG) meetings in 2008, numerous tools were identified that are believed to be driving forces in attaining the proposed Sustainable Materials Management Vision presented in this Plan. Of the elements that were considered essential to successful waste reduction, seven were selected for further discussion. Those seven essential elements for materials management programs are targeted in this MMP as “Tools of Action,” and include environmental education, product stewardship and extended producer responsibility, government leadership, infrastructure improvements, mandates and bans, standards, and partnerships.

Transfer Station: a solid waste management facility where solid waste is collected, aggregated, sorted, stored, and/or processed for the purpose of subsequent transfer to another solid waste management facility for further processing, treatment, transfer, or disposal.

Unit Based Pricing: See Variable Rate Pricing for definition.

Universal Waste: establishes alternative management standards for certain hazardous wastes in order to streamline the management process. Examples of Universal Wastes are batteries, pesticides, thermostats, PCB-containing fluorescent light ballasts, lamps, mercury-containing devices, paint, and cathode ray tubes.

Variable Rate Pricing (or Unit Based Pricing, or Pay As You Throw): Charging a tiered or variable fee based on the volume or weight of the solid waste collected.

Waste: a material that is discarded or is being accumulated, stored, or physically, chemically, or biologically treated prior to being discarded, or has served its original intended use or is a manufacturing or mining by-product, and is normally discarded.

Waste Prevention: actions or choices that prevent the generation of waste. Waste prevention involves altering the design, manufacture, purchase, or use of products and materials to reduce the amount and toxicity of what gets thrown away.

Waste Reduction: waste reduction combines the efforts of waste prevention, reuse, composting, and recycling practices.

Zero Waste: an ambitious goal adopted by several states and municipalities to attain the highest degree of waste prevention and diversion possible with a value-retained vision of materials. The MMP strives to achieve zero waste principles through the collaboration and innovation of the people and businesses of Vermont and beyond.

Glossary of Acronyms and Abbreviations

3Cs: Convenient, Consistent, Cost Effective

3Rs: Reduce, Reuse, Recycle

ANR, or Agency: Vermont Agency of Natural Resources

AOT: Vermont Agency of Transportation

BB: Bottle Bill

BGS: Vermont Department of Buildings and General Services

BMP: Best Management Practices

C&D: Construction and Demolition

CEG: Conditionally Exempt Generator

D&D: Diversion and Disposal

DEC: Vermont Department of Environmental Conservation

Districts: Solid Waste Management Districts

EAO: Vermont Environmental Assistance Office

EPP: Environmental Preferable Purchasing

EPR: Extended Producer Responsibility

EQ: Exceptional Quality

FY: Fiscal Year

GHG: Green House Gas

HHW: Household Hazardous Waste

LEED: Leadership in Energy and Environmental Design

Mg/kg: Milligrams per kilogram

MMP or Plan: Vermont Materials Management Plan, formerly known as Vermont Solid Waste Management Plan

MMTCO₂: Million Metric Tons Carbon Dioxide

MSW: Municipal Solid Waste

PCB: polychlorinated biphenyl

Plan or MMP: Vermont Materials Management Plan, formerly known as Vermont Solid Waste Management Plan

SW: Solid Waste

SWMEs: Solid Waste Management Entities

SWIP: Solid Waste Implementation Plan

SWWG: Solid Waste Working Group

USEPA: United States Environmental Protection Agency

Vision: Sustainable Materials Management Vision

WCS: Waste Composition Study

WWTF: Wastewater Treatment Facility

APPENDIX A: Timeline of Act 148 Implementation Dates



Universal Recycling TIMELINE

**JULY 1
2014**

- » Transfer stations/Drop-off Facilities must accept residential recyclables at no extra charge
- » Food scrap generators of 104 tons/year (2 tons/week) must divert material to any certified facility within 20 miles

**JULY 1
2015**

- » Statewide unit based pricing takes effect, requiring residential trash charges be based on volume or weight
- » Recyclables are banned from the landfill
- » Transfer stations/Drop-off Facilities must accept leaf and yard debris
- » Haulers must offer residential recycling collection at no extra charge
- » Public buildings must provide recycling containers alongside all trash containers in public spaces (exception for restrooms)
- » Food scrap generators of 52 tons/year (1 ton/week) must divert material to any certified facility within 20 miles

**JULY 1
2016**

- » Leaf, yard, and clean wood debris are banned from the landfill
- » Haulers must offer leaf and yard debris collection
- » Food scrap generators of 26 tons/year (1/2 ton/week) must divert material to any certified facility within 20 miles

**JULY 1
2017**

- » Transfer stations/Drop-off Facilities must accept food scraps
- » Haulers must offer food scrap collection
- » Food scrap generators of 18 tons/year (1/3 ton/week) must divert material to any certified facility within 20 miles

**JULY 1
2020**

- » Food scraps are banned from the landfill