

Prepared for:

Greater Upper Valley Solid Waste District

Town of Hanover, NH

Town of Hartford, VT

City of Lebanon, NH

Town of Norwich, VT

# Opportunities for Regional Cooperation on Solid Waste Management in the Upper Connecticut River Valley

FINAL REPORT – JULY 2014

Prepared by:

DSM ENVIRONMENTAL

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## INTRODUCTION

For decades communities in the Upper Valley have cooperated on solid waste management, even though solid waste regulations and planning requirements differ in the two states. Ten Upper Valley municipalities in Vermont are members of the Greater Upper Valley Solid Waste Management District (GUVSWD), and municipalities to the south of Lebanon on the New Hampshire side were members of the Sullivan County Regional Refuse Disposal District and the NH/VT Solid Waste Project for over twenty years before it was disbanded. More importantly, the City of Lebanon landfill has served communities in both states for many years, providing cost effective landfill disposal while providing the host community of Lebanon with up to \$600,000 annually in revenue for the general fund over and above the cost to operate the landfill.

The adoption of Act 148 in Vermont, which significantly ratchets up mandatory materials and organics recycling requirements for Vermont communities, combined with a desire by municipalities in both states to save costs through regionalization of shared services prompted the larger communities of Lebanon, Hanover, Hartford and Norwich, together with the GUVSWD to contract with DSM Environmental Services, Inc. (DSM) to examine the potential for cost savings and increased materials diversion through greater regional cooperation. One of the driving forces behind the analysis was the realization that eventually Lebanon's landfill will either reach capacity or be required to invest in more costly cell construction to the south of the existing landfill. The GUVSWD, which owns a permitted landfill site in Hartland, has financed the development of that site and would be interested in sharing those costs with additional communities in return for joint ownership of this potentially valuable resource in the future. And, the Town of Hartford has the only permitted permanent household hazardous waste (HHW) collection facility which could be operated as a regional facility serving all of the municipalities using the Lebanon landfill.

DSM Environmental Services, Inc. (DSM) was contracted by the towns of Hanover, Hartford, and Norwich, the City of Lebanon and the GUVSWD to conduct a regional analysis of solid waste collection, disposal and recycling activity. The objective was to not only provide a better understanding of the watershed and the potential for additional diversion, but to review how municipalities on both sides of the river might share resources and jointly finance solid waste management activity in the future, including the GUVSWD landfill site.

Municipalities included in the analysis comprise all of the municipalities that are currently delivering waste to the Lebanon landfill. Table 1 lists the municipalities and their population and provides an estimate of the total number of households (adjusted for the seasonal population) which make up the study region.

**TABLE 1: POPULATION AND ADJUSTED HOUSEHOLD COUNT<sup>(1)</sup> FOR MUNICIPALITIES IN THE STUDY REGION (2012)**

<b>VERMONT</b>	<b>Population</b>	<b>Housing Units</b>	<b>Households Occupied</b>	<b>Household Count, Including Seasonal Households</b>
Bridgewater	936	688	431	495
Hartland	3,393	1,584	1,417	1,459
Norwich	3,414	1,553	1,386	1,428
Pomfret	904	544	393	431
Sharon	1,502	735	621	650
Strafford	1,098	586	453	486
Thetford	2,588	1,288	1,097	1,145
Vershire	730	435	300	334
West Fairlee	652	368	275	298
Woodstock	3,048	1,893	1,392	1,517
<b>Subtotal, GUVSWD:</b>	<b>18,265</b>	<b>9,674</b>	<b>7,765</b>	<b>8,242</b>
Fairlee	977	625	429	478
Hartford	9,952	5,816	4,446	4,789
<b>Total, Vermont:</b>	<b>28,217</b>	<b>15,490</b>	<b>12,211</b>	<b>13,031</b>
<b>NEW HAMPSHIRE</b>				
Canaan	3,909	1,930	1,588	1,674
Enfield	4,582	2,508	2,044	2,160
Grafton	1,340	839	564	633
Grantham	2,985	1,773	1,249	1,380
Hanover	11,260	3,445	3,119	3,201
Lebanon	13,151	6,649	6,186	6,302
Lyme	1,716	810	705	731
Newbury	2,072	1,559	869	1,042
Orange	311	167	132	141
Orford	1,237	656	535	565
Plainfield	2,364	984	923	938
Sutton	1,837	985	757	814
<b>Total New Hampshire:</b>	<b>46,764</b>	<b>22,305</b>	<b>18,671</b>	<b>19,580</b>
<b>Total Region:</b>	<b>74,981</b>	<b>37,795</b>	<b>30,882</b>	<b>32,610</b>

(1) Unoccupied housing units are assumed to be occupied 25% of the year, to account for the seasonal population.

## SCOPE OF WORK

DSM was contracted in November 2013 to undertake the following scope of work:

- Develop rough estimates of the amount of MSW, Recyclables, HHW, C&D, Organics, Electronics, Tires, and other special wastes generated in the study area based on information supplied by the municipalities, as well as per capita estimates where real data are not available, with adjustment to account for industrial, commercial and institutional (ICI) waste and materials.
- Examine the refuse and recycling collection infrastructure in the region and estimate the percentage of the population that relies on curbside versus drop-off collection, considering the existing municipal contracts in place.
- Look at existing (and potential) facilities located in the participating municipalities and the type and volumes of materials handled by each.
- Make rough estimates of the current capacity of the existing infrastructure to handle these materials, and the potential to handle materials moving forward. This includes consideration of current costs (as provided by municipalities), and potential future costs given changes associated with Act 148 in Vermont, and similar changes that might occur in NH over time.
- Assess any regional opportunities for materials collection, management, transfer and disposal; including consolidation or sharing of facilities. This includes examining the potential for regional governance and the distribution of costs to participants, as well as how the Lebanon landfill lifetime might change with changing disposal rates, and the potential future for the GUVSWD District landfill.

In order to accomplish this Scope of Work, DSM carried out the following tasks:

- Reviewed transfer stations reports required by the NH Department of Environmental Services (DES) and VT Agency of Natural Resources (ANR) on materials collected for recycling and disposal at municipal transfer stations, including volumes and markets by material type;
- Surveyed municipalities on the facilities and services available for solid waste management in their municipality, and collected additional data on the use of those facilities and services, and the types and volumes of materials handled;
- Collected and analyzed information on the flow of municipal solid waste (MSW) in the study region including data on MSW and construction and demolition waste (C&D) compiled by GUVSWD, scale data detailing CY 2013 deliveries to the Lebanon landfill, and MSW and C&D deliveries to other disposal facilities;
- Reviewed current tipping fees and the potential to increase tip fees at the Lebanon landfill;
- Surveyed area haulers on services provided and the percentage of waste and recycling collected from households as opposed to businesses and institutions;
- Reviewed municipal curbside collection contract costs and services provided;

- Evaluated the current HHW collection system in VT and in NH in calendar year (CY) 2013;
- Evaluated current recycling activity and the potential to increase recycling;
- Collected data on food waste composting activity, facilities used, and volumes generated by different institutions;
- Reviewed the potential to increase diversion of recyclable materials and organics;
- Evaluated the impact of these decreased deliveries on the Lebanon landfill;
- Reviewed the potential to share services regionally, and the potential benefits of regional arrangements; and,
- Developed a description of the potential institutional and regional funding options that might exist if regional sharing of facilities was deemed cost effective.

The findings of DSM's work are presented below

### Limitations of Analysis

DSM has relied on data provided by the municipality or listed in a mandated facility report for each operating facility. However, in many cases, municipalities had limited data on quantities of wastes collected by material type requiring DSM to use best professional judgment to estimate materials quantities. DSM endeavored to locate missing data by contacting organizations that handled materials collected, such as Northeast Resource Recovery Association (NRRRA) which cooperatively markets materials from some of the study municipalities, or other material and organics recyclers operating in the region.

The City of Lebanon did provide DSM with detailed data on deliveries to the Lebanon landfill which were used in this analysis. However, according to the scale operator Lebanon sometimes relies on statements by drivers entering the landfill as to the location of collected waste, which may or may not be entirely accurate.

Data available to DSM beyond that provided by Lebanon on landfill deliveries are for the most part estimates, with scale data not available for much of the estimates on recycling and on MSW and C&D disposed outside of the Lebanon landfill.

In addition, and most critically, through this analysis DSM found that over 70 percent of MSW, recyclables and C&D are collected by the private sector and as result there was no central source of data on materials collection by municipality outside of that reported by transfer stations. DSM was highly reliant on the largest waste collection company in the region, Casella Waste Services, to provide information and verify data in order to complete the analysis of material flow in the region. DSM also conducted surveys of other private haulers, and relies on these responses to draw any conclusions.

## METHODOLOGY AND RESULTS

### Analysis of Lebanon Landfill Scale Data

The City of Lebanon provided landfill scale data for 2010 – 2013 for each of the municipalities utilizing the landfill. The scale data lists the hauler or permit holder name, date, time, weight, material type and source (originating municipality) for each weight taken. DSM analyzed this information in detail for calendar year (CY) 2013 to calculate the quantities collected from each hauling company and from each municipality.

While the scale operator has the ability to 'split tickets' when trucks are delivering MSW collected from more than one municipality to the landfill, in practice this rarely occurs. It is up to the driver to ask for a split ticket and any 'split ticket' data would represent the driver's estimate as to the weight and origin of trash collection as the trucks do not have on-board scales. Finally, there is no reason for the driver or waste company to track which municipality the waste is collected in except when reporting tonnages to the Greater Upper Valley Solid Waste District. Therefore, the municipal scale data provides only a rough estimate of the quantities of waste by municipality.

DSM also surveyed the landfill operators to more accurately allocate deliveries from users paying with coupons. However, it is likely that some coupon users claim they are from Lebanon when they purchase coupons, even if they are not, which inflate totals originating in Lebanon.

Key findings from the analysis of the Lebanon landfill scale data include:

- Roughly 38,000 tons were delivered to the Lebanon landfill last year. Another 3,000 tons from municipalities that could deliver waste to Lebanon went to other facilities; it is not likely that this waste will be delivered to Lebanon going forward given current tipping fees at surrounding facilities;
- Roughly 95% of the total MSW tipped from NH municipalities is delivered by 20 private haulers who make up only 9% of permit holders from NH;
- Roughly 96% of the total MSW tipped from VT municipalities is delivered by 12 private haulers who make up only 14% of permit holders from VT;
- Casella represents roughly 60% of the MSW disposed at the Lebanon landfill, and with the purchase of Woodstock Recycling, would represent 63%;
- The remaining MSW is delivered from other private haulers (13%), municipal transfer stations including Lebanon's drop-off at the landfill (14%), and businesses and institutions that direct haul their waste (10%, of which 1665 tons were from Dartmouth College); and,
- A large number of businesses in Lebanon, especially, deliver waste directly to the landfill, as opposed to contracting with a private hauler – while these deliveries represent a relatively small percentage of total deliveries they comprise a large percentage of the traffic delivering waste;

As the findings above indicate, Casella is the key to deliveries of waste to the Lebanon landfill. Casella is under no obligation to deliver waste to Lebanon, and a decision by Casella to stop using the Lebanon landfill would have a significant impact of Lebanon landfill revenues.

### The Role of Transfer Stations

According to George Murray, City of Lebanon, all municipalities using the Lebanon landfill have a signed agreement with Lebanon which, among other clauses, requires that *“the Town shall have the obligation to deliver all Acceptable Waste which the Town controls to the (Lebanon) Landfill”*.<sup>1</sup>

DSM obtained 2012 transfer station reports from the New Hampshire Department of Environmental Services for municipal transfer stations located in Lyme, Sutton, Canaan, Enfield, Newbury, Grantham and Grafton. These reports list tonnages of MSW, recyclables and Construction and Demolition (C&D) Waste collected during each calendar year and the destination for these materials. However in some cases, DSM needed to confirm the destination and quantities of materials as information was incomplete.

In Vermont, DSM obtained copies of quarterly reports for the transfer stations and drop-offs, and/or collected data on materials collected, weights and destinations directly from the municipality.

DSM’s key findings from reviewing these reports include:

- Some transfer stations serve as an important outlet for hard to handle wastes, such as propane tanks, tires, lead acid batteries, bulky and C&D wastes, scrap metal, and florescent tubes;
- Roughly 30% of residential MSW is collected through transfer stations;
- Transfer stations collected an estimated 36 percent of residential recyclables in the region;
- Recycling rates at transfer stations appear relatively high, and when coupled with unit based pricing result in the highest rates of recycling however, these rates do not represent the recycling rate for a municipality as a whole since not all residents use the transfer station and some do to only recycle or drop-off special wastes; and,
- Costs to collect materials at a transfer station are not necessarily lower than the cost to collect materials curbside, particularly if the cost to the resident to drive to the transfer station is included.

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<sup>1</sup> Language from *“Municipal Solid Waste Agreement between City of Lebanon and Greater Upper Valley Solid Waste District*, June 1, 2000. It is assumed that all VT and NH municipalities using the Lebanon landfill have entered into the same agreement.

### Source of Waste and Collection Method

DSM contacted town administrators, transfer station operators and private haulers to determine who collected MSW in the municipality, where MSW went if it didn't all go to the Lebanon landfill and how much, and roughly how much MSW was generated by residents as opposed to the commercial/industrial/institutional (ICI) sector.

This information was used in conjunction with the Lebanon landfill scale data and the municipal transfer station data to allocate tonnages collected to either residential or ICI generators, and by municipality.

The results from this analysis are shown in Tables 2 and 3 below. As noted above, roughly 38,000 tons was delivered to the Lebanon landfill with the remainder going to other transfer stations or landfills.

**TABLE 2. ESTIMATED TONS OF MSW GENERATED BY VERMONT AND NEW HAMPSHIRE MUNICIPALITIES USING THE LEBANON LANDFILL**

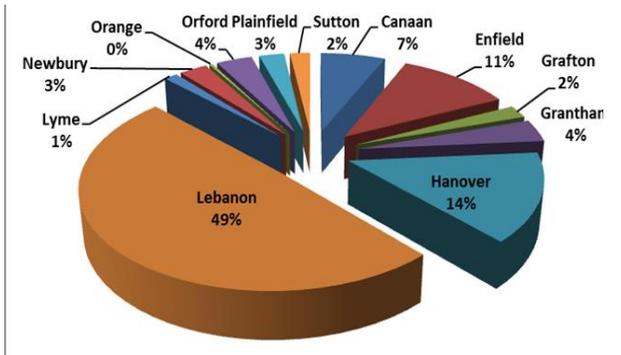
	<b>Residential</b>	<b>ICI</b>	<b>Total</b>	<b>Percent</b>
<b>State</b>	<i>(tons)</i>	<i>(tons)</i>	<i>(tons)</i>	<i>(%)</i>
Vermont	9,300	4,400	13,700	33%
New Hampshire	15,900	11,700	27,600	67%
<b>Total:</b>	<b>25,200</b>	<b>16,100</b>	<b>41,300</b>	

**TABLE 3: ESTIMATED TONS OF MSW DISPOSED BY COLLECTION METHOD AND BY GENERATOR TYPE**

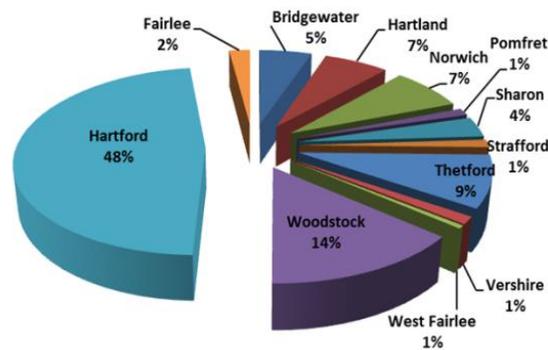
	<b>Residential</b>	<b>ICI</b>	<b>Total</b>	<b>Percent</b>
<b>Collection Method</b>	<i>(tons)</i>	<i>(tons)</i>	<i>(tons)</i>	<i>(%)</i>
Private Hauler	17,400	12,300	29,700	72%
Property Manager	300		300	1%
Business/Institution Direct Haul		3,600	3,600	9%
Transfer Station	7,500	200	7,700	19%
<b>Total:</b>	<b>25,200</b>	<b>16,100</b>	<b>41,300</b>	

Figures 1 and 2 illustrate the contributions of MSW from each municipality in the study area to the Lebanon landfill wasteshed. These include both residential and ICI waste disposal from each municipality.

**FIGURE 1. ESTIMATED MSW DISPOSAL IN CY 2013 BY NH TOWNS**

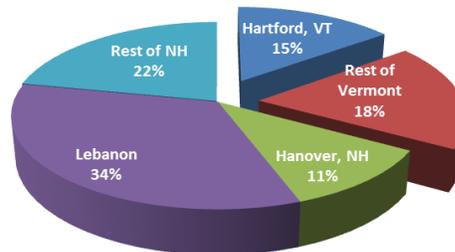


**FIGURE 2. ESTIMATED MSW DISPOSAL IN CY 2013 BY VT TOWNS**



Finally, Figure 3 illustrates the largest contributors to the wasteshed in the study region. Collectively, an estimated 24,700 tons of waste were delivered from generators in Hanover, Hartford, and Lebanon last year, or about 60 percent of waste disposed from the study region.

**FIGURE 3. LARGEST CONTRIBUTORS TO DISPOSAL FROM THE STUDY REGION (CY 2013, BY WEIGHT)**



DSM’s key findings from this analysis are:

- Over 70 percent of the MSW is collected by private haulers and not by municipalities;
- Transfer stations are responsible for 19 percent of this MSW collected in the region;
- Many small businesses haul their own waste directly to the Lebanon landfill, typically in small loads paying the same tip fee as larger haulers delivering much larger loads;
- Most of the waste from Vermont is residential; and,
- Vermont’s contribution to the wasteshed is relatively small at an estimated 13,700 tons disposed last year, or 1/3 of disposal in the region.

## Review of Construction and Demolition Waste Management

Most C&D waste is not delivered to the Hartford transfer station or the Lebanon landfill. Instead it goes to Casella transfer stations in Lebanon or Newport; or a small amount goes to Hammond Grinding and Recycling in Orange, NH.

Based on DSM's limited survey, an estimated 13,000 tons of C&D waste were generated last year from the study area, of which only roughly 1,000 tons was delivered to the Hartford transfer station or the Lebanon landfill. Generation of C&D waste is likely up from the past few years when construction and demolition activity was down, and therefore associated C&D waste generated at low levels. C&D waste composition varies greatly depending on the type of construction (and demolition) activity that occurs in the region. For example, new home starts generate more clean wood and gypsum than renovation or demolition activity. Because of this, it is difficult to predict how much material might be available for recycling in a given region. However, based on a comprehensive analysis that DSM conducted for Massachusetts Department of Environmental Protection in 2007,<sup>2</sup> only about 11 percent of C&D waste is composed of clean wood (or high grade wood, consisting of pallets and crates and other unpainted wood), and another 6 percent is clean dry wall. In both cases, separating the clean wood and gypsum after it has been combined with other C&D materials is difficult (for clean wood) and nearly impossible for clean gypsum (because it is broken into small pieces). As such recycling activity for these materials must take place at the job site, or at the entrance to disposal/transfer facility.

There is very little information available on the volume of C&D recycling activity occurring in the region. Reuse outlets like *Cover* and *Vermont Salvage* play a role in the recovery of useable building components, and large demolition contractors that work directly with C&D processors/recyclers can help to divert C&D materials in the region from disposal. In most cases, C&D recyclers sort C&D materials manually and mechanically, and sell the majority of wood waste for fuel, while recovering large pieces of cardboard and metal.

The economics of hand separating materials at a transfer station typically do not justify the cost of sorting. Source separation of clean wood with consolidation at a transfer station or landfill can be economical. However, given how little C&D waste is being disposed of at municipal facilities, it does not appear that there are significant regional opportunities for managing this material.

More importantly, grinding of C&D at Hartford with free disposal of the ground C&D at the Lebanon landfill may prove problematic going forward as Lebanon works to control odors at the landfill. This is because disposal of whole C&D mixed with MSW typically generates less odor than grinding and use of the C&D as landfill cover material.

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<sup>2</sup> <http://www.mass.gov/eea/docs/dep/recycle/reduce/06-thru-1/07cdstdy.doc>

## Materials Recycling

DSM collected data on recycling activity occurring in the study region. This included collection and review of state facility reports and telephone surveys of major recyclers and transfer station operators. DSM did not survey large generators that handle their own material, such as grocery, department and large retail stores that may bale on-site and backhaul materials. As such, these materials are not included in our estimates of recycling in the region.

As part of the telephone surveys, DSM asked handlers to estimate how much material was collected from households as opposed to businesses and institutions, and how much material came from Vermont locations as opposed to those in New Hampshire.

The focus of DSM’s analysis was on the recycling of printed paper and packaging materials, including bottles and cans. Scrap metals, textiles and other types of materials were not well documented beyond any reporting by transfer stations. A summary of DSM’s findings are shown below in Table 4. Please note that the allocation of recycling to the residential and commercial sectors, and to Vermont as opposed to New Hampshire relies heavily on estimates made by the largest handlers of recyclables. Note that ICI refers to the Institutional, Commercial and Industrial sector combined and includes the hospitals and Dartmouth College.

**TABLE 4: ESTIMATED RECYCLING QUANTITIES BY SECTOR, SOURCE AND STATE (CY 2013)**

	<b>Residential</b>	<b>ICI</b>	<b>Total</b>	<b>Percentage</b>
<b>Source</b>	<i>(tons)</i>	<i>(tons)</i>	<i>(tons)</i>	<i>(%)</i>
<b>Recycling - VT</b>				
Drop-offs	1,300	140	1,440	12%
Curbside	1,550	1,900	3,450	29%
Leb Landfill	80	0	80	1%
<b>Recycling - NH</b>				
Drop-offs	500	50	550	5%
Curbside	1,900	3,600	5,500	46%
Leb Landfill	920	80	1,000	8%
<b>Recycling - Total</b>				
Drop-offs	1,800	190	1,990	17%
Curbside	3,450	5,500	8,950	74%
Leb Landfill	1,000	80	1,080	9%
<b>Total Recycling:</b>	<b>6,250</b>	<b>5,770</b>	<b>12,020</b>	

Key findings from DSM’s analysis include:

- An estimated 6,250 tons of printed paper, packaging and containers were recycled from households in the study region last year;
- Of this amount, Vermont’s households were estimated to have recycled an average of 430 lbs. last year and NH households an average of 340 lbs. per household;
- Transfer stations and drop-offs, including the Lebanon landfill’s drop-off area, contributed roughly 26% to the recycling estimate;
- An estimated 45 percent of residential recycling occurred through transfer stations and drop-offs (including the Lebanon landfill), even though 69 percent of refuse is collected by private haulers – this indicates that many households do not have access to parallel collection of recyclables and refuse and must rely on driving to a transfer station to recycle; and,
- The majority of commercial recycling occurs in NH and this figure is underestimated as it excludes many large generators of old corrugated containers and other packaging such as grocers and large retailers.

While recycling rates are a notoriously poor way to compare the progress or success of recycling/diversion programs, they continue to be a standard method of measurement. Table 5 below presents estimated recycling rates for printed paper and packaging (including containers) only, and excludes Vermont bottle bill material. If the bottle bill material were included, Vermont’s rate would be even higher.

**TABLE 5. RECYCLING RATES FOR THE RESIDENTIAL AND ICI SECTORS**

<b>Source</b>	<b>Residential (tons)</b>	<b>ICI (tons)</b>
<b>Vermont</b>		
Recycling	2,930	2,040
Disposal	9,344	4,407
<b>Rate:</b>	<b>24%</b>	<b>32%</b>
<b>New Hampshire</b>		
Recycling	3,320	3,730
Disposal	15,878	11,735
<b>Rate:</b>	<b>17%</b>	<b>24%</b>
<b>Total Study Region</b>		
Recycling	6,250	5,770
Disposal	25,222	16,142
<b>Rate:</b>	<b>20%</b>	<b>26%</b>

## Household Hazardous Waste (HHW) Management

There are three different organizations currently managing HHW collections in the Study Region - the GUVSWD in Vermont, the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC) in New Hampshire, and at a much smaller scale, the Town of Canaan.

The collection programs run by the two regional organizations are similar – each host a series of one day collections in the warmer months at transfer stations or other municipal locations to enable residents from the region to drop off HHW. In Vermont, Hartford has access to the GUVSWD collections, as one is typically offered each year at the Hartford transfer station at the location of the constructed but unused Hartford HHW facility. In addition, some municipalities periodically host their own collections for their residents.

Depending on funding available, HHW collections hosted by UVLSRPC are offered 4 to 5 times per year between the months of May – October. In Vermont, collections are less frequent and also depend on funding. Last year, there were two collections serving the Vermont towns.

Both the NH and VT collections rely on a permitted and licensed hazardous waste contractor to manage the collection site, ensure safety and compliance with state and federal law, and bulk, consolidate and label materials for shipment and further processing. These contractor costs represent a high percentage of the total program budget each year.

As part of a 2012-2013 Solid Waste Technical Assistance Grant funded by USDA, UVLSRPC studied the HHW collection program along with the universal waste collection programs, partnering with two Vermont Solid Waste Districts along the Connecticut River to look at HHW collection along the CT River Valley.

Conclusions from this study are summarized below<sup>3</sup>:

- *“Communities could do more to manage HHW at municipal transfer stations in New Hampshire.”*
- *“Towns could be managing all universal waste at local transfer stations/recycling centers. (For example, many towns in the region are not collecting antifreeze which could reduce cost by diverting this material from more expensive HHW collection.)”*
- *UVLSC could “benefit from partnering with nearby Vermont communities such as: Hartford and towns with the Greater Upper Valley Solid Waste District.”*
- *A rural rover program is not recommended for the region. However “Satellite collections” operated by trained professionals who set up in a small town and transfer the materials collected directly to a consolidation point are an alternative and seem to be the best option for the region.*

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<sup>3</sup> Connecticut River Valley Household Hazardous Waste Management 2013. November 15, 2013. Prepared by Morgan Environmental Solutions, LLC.

- *“Developing a permanent HHW collection facility could be a costly endeavor.” The final report estimates annual costs of \$150,000 of which \$20,000 are estimated for disposal costs and \$11,000 for a bond payment on the capital costs for construction of a new facility (which were estimated at \$102,000).*
- *“A permanent center would provide on-going options to residents and small businesses for properly managing the more dangerous wastes generated in the home or business. It would also provide storage for materials gathered that would not fit onto a truck after an HHW collection event.”*
- *“The UVLSRPC should work with the Town of Hartford, VT to utilize their existing collection center to be used by area residents and small businesses. A partnership with Hartford, VT would require some site improvements/repairs and a memorandum of understanding between the two parties.”*
- *“This partnership could increase access to proper HHW collection services and could reduce costs through sharing costs among towns.”*
- *“By establishing a permanent collection option and encouraging towns to collect all universal wastes, costs could be reduced and access increased.”*

The report also said the UVLSRPC study was to “provide the information needed to implement a long-term management program for HHW in its planning region and participating Vermont Solid Waste Districts.”

DSM reviewed the data available in this report and on the HHW collection programs in the study region. This included analyzing last year’s data on participation, quantities collected by material type, and program costs. DSM then compared these data with the Chittenden Solid Waste District (Williston, VT) program which is viewed as a model program in Vermont, as well as in many other states. Findings are summarized in Table 6.

**TABLE 6: HHW COLLECTION PROGRAM COST, VOLUMES AND PARTICIPATION STATISTICS, AS COMPARED TO THE CSWD PROGRAM (1)**

	NH	VT	CSWD
<b>Gross Cost</b>	\$43,431	\$30,778	\$472,218
<i>Quantity (lbs.)</i>	45,940	34,344	581,750
<b>Participants</b>	731	329	10,023
Households	731	329	9,290
<b>Cost per Participant</b>	<b>\$59</b>	<b>\$94</b>	<b>\$47</b>
Lbs/Participant	63	104	58
Total Households:	19,580	13,509	62,267
Participation Rate	4%	2%	15%

(1) Volume was converted to weight by applying commonly acceptable conversion factors for materials collected (such as paint and oil) and by interviewing the contractor to confirm the average density of invoiced materials.

As shown in Table 6, the CSWD had a participation rate of 15% of households in their District as opposed to participation rates of 2% to 4% in the Vermont and New Hampshire programs respectively. The cost per participant (typically a household or vehicle) ranged from \$47 in the CSWD to \$94 in VT. The quantity collected per participant also ranged broadly, with a high of 104 pounds for the Vermont collections to a low of 58 pounds in the CSWD. This difference in the weight delivered per participant typically plays a large role in the higher cost per participant since the majority of program costs are for disposal.

When comparing costs on a per pound collected basis, CSWD's costs are lowest at \$ 0.81 per pound with NH's program costs the highest at \$0.95 per pound and VT at \$0.90 per pound. However given the wide range in waste materials collected, the cost per pound varies, with highly toxic materials that must be lab packed typically at much higher costs than those of oil based paints, paint related wastes and other flammable wastes that might be bulked on-site.

In conclusion, if the Study Region were to follow the recent report conclusions and utilize the Hartford facility as a permanent facility, and offer satellite collection points to increase participation in the region, with a goal of achieving participation rates similar to the CSWD (at 15%), system costs would increase significantly over current costs. The cost per capita is misleading since lower costs are achieved with low participation and lower quantities per participant. At 15% participation in the Study Region (or 4,963 households) and at average quantities per participant of 58 pounds at a cost of \$0.81 per pound handled, the region would see annual costs of roughly \$234,000, compared to current annual costs of roughly \$74,000. This difference (roughly \$160,000) would have to be subsidized through a surcharge on landfill tip fees or through some form of per capita or per household charge. Grants may reduce this cost slightly, just as they offset program costs in both states currently, but would not cover most of the increased cost.

In conclusion, while there may strong interest in pursuing a broader and more permanent HHW program, it cannot happen without a significant subsidy. CSWD's HHW program has received a subsidy of over \$500,000 the past three years from the District's MSW tipping fee surcharge.

## Organics Diversion

There has been interest and participation in food waste composting in the Study Region for over 15 years. Dartmouth College and the Town of Hanover were early supporters of the ROT composting facility located in Lebanon, and Dartmouth continues to use the facility to divert food waste and other organic materials.

DSM conducted a limited survey of food waste collection and off-site composting in the study region to determine who was separating food waste, how much material (roughly) was being diverted for off-site composting, and who was collecting and composting the material.

DSM also made rough estimates of how much food waste might be currently disposed in the region in order to estimate the potential for additional organics diversion above current activity. To do so, DSM used the recent

(2012) Vermont Waste Composition Study findings, and applied them to the estimated residential and commercial MSW tons disposed in the Study Area. The resulting estimates of food waste and other organics currently disposed are very rough, as the Vermont study presents results for Vermont as a whole, not for a particular region. But since there are no data on the composition of waste disposed in the Lebanon landfill, the Vermont study serves as a reasonable proxy to estimate organics diversion potential for the Study Region, as shown below in Table 7.

**TABLE 7: ESTIMATED FOOD WASTE AND YARD WASTE DISPOSED IN THE STUDY AREA (CY 2013)**

	<b>Residential</b>	<b>Commercial</b>	<b>Total</b>
	(tons)	(tons)	(tons)
<b>Vermont</b>			
Tons of MSW Disposed	9,025	4,726	<b>13,751</b>
<i>Food Waste</i>	1,509	531	<b>2,040</b>
<i>Mixed Yard Waste Leaves, Branches, &amp; Stumps</i>	288	138	<b>425</b>
<i>Fines / Dirt</i>	253	118	<b>371</b>
<i>Other Organics</i>	486	42	<b>528</b>
<b>New Hampshire</b>			
Tons of MSW Disposed	16,011	11,735	<b>27,746</b>
<i>Food Waste</i>	2,677	1,319	<b>3,996</b>
<i>Mixed Yard Waste Leaves, Branches, &amp; Stumps</i>	511	342	<b>852</b>
<i>Fines / Dirt</i>	449	293	<b>743</b>
<i>Other Organics</i>	861	105	<b>967</b>

From DSM’s telephone survey of food waste separation in the ICI sector, a total of 750 tons of food waste was estimated to be diverted off-site for composting from Dartmouth College, DHMC, APD Hospital, grocers and some restaurants and businesses in the region.

DSM’s findings include:

- Food waste is composted at three facilities in the region – the ROT facility (Lebanon), Acorn Hill Farm (Lyme) and Cookville Compost (Corinth);
- An estimated total of 750 Tons of food waste was diverted last year from institutions and businesses in the study region, including 650 tons from NH Facilities, 100 tons from VT establishments of which some were located in Bradford (which is outside the study region).
- If the estimates of commercial food waste disposed in NH were correct, the recovery rate for commercial food waste is already at 30%; and,
- Residential food waste disposal estimates (using the VT waste composition study) indicate backyard composting may already be in widespread use, particularly in Vermont.

## Costs of Solid Waste Management

DSM developed rough estimates of the annual cost of solid waste management and recycling in the Study Region based on estimated unit costs from DSM’s database applied to quantities of material handled in the Study Region. Applying the estimated number of tons collected by the different collection methods used in the region (i.e. drop-offs and transfer stations, curbside collection and containerized collection) to an estimated per ton cost to collect yields a rough estimate of the total costs for each method in the region. These cost estimates are shown below in Table 8.

These costs assume tip fees of \$68.88 per ton, as charged at the Lebanon landfill last year, as well as transfer station operating costs (net of the disposal costs) of \$143 per ton for MSW and \$138 per ton for recyclables. Curbside costs applied were assumed to range from \$125 per ton for ICI refuse to a high of \$328 for residential curbside refuse.

**TABLE 8: ESTIMATED SOLID WASTE MANAGEMENT COSTS IN THE STUDY REGION (CY 2013)**

<b>Service</b>	<b>Refuse (\$)</b>	<b>Recycling (\$)</b>	<b>Total (\$)</b>
<b>Residential</b>			
Curbside Collection	\$5,805,000	\$715,000	\$6,520,000
Transfer Stations	\$1,075,000	\$338,000	\$1,413,000
Disposal (Tip Fee)	\$1,737,000	\$18,000	\$1,755,000
<b>Subtotal:</b>	<b>\$8,617,000</b>	<b>\$1,071,000</b>	<b>\$9,688,000</b>
<b>Commercial</b>			
Curbside Collection	\$1,993,000	\$854,000	\$2,847,000
Transfer Stations	\$28,000	\$49,000	\$77,000
Disposal (Tip Fee)	\$1,112,000		\$1,112,000
<b>Subtotal:</b>	<b>\$3,133,000</b>	<b>\$903,000</b>	<b>\$4,036,000</b>
<b>Total Estimated Cost:</b>	<b>\$11,750,000</b>	<b>\$1,974,000</b>	<b>\$13,724,000</b>

These cost estimates do not include the cost of HHW Collections (\$74,000, rounded last year), or the collection of some special wastes such as universal wastes, C&D waste, and tires. The cost estimates also exclude the cost to households and small businesses to deliver material to transfer stations, which could add roughly \$700,000 in additional costs per year if accounted for. The cost estimates do include the surcharge paid to the GUVSWD and to the City of Lebanon, which are built into the prices charged for collection and disposal.

Costs of existing food waste collection and composting off-site may add another \$200,000 or more to the system costs shown in Table 8.

The general conclusion is that solid waste and recycling collection, processing and disposal cost the Study Region roughly \$14 million, of which roughly \$10.9 million, or 79 percent (rounded) of total costs are spent on

collection. This illustrates the importance of managing collection costs to achieve efficiencies and control costs over time.

Given the importance of collection costs to total system costs the question has been raised by some municipal officials in the Study Region whether it would make sense to organize regional, public collection as a way to reduce total costs. While it is beyond the scope of this analysis to cost out a public collection system it is DSM's professional opinion, based on 30 years of observing private and public collection programs throughout the United States that in most, but not all cases, the private sector is more efficient than the public sector in the provision of collection services. There are exceptions (based on DSM's observations, Marion, Iowa and Fort Collins, Colorado are two municipal programs that are clearly competitive with private sector collection); but in general public sector programs often suffer from a lack of investment in the necessary maintenance and spare truck infrastructure, entrenched unions unwilling to make changes to increase efficiency, and public governing bodies unwilling to invest in new collection equipment on a timely basis.

This does not mean that individual municipalities in the Study Region should not consider organizing public collection if they believe that the private sector has become too monopolistic, and they have the existing public works fleet infrastructure in place; only that historically it has been difficult for the public sector to compete efficiently against the private sector for collection of MSW if there remains a competitive private sector willing to provide the service.

### Increasing Materials Diversion from Disposal

Changes would need to be made in the organization of refuse and recycling collection to significantly increase recycling and food waste composting in the region. First, and foremost, municipalities that rely on subscription collection of refuse, but drop-off collection of recycling would need to require parallel collection of refuse and recycling to significantly increase materials diversion. This is especially the case for Lebanon where there is no organized curbside collection of recyclables even though the majority of residents subscribe for refuse collection.

Parallel collection will be required in Vermont by July, 2015, and simply means that all households receiving curbside collection of refuse must be offered curbside collection of recyclables with the cost embedded in the refuse collection cost.

DSM has surveyed household behavior in a number of municipalities around the United States where households receive curbside refuse collection, but must drive to a drop-off or transfer station to recycling. Only between 7 and 15 percent of households typically participate in recycling under this arrangement, compared to between 60 and 90 percent household participation when parallel curbside collection of refuse and recycling is provided.

The same parallel access for organics collection will eventually be required if the Study Region is to significantly increase the diversion of organic waste from households. While rural residential households can rely on backyard composting, most households with curbside refuse collection would need some type of separate food

waste collection service, which will be the case in Vermont under Act 148. This type of service will come at a higher cost than currently experienced because a second truck or new split truck would need to be utilized to separately collect food waste, and for some households, to add curbside recycling collection.

The only way to minimize additional costs would be to develop a uniform, consolidated service route for households. For example, Plainfield and Enfield are experiencing much lower per household costs for parallel refuse and recycling collection services than those who subscribe for curbside collection service because everyone in the Town has the same service and the hauler is able to develop efficient routes with a higher number of households served per route day than on a subscription route (where longer distances between stops are typical).

One way to reduce the added cost of organics collection would be a weekly food waste and organics (e.g. yard waste) collection, paired with every other week recycling (one week) and trash (the other week). This could be most efficiently achieved through use of a split truck, but could be achieved using multiple trucks at a higher cost.

Table 9 below illustrates the potential for additional diversion in the Study Region. These levels cannot occur without a significant commitment to the provision of parallel curbside collection or recycling and of food waste for all households.

**TABLE 9: POTENTIAL FOR INCREASED DIVERSION OF RECYCLABLES AND FOOD WASTE, AND ASSOCIATED RECYCLING RATES (1)**

	<b>Residential</b>	<b>ICI</b>	<b>Total</b>
<b>Current</b>	<i>(tons)</i>	<i>(tons)</i>	<i>(tons)</i>
MSW Disposal	25,200	16,100	41,300
MSW Recycling	6,250	5,770	12,020
Organics Collection		750	750
<b>Subtotal, Diversion</b>	<b>6,250</b>	<b>6,520</b>	<b>12,770</b>
<b>Total Generation:</b>	<b>31,450</b>	<b>22,620</b>	<b>54,070</b>
<b>Recycling Rate:</b>	<b>20%</b>	<b>29%</b>	<b>24%</b>
<b>Additional Diversion:</b>			
MSW Recycling	3,700	3,300	7,000
Organics Collection	3,000	1,100	4,100
<b>Subtotal:</b>	<b>6,700</b>	<b>4,400</b>	<b>11,100</b>
<b>Total Projected Diversion</b>	<b>12,950</b>	<b>10,920</b>	<b>23,870</b>
Remaining For Disposal	18,500	11,700	30,200
<b>Total Generation:</b>	<b>31,450</b>	<b>22,620</b>	<b>54,070</b>
<b>Recycling Rate:</b>	<b>41%</b>	<b>48%</b>	<b>44%</b>

(1) These estimates are based on an annual average weight of 600 lbs. per household recycled compared with the current estimated average of 382 lbs. in the study region. They also assume additional commercial recycling to a rate (for packaging and printed paper) of 40%, as well as additional residential and commercial organics diversion based on 60 percent recovery rate, minus the current off-site diversion.

As illustrated by Table 9, if the Study Region were to achieve best possible diversion rates an additional 11,100 tons of waste would move from disposal to materials or organics diversion, leaving roughly 27,000 tons potentially available for disposal at the Lebanon landfill. This estimate assumes no change in waste generation over time, which is not unreasonable given historic declines in deliveries of waste to the Lebanon landfill.

## FINDINGS AND CONCLUSIONS

DSM performed this analysis of solid waste management and recycling activity in the Study Region with the objective of identifying opportunities for regional cooperation to increase diversion and/or reduce costs; including the potential for shared services for collection, recycling, organics management and HHW management.

DSM's findings and conclusions concerning **collection** in the region are as follows:

- The private sector is a key participant in solid waste collection in the region, currently collecting over 70 percent of MSW, with Casella dominating. Reducing collection costs and significantly increasing diversion may require managing collection through contracts or franchises.
- While it may be possible to organize collection across municipal (and state) lines, it is significantly easier for individual municipalities to organize collection through either a franchised arrangement or a municipal contract. The difference between a franchise and a municipal contract is typically that under a franchise one or more haulers have an exclusive license to operate in a municipality, while a municipal contract typically implies that the municipality contracts with one or more haulers to provide a specific collection service, with the municipality typically paying the contractor for the service.<sup>4</sup>
- Enfield represents a successful example of offering uniform, contracted curbside collection service to residents using small carts for MSW and large carts for single stream recycling at a relatively low cost per household.
- Plainfield also provides an example, with organized MSW and recycling collection, and the use of pay as you throw bags to raise some revenues to offset the costs of the contracted service to the Town.
- While Hanover and Hartford have organized recycling collection they do not have organized MSW collection, which may lead to lower quantities of materials recycled in these two Towns because not all households necessarily receive MSW collection on the same day as recycling collection.
- As recommended in DSM's 2012 report to Hartford, the logical option for Hartford would be to create a single franchise or contract for collection of MSW and recyclables using carts for both MSW and recyclables. Hartford could combine this with PAYT financing – either bags (as used in Plainfield) or billed by MSW cart size, which will be required under Act 148. Alternatively Hartford could simply allow the

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<sup>4</sup> There are municipal contracts where the private hauler is required to bill the households – Middlebury, Vermont is an example of this arrangement for recycling collection, however, typically this is more expensive because the private hauler must also bear the cost of non-payment, which typically might be roughly 5 percent of households.

private sector to implement the requirements of Act 148 with no role by the Town (and elimination of the curbside contract) but this will be more costly to residents<sup>5</sup>.

- If Hanover wants to move organics collection forward, organizing MSW collection to go with recycling collection would allow for eventual implementation of separate residential food waste collection.
- Lebanon has no organized collection, and no requirement for parallel collection of recyclables and refuse, as such it is likely that the recycling rate for Lebanon residents is significantly lower than it could be with more active involvement by the City of Lebanon.
- Smaller municipalities in VT can assume that private haulers will meet the requirements of Act 148
- Smaller municipalities in NH could organize collection as Enfield and Plainfield have, or continue with current system.

DSM's findings and conclusions on **materials processing** in the region are:

- There is an insufficient volume of recyclables in the region to justify investment in a modern Materials Recovery Facility – the industry trend is to develop large Single Stream processing facilities with long distance transfer of materials to these facilities. Casella represents this trend, with transfer capacity in White River Junction to transfer to either Casella's Rutland Single Stream MRF, or the Chittenden Solid Waste District's Single Stream facility in Williston, VT (operated by Casella).
- Casella's monopoly of Single Stream processing capacity in Vermont and New Hampshire has been raised by municipal officials as a concern going forward. However, the Chittenden District (not Casella) controls tipping fees and revenue sharing for the Williston (VT) facility, and there are competitive single stream MRF's owned by: Ecomaine in Portland, ME; Waste Management in Billerica and Springfield, MA; Willimantic Waste in Willimantic, CT; and, a Connecticut Resource Recovery Association facility in Hartford, CT operated by ReCommunity.
- Hartford's transfer station could be modified to transfer single stream materials collected in the Upper Valley to any of these single stream MRF's. Modification would require the provision for dumping into a 100 yard walking floor trailer. This typically requires a higher loading height, and the use of a front-loader to tamp down the load to achieve maximum over-the-road tonnage (averaging perhaps 18 tons per load)
- Lebanon could also be modified for regional transfer of single stream material, although because they currently bale and sell materials, they may find it cost effective to continue to do so;

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<sup>5</sup> DSM's analysis for Hartford in 2012, and a similar analysis for the Chittenden District indicates that organized, parallel collection using a single contract hauler could save roughly 15 percent over current systems costs using multiple subscription haulers.

- However, it is DSM's professional opinion that it is highly unlikely investment in new baling and sorting equipment at other facilities will be worth it, other than small OCC balers spotted at large generators such as grocery or big box stores (if they are not already there).

DSM's findings and conclusions on **organics processing** in the region are:

- Construction of a single compost facility to serve the region could cost as much as \$2 to \$3 million based on rough construction estimates DSM prepared for Vermont's Act 148 Analysis. This would involve construction of concrete pads, use of a cover material such as the Gore fabric, or a roofed building, aeration and grinding, turning and screening equipment.
- It is possible to construct a smaller facility with lower throughput for perhaps \$750,000 to \$1 million, assuming that it was designed primarily for yard wastes with some source separated food wastes low in contaminants. Such a facility would consist of gravel pads, a grinding machine, a front loader for construction and turning of uncovered windrows, and stationary screens for screening of finished compost. However, it should be cautioned that while the science of composting has been around for a very long time, there is a reason that there are as few successfully operating composting facilities as there are. The production of high quality compost without odor issues requires a significant investment in equipment to grind incoming materials and screen outgoing materials, as well as investment in trained operators to manage the composting and curing process. This investment increases significantly if the desire is to compost large quantities of food wastes in addition to yard wastes.
- Much of the "low hanging fruit" of organics appears to already be separately collected and brought to processing facilities in or adjacent to the Study Region. However, it is not clear that some of these facilities are adequately capitalized to provide long-term processing of organics.
- Based on DSM's Act 148 Analysis, it is estimated that residential collection of organics would cost an additional \$4 to \$8 per month per household. Costs at the lower end would depend on the availability of Single Stream collection of recyclables and every other week MSW collection. Single Stream collection is essential in order to co-collect organics and either recyclables or MSW. Dual or multiple stream recyclable collection is incompatible with split truck collection of organics.
- The costs to collect Institutional/Commercial/Industrial (ICI) organics are highly dependent on the individual business or institution, with larger generators of food waste experiencing lower costs per ton;
- In general, ICI collection costs will be more for organics collection than for MSW collection (perhaps \$75 per ton more) but tipping fees may be slightly lower (perhaps \$20 per ton), and the business or institution may save on MSW collection once heavy food waste is removed.
- As a result, only the larger generators would save money by having food waste collected separately.

DSM's findings and conclusions on **regionalization of disposal facilities** located in the study region are:

- There is currently excess disposal capacity in New England, with tip fees reported as low as low as the low 40's for Waste to Energy disposal in Massachusetts; and landfills in northern VT and NH offering disposal capacity in the low \$40's to low \$50's. Transfer of MSW and/or Single Stream recyclables can be accomplished for roughly \$15 to \$20 per ton, which means that the Lebanon landfill tipping fee of \$68.88 is roughly competitive with long distance transport. However, there is limited ability to raise Lebanon's tipping fee without risking the loss of waste.
- The Lebanon landfill's current business plan shows sufficient capacity through 2030 without need for more expensive expansion to south. The GUVSWD landfill site could provide capacity after that date. DSM is not aware of any analysis that compares the cost of expanding the Lebanon landfill south after 2030 with the alternative cost of developing the GUVSWD landfill. Such an analysis should be undertaken by the Study Region before making a decision as to which alternative is most cost effective.
- If the region as a whole (or with leading participation by the larger municipalities along with the GUVSWD) acquired the bond cost for the landfill, the GUVSWD could be freed up to serve more regional interests – including operating the Hartford TS and providing a permanent HHW collection site as well as a drop-off for other hard to handle materials and recyclables. This does not imply that the GUVSWD could necessarily operate the Hartford TS more efficiently than the Town of Hartford, only that the Town of Hartford is currently providing a regional service with any excess cost borne solely by the Town of Hartford.
- Regional acquisition of the GUVSWD site might involve the following:
  - The GUVSWD owes roughly \$2.6 million through three bond issues (house/office, Twin State land, Bridge) with one bond payment ending in 2014, a second in 2028, and the third in 2031.
  - Bond payments could be covered by a \$5 surcharge on current tonnage at Lebanon in 2015, falling to \$4 by 2024 (declining principal).
  - A lower surcharge might be achieved by stretching out payments but this course of action would require a regional bond vote which appears to be highly unlikely.
  - Potentially the most logical arrangement might be a capital lease finance which doesn't require a regional vote. This would require legal review for both Vermont and New Hampshire municipalities, with costs allocated by population or by potential tonnage deliveries.
- Other ways to raise the funds might involve:
  - More tons could be brought into the Lebanon landfill from Southern Windsor County such as from Weathersfield (who is paying \$79 per ton currently) or small haulers interested in an alternative disposal location, with the excess revenue (over costs) allocated to acquisition of the GUVSWD landfill site.

- A per household or per capita surcharge might be assessed on the entire population using the Lebanon landfill, which would equate to an estimated \$6.30 per HH in 2015 falling to \$4.50 in 2025 and \$1.30 by 2031.
- This surcharge would be less if it were assessed on all property (residential plus ICI) instead, which might be reasonable since the landfill serves the ICI sector as well as residents.
- Municipalities interested in acquiring the landfill could simply make payments using general fund revenues from property taxes.

DSM's findings and conclusions about the **Hartford Transfer Station (TS)**:

- The Hartford TS pays for itself (through the fees currently set) only as long as ground C&D can be delivered to Lebanon at no cost, If this arrangement changes, then (using 2011 cost data) the net annual cost to Hartford is an additional \$220,000 above the fees to users.
- If GUVSWD landfill debt (\$215,000 in 2015) were covered in some other way, labor and administration of the Hartford TS and the GUVSWD could be consolidated and paid for through the GUVSWD surcharge allowing the Hartford TS to be used for a permanent HHW collection site, and allowing all of the other activities currently provided to Hartford residents and residents of the GUVSWD towns to continue at no annual cost risk to Hartford taxpayers.
- If Hartford moves to parallel curbside collection of refuse and recycling, transfer station costs could be reduced by reducing hours of operation.

DSM's findings and conclusions regarding **HHW management** in the Study Region include:

- Participation in the current programs is relatively low at 2 to 4 percent last year. Increasing participation will increase costs, regardless of how efficient the new program may become.
- For example, the CSWD spends over \$3 per capita to support its' permanent program, which had 15% participation last year.
- Hartford's permanent facility could be updated and reopened to become a permanent collection location and the consolidation point for a regional system similar to CSWD. This might boost participation to close to 15% of households, depending on how many satellite collections were held throughout the region.
- However the cost of this type of program would be significantly greater than what is being spent now in the region (about \$74,000 last year). It is estimated that at minimum an additional \$160,000 per year would need to be spent to serve 15% of households even if program efficiencies were achieved.

- Raising this money would involve either assessing member municipalities, adding a surcharge on waste or looking for additional grants, which are typically not available beyond what grant monies are available now from State government.

DSM's findings and conclusions concerning **Construction & Demolition wastes and miscellaneous hard to handle wastes** are as follows:

- The vast majority of C&D wastes are being managed by the private sector and are not going through either the Hartford transfer station or the Lebanon landfill. There is no reason to believe that this will change in the near future.
- Only approximately 11.5 percent of C&D wastes are clean wood, with a potential market, and it is very difficult to separate out this clean wood once it is mixed with all other C&D waste. Therefore, any expanded efforts would require source separation by generators, or a concerted picking operation at the Hartford transfer station. However, given the relatively small volume of C&D waste going through the Hartford facility, it is not likely that this operation would be economical.
- Asphalt shingles are also potentially recyclable; however, as with clean wood they require source separation and close monitoring. It is DSM's observation that most asphalt shingles come in mixed with wood, metal and paper or plastic sheathing, all of which contaminate the asphalt shingles. It is not clear that the cost to closely monitor the stockpiling of asphalt shingles would be worth the cost to then transfer it to a facility in Portsmouth, NH currently accepting this material. However, it may be worth contacting Pike Paving about the potential to use asphalt shingles in their paving mix.
- Tires are another hard to handle waste generated in the Study Region. There are programs to collect tires for use in combustion facilities and/or for grinding and construction projects. The Lebanon landfill already acts as a consolidation point for the NRRR program to collect tires in the Study Region. There is no reason why this can't continue to occur.

## Regional Cooperation

The following institutional arrangements could be used to further regional cooperation, in order of potential difficulty:

- A Regional Refuse Disposal Agreement could be created on the NH side with an associated governing body to manage solid waste (for example the Sullivan County Regional Refuse Disposal District had broad powers to implement solid waste facilities), and Hartford could become a member of the Greater Upper Valley Solid Waste District, if the landfill and bridge debt could be addressed or set aside so that all municipalities belonged to a single district.
- An Interstate Compact then could be adopted allowing the two districts to jointly manage solid waste. However while the language may still exist on VT side, the ability to do this has been repealed on NH

side and will require the adoption of new NH legislation, and Congressional and US EPA approval. While this appears difficult, it may not be as hard as it sounds if the compact plans are not actively opposed and the benefits are significant enough.

- The Compact could proceed with joint financing of the acquisition of GUVSWD landfill site, the development of a single permanent HHW facility (either by buying or leasing Hartford's facility and updating it or by developing a new facility in Lebanon) for use by residents and small businesses of member municipalities, and with taking over the management and long-term closure commitments of the Lebanon landfill (which could be transferred to the users of the landfill). The Compact could also take over and manage the inter-municipal contracts made with the private sector for collection and processing of refuse, recyclables or organics.

However, as outlined above, while it is certainly possible to create a single regional entity to coordinate all of the potential solid waste and materials management tasks, it is not clear that there are sufficient benefits to endure the costs of moving this forward. Working within the framework of existing municipal governments could instead yield similar results at a much lower political cost.

For example, the following could be pursued without a regional entity in place:

- Capital lease financing of the GUVSWD landfill could occur, which would require legal review for NH and VT municipalities, and costs could be allocated by population, or by potential tonnage deliveries (which could be estimated annually).
- A more formal Lebanon landfill contract could be written for all municipalities specifying joint actions.
- New contracts could be put in place between member municipalities to implement joint facilities, projects or services (which would require legal review if they cross state lines).
- As part of this, unilateral action could be taken by municipalities to organize the collection of refuse, recyclables and/or organics with the goal of providing uniform service at lower costs. This could be done by contract or possibly by setting up a franchise(s).
- However, it must be recognized that private haulers currently collect roughly over 70% of the waste and recyclables in the region. Without some control over this collection, joint facilities or programs may or may not meet performance and financial goals.

In summary, it should be recognized that regional cooperation already exists on many solid waste management fronts. The Lebanon landfill is a de-facto regional facility, the GUVSWD already exists and owns a potential landfill site, and Hartford already shares its' transfer station and site with members of the GUVSWD.

Many of the activities necessary to improve diversion can occur unilaterally by municipalities, such as organization of curbside collection of waste and recycling and implementation of unit based pricing, which is probably the activity that would have the greatest impact on diversion.

However an important impediment to further regionalization is the debt service of GUVSWD landfill site, which has prevented the regionalization of the Hartford Transfer Station beyond the current sharing of this service.

Resolving the debt service issue will depend on the buy-in from the City of Lebanon, which currently may or may not recognize any value in acquiring a share in a future disposal site. Some of the ways in which this arrangement might create value for Lebanon include:

- Securing ultra-long term landfill capacity for the City as a backup to the existing site. It is probably safe to say that siting another landfill in the Upper Valley in the future would be exponentially more difficult than simply acquiring the permitted GUVSWD site.
- Avoiding the costs associated with expanding to the south.
- Potentially developing a way to avoid the risk of losing Casella and/or sufficient waste in the near term through the municipal arrangements made with the other municipalities (and therefore avoiding the risk of losing the General Fund revenue raised by landfill tip fees in the short term).
- Increasing the real estate value of buildings and land along Route 12 A.
- Providing additional capital and political support to help resolve odor issues and any other environmental issues that might arise in the future from the existing site.

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Stephen Lambert, GUVSWMD administration

Carl M. Mitchell, Contractor to GUVSWMD

Neil Fulton, Town of Norwich

Peter Kulbacki, Town of Hanover.

Rich Menge, Town of Hartford

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John Leigh, DHMC

John Godkin, Town of Sutton

Dennis Pavlicek, Town of Newbury

Andy McDonald, Town of Enfield

Steve Halleran, Town of Plainfield

Chris Scott, Town of Grantham

Gene Craft, Town of Vershire

Mike Durfor, NRRRA

Town Clerks for Bridgewater, Hartland, Fairlee, Sharon, Strafford, Thetford