Waste Audit : Executive Summary

Students Sort Trash and Recyclables During Earth Week 2013

Appalachian State University
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Office of Sustainability

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Introduction

Consistent with the zero waste commitment, Appalachian State University has completed the comprehensive waste audit on campus, and has identified a need to reimagine our waste stream management. In the past, we have been equipped to handle a system designed to send most of our waste to the landfill, but in recent years we have seen a natural shift in waste diversion capability. While Appalachian has designed for landfill trash removal in the past, we are now identifying more opportunities to reuse, recycle, and compost in order to divert our waste from the landfill. This is not a result of poor planning or execution on our part, but rather there have been innovations around recycling and composting that contribute to more sustainable waste management solutions. We have the potential to divert over 88% of our total waste stream through existing measures by rethinking the way we handle our waste. This is not something that will happen immediately, but it will be a multi-year effort that requires creative thinking and thoughtful collaboration. We need to be careful to consider the resources needed to support zero waste.

Purpose, Scope and Methodology

In April 2013, Appalachian State University contracted Kessler Consulting, Inc. (KCI) to conduct an audit of the landfilled solid and hazardous wastes generated on campus. This audit reported data from the assessment and measurement of municipal solid waste and hazardous waste generated on Appalachian's campus.

In regards to the municipal solid waste, it is very important to note that this represents the landfilled waste stream, and does not include the materials we currently divert on campus through reuse, recycling, and composting. Through the current efforts, the university diverts 43% of our overall waste stream, a 13% increase from the previous fiscal year 11-12.

The objective of the Solid Waste Audit (SWA) was to determine the composition of the landfilled solid waste stream generated in the academic,

Kessler Associates Sorting Landfill Waste Into Material Categories

auxiliary, and residential areas of campus. Appalachian's Office of Sustainability, Physical Plant, and University Housing staff identified 32 campus buildings, with a total of 45 distinct areas of campus, for inclusion in the audit. The SWA consisted of the sampling and sorting solid waste (landfill) from these areas of campus to determine the types and quantities of recoverable materials currently being landfilled. Ninety one samples were collected and sorted over the two-week period of April 15 to 26, 2013.

The objective of the Hazardous Waste Audit (HWA) was to evaluate the handling, storage, and disposal practices for hazardous waste materials. Appalachian's Environmental Health, Safety, and Emergency Management and Office of Sustainability staff identified locations where hazardous wastes were being generated and stored. The HWA established a benchmark of Appalachian's compliance with United State Environmental Protection Agency (EPA) and North Carolina Department of Environment and Natural Resources (DENR) regulations pertaining to hazardous waste generators. The HWA entailed inspections of the locations where hazardous wastes were being generated and stored. Inspections of a representative number of laboratories were performed on April 15 and April 17, 2013.

Landfilled Waste Stream Overview

For the SWA, Kessler Consulting, Inc. presents the findings in seven different **building categories** as listed below:

- Academic Buildings
- Residence Halls
- Student Union
- Sports and Recreation
- Central Dining
- Physical Plant
- Other Campus Locations

The results were classified into four material categories: program recyclables, other recyclables, compostable materials, and all other materials. Program recyclables are recyclables accepted in Appalachian's existing single stream recycling program. Other recyclables are items that Appalachian also has other programs in place to capture. Compostable materials are organic materials that are able to be composted including food waste, landscape waste, compostable paper products, and other organics. All other materials are not recyclable or compostable and are classified as landfill for the purpose of this report.

The following chart shows the various material categories of waste separation for purposes of the waste sort.

Program Recyclables	Other Recyclables	Compostables	Landfill
Recyclable Glass	Laboratory Glass	Compostable Paper	Other Non-Rec. Glass
Aluminum Cans	Other Ferrous Metals	Food Waste	Non-Compostable Paper
Steel or Tin Cans	Other Non-Ferrous Metals	Yard Waste	Plastic Bags and Film
Corrugated Cardboard	Rigid Plastics	Clean Wood Waste	Styrofoam (food service)
Office Paper	Electronic Waste	Other Rec. Org. Waste	Styrofoam (packaging)
Newspaper	Technotrash		All Other Plastics
Magazines	White Goods/Small Apps.		Treated Wood Waste
Books			Textiles/Clothing
Other Recyclable Paper			All Furniture
Aseptic Containers			Tires/Rubber
PET Plastic Cont. (SP#1)			Special Waste
HDPE Plastic Cont. (SP#2)			Construction Waste
Plastic Cont. (SP#3-#7)			All Other Garbage
			Liquids
			Grit

Solid Waste Opportunities

Appalachian has an extensive recycling program in place and installed a new composting facility in 2011. Through these efforts, the University has continued to see an increase in our overall diversion rate. The purpose of the SWA was to establish a baseline of the current program and to identify opportunities for future program expansion. The audit revealed that the majority of the waste currently landfilled on the Appalachian campus could potentially be recycled or composted. The data from this study not only benchmarks current waste generation, but also provides the foundation on which to develop future waste reduction and recycling systems that will enable the University to navigate the path toward Zero Waste.

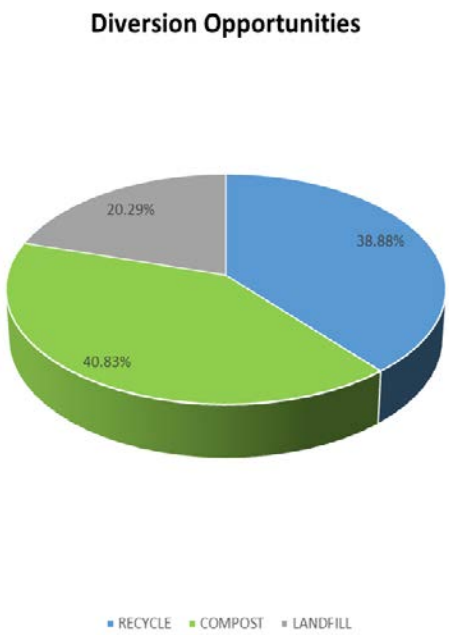
OUR DIVERSION OPPORTUNITIES

The following graphs display diversion potentials in the recycling and composting areas based on current total campus landfill waste stream data. Since the audit was conducted, plastic bags and film are now accepted into our recycling program so these have been added to the recycling category.

MEASURED WASTE STREAM COMPOSITION

BUILDING CATEGORY	MEASURED WASTE STREAM COMPOSITION (April 2013)			ESTIMATED % OF WASTE STREAM
	recycle	compost	landfill	% OF TOTAL
Academic Buildings	33.0%	42.4%	24.6%	5.0%
Residence Halls	43.1%	34.7%	22.2%	70.0%
Student Union	34.1%	48.0%	17.9%	1.0%
Sports and Recreation	40.0%	39.5%	20.5%	2.0%
Central Dining	25.6%	62.9%	11.5%	20.0%
Physical Plant	48.8%	25.0%	26.2%	1.0%
Other Campus Locations	31.1%	32.4%	36.5%	1.0%

DIVERSION OPPORTUNITIES BASED ON % OF TOTAL WASTE STREAM



BUILDING CATEGORY	ESTIMATED % OF WASTE STREAM	DIVERSION OPPORTUNITY (As % of total waste stream)		
	% OF TOTAL	recycle	compost	landfill
Academic Buildings	5.0%	1.65%	2.12%	1.23%
Residence Halls	70.0%	30.17%	24.29%	15.54%
Student Union	1.0%	0.34%	0.48%	0.18%
Sports and Recreation	2.0%	0.80%	0.79%	0.41%
Central Dining	20.0%	5.12%	12.58%	2.30%
Physical Plant	1.0%	0.49%	0.25%	0.26%
Other Campus Locations	1.0%	0.31%	0.32%	0.37%
	TOTAL	**38.88%**	**40.83%**	**20.29%**

RECYCLING OPPORTUNITIES

Approximately **38.88%** of the total campus landfill waste stream is recyclable through the current recycling programs offered on Appalachian's campus. With this figure in mind, it is crucial that we enhance our current programs to ensure we capture all that should be recycled on campus. Based on this information here are some enhancement recommendations:

- Enhance education and outreach to ensure the campus is educated on the new single stream recycling program and the materials that can be included in this program.
- Engage students in the education and outreach process as peer to peer education is beneficial!
- Develop campus wide standards and color coding for recycling, composting, and landfill containers in order to eliminate confusion. The Office of Sustainability is currently working with Design and Construction on this project.
- Develop walkway recycling system to capture recycling on all areas of campus. Currently there are only 5 outdoor recycling containers, while the campus is filled with outdoor landfill bins.
- Ensure that all central waste stations have recycling and landfill containers. It is fundamental to have recycling and landfill containers co-located at each central waste station.

Two of the building categories with the greatest immediate potential for increased recycling collection are:

- Residence Halls- capturing additional recycling from the residence halls would allow us to divert **30.17%** of our total landfilled waste stream through current recycling programs
- Central Dining- capturing additional recycling from central dining would allow us to divert **5.12%** of our total landfilled waste stream through current recycling programs

COMPOSTING OPPORTUNITIES

A comprehensive organics waste recovery and expanded composting program will need to be a key component of Appalachian's waste diversion system to achieve its Zero Waste goals. Approximately **40.83%** of the total campus landfill waste stream is potentially compostable. As a University we do a wonderful job capturing the pre-consumer food waste so our biggest opportunity with waste diversion is to address post-consumer composting. The two areas with the greatest immediate potential are:

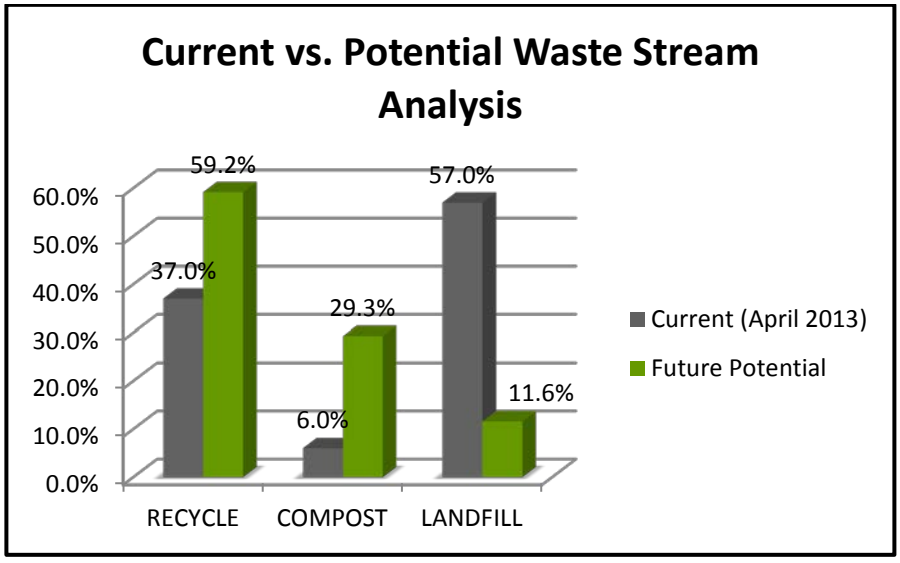
- Residence Halls- capturing compost from the residence halls would allow us to divert **24.29%** of our total landfilled waste stream through composting
- Central Dining- capturing compost from central dining would allow us to divert **12.58%** of our total landfilled waste stream through composting- in addition the waste from central dining has been pulped, so it is a wonderful medium for composting

Based on these percentages, the University should target these areas to pursue post-consumer composting collection.

OVERALL WASTE STREAM POTENTIAL

The following graphs display an overall waste stream analysis based on the current diversion data as of April 2013, projecting the potential for future diversion.

OVERALL WASTE STREAM ANALYSIS	RECYCLE	COMPOST	LANDFILL
Current (April 2013)	37.0%	6.0%	57.0%
Future Potential	59.2%	29.3%	11.6%



Based on the audit information provided on our landfill waste stream, along with the addition of the materials we already capture in our reuse, recycling, and composting programs, there is a potential for our waste diversion rate to be at **88.4%**.

CONSUMPTION-BASED WASTE REDUCTION OPPORTUNITIES

The commitment to zero waste begins with the reduction of consumption and thoughtful purchasing decisions that promote responsibility toward our resources. In order to truly achieve zero waste, we must rethink wasteful and unnecessary purchasing. As a University we need to ensure that we are working together toward waste reduction by considering the commitment is all our operation decisions.

The university needs to support and continue to promote the use of reusables over disposables by considering:

- Offering reusable items in the food service and catering areas
- Expanding water bottle filling station options
- Reducing paper usage
- Eliminating the use of single use plastic bags in retail areas
- Rewarding the campus community for the use of reusable alternatives through incentive programs

The University needs to work with all departments to ensure proper utilization of resources. In more than one location, there were instances of usable items such as paper towel and toilet paper rolls, athletic and medical tape, and garbage bags that were being landfilled despite their usability. It is vital to our commitment that we use our resources wisely.

REUSE OPPORTUNITIES

The University needs to consider reusability options in future decision making. Opportunities to develop free stores, free-cycle models, or campus trading options are a possibility on this campus. In addition, the surplus property department needs to be utilized to its fullest potential in order that campus community members take full advantage of these resources before they leave the campus.
The University needs to continue to support policies and operational program changes that ensure environmentally preferable purchasing, limit packaging and disposables, and divert more materials from the landfill.

Campus Waste Stream is Staged for Sorting @ Broyhill

Hazardous Waste Findings

Each building identified to participate in the Hazardous Waste Audit was inspected for compliance with Department of Environmental and Natural Resources (DENR) and Environmental Protection Agency (EPA) regulations. These regulations include the following: hazardous waste

determinations, labeling and management of containers, storage of waste, laboratory clean-out, training, tracking waste, and recordkeeping. The following findings were revealed by the audit:

- Appalachian is classified as a Conditionally Exempt Small Quantity Generator (CESQG), and is not required to meet many of the requirements for Small Quantity and Large Quantity Generators. The requirements of this classification are not to exceed the maximum hazardous waste generation accumulation quantity for a conditionally exempt generator, and to ensure that the waste is shipped to the proper facility. The University uses a private vendor to make the "official" hazardous waste determinations at the time of pickup; however, professors and graduate assistants are also constantly making determinations that materials are waste and in some instances being labeled as hazardous waste.

- Appalachian is meeting the standard for shipping waste to the proper facility; however, whether the University meets the maximum generation and accumulation quantities is uncertain.

- Currently Waste shipment manifests are kept on-site and are available for review. All manifest were properly signed by the University and the receiving facility.

- A set protocol does not exist for making the hazardous waste determinations, nor a tracking system of the determinations. Therefore, it is impossible to quantify the exact amount of waste on-site at any instance.

- There is no set protocol campus wide with regards to labeling of hazardous waste in laboratories.

- A set protocol does not exist for storage of waste in laboratories.

- Several labs had numerous chemicals that appeared to be hazardous waste stored haphazardly throughout the labs.

- There was no formal training for workers and students regarding the proper management of unwanted materials.

Hazardous Waste Opportunities

- The University needs to develop a designated position within the EHS and EM department who could train faculty and staff in the proper handling and management of hazardous waste and materials, update contingency plans and emergency procedures, and conduct weekly inspections of laboratories and non-academic buildings that generate and store waste.

- To ensure that the University maintains its status as a Conditionally Exempt Small Quantity Generator, it needs to do a better job in tracking the amount of waste being generated and stored on-site.

- It would be in the best interest of the University to properly manage any hazardous waste generated and follow the standards outlined in 40 CFR 262.200 through 262.216 (Subpart K), "Alternative Requirements for Hazardous Waste Determination and Accumulation of Unwanted Material for Laboratories Owned by Eligible Academic Entities."

- During the solid waste audit, biomedical and potentially biohazard wastes were found in the regular solid waste stream. The University has a protocol for handling biohazard materials that is reviewed every three years by a Bio-Safety Committee. The procedures for proper disposal of blood, syringes, animal and human parts are in place, but should be strictly followed.

- There needs to be a removal schedule for radiological waste.

- The software being used by the University to track chemical purchases should significantly reduce the overstocking of chemicals used in various parts of the University, and could potentially be expanded to include a purchasing and waste module.

For more information please contact Jen Maxwell at *maxwelljb@appstate.edu* or to view the complete audit report please visit: *www.zerowaste.appstate.edu*

Reader Notes:

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