

City of Fort Collins Utilities

Case Study: Soil Recovery and Landfill Reduction

**Project Manager: Hank Richardson,
Stormwater Systems Superintendent**

The Soil Recovery project is estimated to return its initial capital investment in just under three years. In addition, the project is diverting up to 91% of the soil collected from the landfill, annually.

Objective

The objective of this case study is to share information with other municipalities, non-profits and local leaders on the lessons learned over the City of Fort Collins' successful implementation of the Soil Recovery project.

This case study identifies practical and cost-savings waste diversion alternatives to sending soil recovered from municipal projects to landfills as well as meeting the city's waste reduction goals.

Introduction

Many cities across the United States are creating aggressive sustainability goals that curb air, water and land pollution. The process of reaching these goals not only minimize a population's impact to the environment, but also maintain and even improves the quality of life for its citizens.

Reducing a community's major waste that ends up in the landfill is one area that encompasses all three environmental areas: air, water and land. It is also one of the areas of sustainability that is the easiest to achieve because all sectors of the community can actively participate - from the individual citizen to large industry.

Waste reduction not only has environmental benefits, but also financial benefits to the community by increasing the life of landfills, reducing city hauling costs and through job creation in the recycling sector. EPA and other studies have found that recycling and other waste diversion programs create jobs over landfilling by 10:1.¹

The City of Fort Collins has set an aggressive goal of reducing waste it sends to the landfill by 80% by 2020. To help meet this goal, the city created a Waste Innovation Program (WIP) to allocate funds for innovative projects that divert materials that would otherwise be sent to the landfill on a trial basis. City employees were encouraged to participate in this grant application process by identifying source reduction, recycling or re-use opportunities for materials generated by city operations.

Approved WIP grants fund projects are up to one year in duration. Applicants can reapply for funds for a maximum of two sequential grant cycles.

¹ Cite: EPA, 10/2013 @ <http://www.epa.gov/region9/newsletter/feb2011/greenjobs.html>

Background

The City of Fort Collins' Water Engineering & Fields Services Drainage & Detention Division under the guidance of Hank Richardson, identified that on average 18,288 cubic yards of soil was sent to the landfill each year². This soil was the result of general municipal activities, including water utility projects and emergency excavations.

Soil collected prior to this recovery project was sent directly to the landfill because it often contained concrete and large scrap metal costing the city over \$80,000 in landfill fees, annually.

After an initial investment of \$252,844.38 with the help of the WIP grant funds, the project is estimated to return its initial capital investment in just under three years³. In addition, the project is diverting over 90% of the soil collected from the landfill, annually.

	WIP Grant Amount	Matching/In Kind Amount (if any)	Total Amount
Equipment Purchases			
Grizzly dirt screening device - custom built	\$11,000		\$11,000
2013 John Deere 544K Wheeled Loader & annual maintenance/fuel costs	\$145,460	\$20,000	\$165,460
Permanent Structures			
Chain Link Fence	\$12,734.38		\$12,734.38
Evergreen trees used for privacy screen (purchase cost and placement)		\$2,700	\$2,700
Privacy fabric for chain link fence & installation	\$4,500		\$4,500
BMP's for stormwater management plan		\$6,750	\$6,750
Staff			
1 Full-time equipment operator, Seasonal Employee being used half time for operations		\$17,680	\$17,680
Crew Chief managing operations		\$15,460	\$15,460
Department Equipment Costs			
3 Dump Trucks with drivers (\$86.25/hr.) to haul screened soil to landfill. 8 days a year		\$16,560	\$16,560
Total Project Cost:	173,694.38	\$79,150	\$252,844.38

² Three-year average for years 2010-2012

³ Three-year estimate also factors in reduced transportation costs to and from the landfill and the purchase of soil for excavation projects.

The Process

1. Soil is collected from municipal utility and infrastructure projects and sent to one of three collection sites.
2. The soil is processed to remove debris such as concrete, asphalt and scrap metal. It is screened 5 - 10 times to remove this debris.
3. Concrete, asphalt and scrap metal are removed and set aside to be recycled.
4. The reclaimed soil is reused at utility infrastructure projects, saving the city money from purchasing new soil in addition to reduced landfill fees and fuel costs.

Successes

In the three months since the initiation of the Soil Recovery Project, over 90% of the soil that once went to the landfill is now recovered and reused. The reduction in landfill volume extends the life of the landfill, reduces landfill costs to the city and is helping the city meet its waste reduction goals.

In addition, the reclaimed soil provides free, needed cover for landfill operations and is given to private organizations, such as irrigation companies, to repair damage caused by flooding.



Irrigation damage as a result of the 2013 flood. Recovered soil went to companies to repair flood damage.

Challenges

Employee Adoption

The Soil Recovery Project, by all measurements is a success, but as with any change management process, employee adoption rates are one of the initial obstacles in implementing a new process and the Soil Recovery Project was no exception.

Based on staff interviews, there was initial resistance to the new soil recovery project due to “old habits” rather than resistance to the rational for the new process. With training, communication and management’s guidance, this resistance to change was significantly diminished after employees saw the positive results of the project. The adoption rate for the Soil Recovery Project was nearly 99% across all divisions in just under two months after the training and implementation of the new program.

Measurements

Success of a new project depends in part on measuring the results. Soil recovered and brought to the processing areas from various divisions within the city make accurate measurements of the soil recovered challenging.

The front loader that processes the soil currently weighs the soil as it is screened, but this is a new process and tracking accurate weights during operation can be difficult to achieve.

Future measurements could be based (in addition to weighing the soil on the front loader), on the reduced number of trucks, the weight of the trucks that go to the landfill and the reduction in landfill fees.

Temporary Space

Adequate and appropriate space for a permanent location for Fort Collins' Soil Recovery project is the greatest challenge to converting this trial project into a long-term successful program.

Uncertainty in having an accessible and permanent space inhibits management's ability to plan for equipment, staff and training needs. Site selection must factor in the needs of the surrounding citizens in mitigating concerns such as dust that can occur from the soil recovery and screening process. However, installation of a track pad for incoming and outgoing trucks, the watering down of the soil to minimize dust, as well as privacy fabric on the surrounding fence mitigate many of these concerns.

The Future

Creating an accessible and permanent space for the location of Fort Collins' Soil Recovery Project will enable this to become a permanent, self sufficient program and will provide the city extra revenue in the long term in addition to helping the city meet its sustainability goals.

The added benefit of a permanent facility could also benefit Fort Collins' citizens by providing low-cost clean soil for residential and/or commercial use while at the same time providing added revenue for the city.

Conclusion

Other municipalities should consider adopting the City of Fort Collins employee-led innovation grant program. By asking employees to identify and lead efforts to help the city meet its sustainability goals, initiatives such as the Soil Recovery and

Landfill Reduction project are successful in not only helping to meet stated goals, but can move beyond this to be a viable revenue source for the city.

The next step in creating successful long-term solutions to achieve sustainability goals is by quickly eliminating the uncertainties of successful trial programs.

Acknowledgements

Hank Richardson
Jon Haukaas
Susan Gordon
Doug Jardine
Joe Backurz
Jason Eich

Appendix A

Summary Information	Values
2012 Total Citywide Self Haul (CY=tons)	26,764
2012: All Utilities at Wood St: Total amount of Self Haul (CY=tons)	20,420
2012: All Utilities at Wood St: Total amount of Self Haul that is dirt (using an estimate of 75 % dirt) (CY=tons)	15,315
2013 YTD Total Citywide Self Haul (CY=tons)	10,066
2013 YTD Total Citywide Self Haul that is Dirt includes all Departments (CY=tons)	6,404
2013 YTD % Total Citywide Self Haul that is Dirt	64%
YTD 2013 Water Utilities: Total amount of dirt sent to landfill	2,933
YTD 2013 Water Utilities: If 90% recovery rate of dirt through Soil Recovery Program, then original amount of dirt before soil screening (CY=tons)	29,330
YTD 2013: Water Utilities % of Self Haul that is Dirt for Quarters 1, 2, and 3	58%
YTD 2013 Streets Self Haul that is Dirt (CY=tons)	2,341
YTD 2013 Streets Self Haul Percentage that is Dirt (%)	84%
2010-2012: Historical % of Total Municipal Industrial Waste that is Self Haul	98.5%
Predicted 2013 total for Self Haul is anticipated to be this amount based on historical percentages and 2013 YTD data for self haul	13,575
2010-2012 Average annual total for Self Haul for 2010-2012 (CY=tons)	24,384
Predicted 2013 total: If the current self haul trend continues through Q4 2013, we will see a total drop in municipal self haul waste (CY=tons) from the previous 3-yr avg	10,809
Predicted 2013: If the current self haul trend continues through Q4 2013, we will see a total % drop in municipal self haul waste from previous 3-yr avg	56%

