

Waste

KEY PERFORMANCE MEASURES

- Levels of Water and Air Pollution at the Landfill
- Municipal Solid Waste Diversion Rate
- Amount of Landfill Space Available
- Number of Weekly Miles Waste Travels for Processing

The amount of waste is minimal, and waste management choices protect the environment. The consumption of material resources and the waste generation that accompanies it can result in contamination of our air, land and water. Wastes are minimized through diversion and reuse whenever possible, which maximizes the life of the current landfill while avoiding pollution. When waste must be disposed, it is done so responsibly.

Mitigating the environmental impacts of Aspen’s waste will take a multi-pronged approach. This is one that reduces consumption and waste creation, while employing responsible diversion and disposal methods. With a tourism-based economy, Aspen generates a significant amount of waste. It serves visitors who come from communities with different reuse, trash disposal, and recycling practices. Ample opportunities and challenges are evolving for how waste is reused, diverted from landfills, or disposed of in the Roaring Fork Valley. For instance, Aspen has enormous potential to increase composting rates of commercial food and lawn waste. On the other hand, the City contends with a real estate and development market that, while integral to its economy, generates significant annual construction and demolition debris.



Abbreviations

- CDPHE:** Colorado Department of Public Health and Environment
GHG: Greenhouse gas
MSW: Municipal solid waste
PCSWC: Pitkin County Solid Waste Center (used interchangeably with Pitkin County Landfill)
VOC: Volatile Organic Compound

Photo: City of Aspen waste containers.⁴⁵

The environmental and economic costs of waste transportation are also changing. Today, there are few nearby facilities that process and sort recycling. As a result, all of the recycling that is not admitted at the Pitkin County Solid Waste Center (PCSWC, a term used interchangeably in this report with “Pitkin County Landfill” or “the landfill”) is hauled out of the valley to Wolcott or Denver for processing.⁴⁶ What is more, the PCSWC, which is the current destination of Aspen’s municipal solid waste, estimates that it has 15 remaining years before it will fill and be closed.⁴⁷ When the landfill does close, Aspen’s waste

⁴⁵ Photo: Armstrong, Laura. 2016.

⁴⁶ Liz O’Connell, City of Aspen Senior Environmental Health Specialist.

⁴⁷“Pitkin County Landfill.” Web. <<http://www.landfillrules.com/>>.

will then have to be long distances for burial and processing, quite possibly out of the valley. The dynamics of waste in the Roaring Fork Valley are complex. Management of this system, with a keen eye toward the future, is an essential and challenging task for decision makers.

Already, the City of Aspen has taken a variety of actions to reduce waste and increase recycling and composting, which are listed in the *Current and Proposed Actions* box at the end of the *Waste* narrative. The Roaring Fork Valley Waste Diversion Plan in particular will provide a tremendous opportunity to improve the environmental sustainability of Aspen's waste system.

In developing this report, a group of stakeholders and experts convened to deliberate on which measures would best track Aspen's sustainability in the topic area of waste. This focus group included representation from Pitkin County, the Community of Resource Efficiency, a local waste hauler, and representatives from the City of Aspen. They elected the following four criteria as key performance measures:

- *Levels of water and air pollution at the landfill*
- *Municipal solid waste diversion rate*
- *Amount of landfill space available*
- *Number of weekly miles waste travels for processing*

Each of these four topics are introduced on the following pages. Following these narratives are four corresponding one-page dashboards, which provide an at-a-glance update on each metric.

Levels of Water and Air Pollution at the Landfill

Waste disposal can contaminate the natural environment in a variety of ways. With responsible disposal and remediation, harmful effects on air, land, and water can be prevented and reduced. The importance of such work is underscored by Aspen's Ecological Bill of Rights, which asserts that Aspen's residents and visitors have: "the right to the absolute minimum involuntary exposure to toxic chemicals, radioactive substances and energy forms that are hazardous to health."⁴⁸

Aspen sends the majority of its municipal solid waste (MSW), the garbage discarded by the public and made up of everyday items, to the PCSWC. The PCSWC was built in 1964⁴⁹ and is an unlined landfill, meaning that any toxins or pollutants present in buried trash, or which results from chemical reactions that occur in the landfill, can leach into groundwater. Accordingly, seven groundwater monitoring wells are maintained on-site and checked regularly for compliance with Colorado Department of Public Health and Environment (CDPHE) regulations. See Figure 1 for a map of groundwater well locations at the landfill.

⁴⁸Aspen Area Community Plan. 2012. City of Aspen and Pitkin County. Web. p. 50.

⁴⁹2014 Annual Groundwater Report: Pitkin County Solid Waste Center, Pitkin County, Colorado. Rep. Lakewood, CO: Golder Associates, 2015. Print.

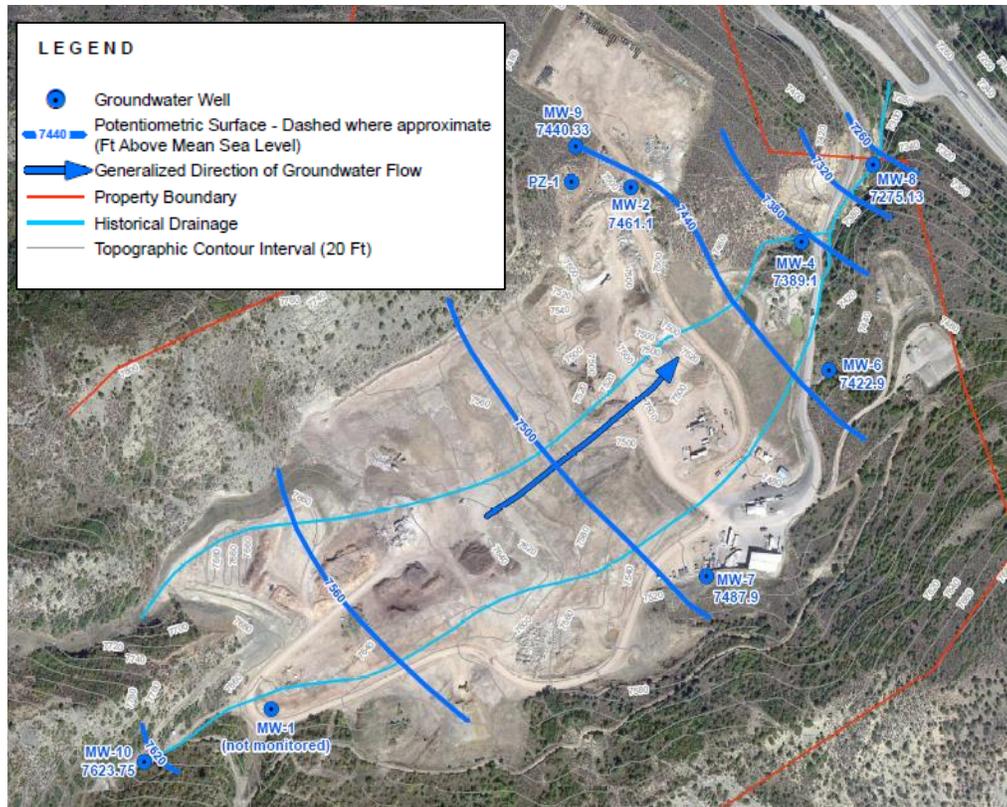


Figure 1. Well sites, monitored for groundwater pollutants, at the Pitkin County Solid Waste Center.⁵⁰

Air quality, visibility, odor, and presence of Volatile Organic Compounds (VOCs) are also monitored on-site. VOCs are compounds made of carbon, which partake in harmful reactions with light. One of the ways that fugitive VOCs are prevented from escaping the landfill is by covering the working surface of the landfill each day when it is not in active use.

The Aspen community can positively impact this measure by limiting use of unhealthy or reactive chemicals or the purchase of items that contain them. It is also critical to separate hazardous chemicals (or products that contain them) and electronic waste from normal household trash. Aspen holds two annual e-waste collection events and the PCSWC accepts and properly disposes of household hazardous waste. This means it does not go to landfill.

The corresponding one-page dashboard portrays the most recent available pollution monitoring data for the PCSWC:

- *Levels of Water and Air Pollution at the Landfill*

Municipal Solid Waste Diversion Rate

Diversion is the process of reducing generated waste or preventing waste from being buried in a landfill through the processes of reuse, recycling, repurposing, or composting. Increased waste diversion is a

⁵⁰2014 Annual Groundwater Report: Pitkin County Solid Waste Center, Pitkin County, Colorado. Rep. Lakewood, CO: Golder Associates, 2015. Print, p. 43.

pressing issue for the Aspen community, as the current destination for the majority of Aspen’s municipal solid waste has an estimated 15 years of life remaining in 2016.⁵¹



Figure 2. SCRAPs program composting instructions and dumpster. Composting diverts food waste, paper, and plants from the landfill.⁵²

The importance of diversion is stressed in the 2012 **Aspen Area Community Plan**, which puts forth the following Community Goals:

"Increase the practice of deconstruction and increase the amount of materials that are diverted from the landfill, reused or recycled."

"Maximize recycling, implement waste reduction and environmentally responsible purchasing programs, and encourage behavior that moves the Aspen Area toward being a zero waste community and extends the life of the landfill."⁵³

While recycling efforts and the joint Pitkin County/City of Aspen SCRAPs composting program have increased diversion, recent trash audit results indicate that the Aspen community has significant room for improvement. In 2015, the results of two trash audits conducted by an outside consultant for the City of Aspen revealed that roughly 13,000 tons/year, **over one half of the total MSW landfilled in 2015, could have been diverted through compost or recycling.**⁵⁴

Current and past diversion rates for the City of Aspen are displayed and discussed in the subsequent dashboard:

- *Municipal Solid Waste Diversion Rate*

⁵¹"Pitkin County Landfill." Web. <<http://www.landfillrules.com/>>.

⁵² Photos: Armstrong, Laura. 2016.

⁵³ Aspen Area Community Plan. 2012. City of Aspen and Pitkin County. Web.

⁵⁴ Roaring Fork Valley Comprehensive Waste Diversion Plan: Phase 1. Rep.: Weaver Consultant Group and LBA Associates, 2016, p. 16.



Figure 3. Newspapers, plastic bags, and cardboard.⁵⁵

Amount of Landfill Space Available

Aspen's municipal solid waste (MSW) is sent to the Pitkin County Solid Waste Center (PCSWC) to be deposited into the landfill and makes up the approximately 78% of the waste buried there each year.⁵⁶ Aspen has a vested interest in keeping the landfill open as long as possible. When the landfill eventually closes, all trash will be hauled out of the valley, resulting in a sharp spike in the energy use and associated GHG emissions of transporting trash, as well as the cost that residents and businesses pay for trash services.

In 2016, the PCSWC estimates that given current space availability, trash volume, and compaction rates, the landfill has 15 years of life remaining.⁵⁷ If any of these elements change, or new factors such as new waste diversion programs or increased waste production are introduced, the available space will be impacted either positively or negatively, and the remaining lifespan estimate will vary. This lifespan could also change if the allowed landfill space expands. The PCSWC has proposed an expansion of the landfill, which they estimate would add another 10 years. This proposal is pending approval.

Further details and figures can be accessed in the following one-page dashboard:

- *Amount of Landfill Space Available*

Number of Weekly Miles Waste Travels for Processing (Data Pending)

Managing Aspen's waste comes with a variety of environmental costs. Many of these costs are associated with the transportation of waste, including fuel consumption, road traffic, and air pollution. By measuring the transportation miles associated with its waste, Aspen can better manage waste to reduce the environmental impacts and consequences.

Trash hauling is a privatized sector in Aspen, and for a small city, there are a wide variety of offerings. Eight waste haulers serve Aspen. They vary in the services that they provide to both residents and commercial businesses. One of these haulers, Evergreen Events, exclusively picks up compost. The other seven offer both trash and recycling services, as is required by Aspen's recycling ordinance.

⁵⁵ Photos: City of Aspen.

⁵⁶ Menges, Chris. 2014 Aspen Community-Wide Greenhouse Gas Inventory. Rep. Aspen: City of Aspen Canary Initiative, 2014. Print, p. 41.

⁵⁷ "Pitkin County Landfill." Web. <<http://www.landfillrules.com/>>.



Figure 4. Recycling (left)⁵⁸ and a waste hauler in Aspen (right).⁵⁹

Aspen's waste is hauled to these locations:

- Trash is buried in the Pitkin County Landfill.
- Recycling is processed at the Pitkin County Landfill, Wolcott, or Denver, Colorado and then sold to brokers in and out of state.⁶⁰
- Compost is processed at the Pitkin County Landfill.
- E-waste is collected twice a year from the Pitkin County Landfill and travels Aurora, CO to be disassembled.

At the time of publishing this report, final data counts had yet to be submitted for this measure. This being said, staff can state with certainty that of Aspen's different waste types, recycling has by far the largest transportation footprint. This is largely due to Aspen's geographical location and the local availability of recycling transfer stations. In years past, recycling was sorted at a local facility, which was part of the PCSWC. Due to recent budget cuts, that processing facility was shut down. Now, the PCSWC has capacity accept some recycling, but only a limited amount. The majority of recycling is hauled to either Wolcott (in Eagle County) or Denver, greatly increasing transportation costs for haulers and the greenhouse gas emissions related with waste removal in the Roaring Fork Valley.⁶¹

⁵⁸City of Aspen Department of Environmental Health.

⁵⁹Babbie, Sheila. 2016.

⁶⁰Please note that due to data availability, this report only measures miles traveled within the state of Colorado, which reduces the values of recycling travel.

⁶¹"Recycling Challenges." Mountain Waste & Recycling. Web. <<http://www.mountainwaste.com/recycling-challenges/>>.

Current & Proposed Actions

- Recycling ordinance: recycling is included in trash hauling fees so that residents and businesses do not pay extra for that service. Grass and leaves, which are compostable, as well as electronics, which are hazardous, are forbidden in the conventional trash stream.
- Single Use Bag Ban: plastic bags are not available in Aspen supermarkets. Paper bags are available for a fee and “bag banks” make free reusable bags available across town.
- ZGreen Events: special events organizers are required to use environmentally friendly practices.
- SCRAPS Composting Program: commercial and residential composting throughout Aspen and Pitkin County.
- “Pay as You Throw Program”: residents pay a variable trash service rate, depending on the amount of trash generated. Customers who use smaller trash bins pay less than those who need a larger bin, further incentivizing residents to recycle and create less trash.
- Roaring Fork Valley Waste Diversion Plan: Pitkin County and the City of Aspen are partnering on a plan to maximize the diversion of municipal solid waste and construction and demolition waste.

Levels of Water and Air Pollution at the Landfill

What is it? Why is it important?

Processing Aspen’s waste has potential negative effects on the surrounding environment. The PCSWC opened in 1964¹ and is unlined, meaning that has the potential to leach pollutants into groundwater as well as into the air. By measuring the levels of air and water pollution at the PCSWC, Aspen can better manage waste to reduce those impacts on the environment. The City of Aspen manages its hazardous materials to prevent harmful substances from being added to the landfill. Supporting chemical management practices is vital in order to not add more harmful substances to the waste stream.

What does the data/trend say?

The PCSWC is responsible for reporting environmental impacts to the Colorado Department of Public Health & Environment (CDPHE). For air pollution, this takes into account visible emissions, odor, and disposal of Volatile Organic Compounds (VOCs). Seven different groundwater monitoring wells exist on-site at the PCSWC and are regularly monitored for levels of organic and inorganic compounds. Instances of air and groundwater pollution are cited below.



Household hazardous waste collection at the Pitkin County Waste Center.

Air Pollution:²

According to the CDPHE’s 2015 Air Pollution Control Division Field Inspection Report, the PCSWC met EPA and State of Colorado visible emissions, odor, and VOC disposal requirements. PCSWC was also in compliance with air quality regulations that pertain to compost. The PCSWC was deemed non-compliant in one area due to a failure to submit an Air Pollution Emission Notice and receive a corresponding permit before facility operation commenced. However, appropriate paperwork for this process was submitted on February 25, 2016 and permit is pending.

Water Pollution: Organic Substances³

- In 2014, **Vinyl chloride** and **cis-1,2-dichloroethene** (both VOCs) have been found in PCSWC wells. Analysis suggests a trend in decreasing concentration for these chemicals between 1996 and 2014.
- Reoccurring levels of **benzene** have been detected prior to and in 2014.

Water Pollution: Inorganic Substances⁴

- There were no new statistically significant increases in inorganic pollutant levels in 2014.
- On-going, statistically significant levels of **chloride** were found at two wells. These sites have tested high for chloride for a number of years; it is believed that the pollutant does not come from landfilled waste, but from dust suppressants and deicers used on a nearby road.
- **Nitrate** was found above the statistical limit in one well, which will be re-tested for in 2015 to confirm significance.

Targets

The target is that groundwater pollutants and greenhouse gases will remain below the CDPHE limits for remediation. **The PCSWC did meet this target for air emissions, but did not do so for groundwater pollution.** Important to note is that **the site is in compliance with all corrective measures** stipulated by the CDPHE, which are resulting in positive remediation.

Data Sourcing and Considerations

Data was sourced from the Colorado Department of Public Health & Environment. Air Pollution data is from 2015, whereas groundwater data is from 2014. Both are the most recent data available.

Sources: [1][3][4] 2014 Annual Groundwater Report: Pitkin County Solid Waste Center, Pitkin County, Colorado. Rep. Lakewood, CO: Golder Associates, 2015. Print. [2] Field Inspector Report: Pitkin County Solid Waste Center. Rep.: Colorado Department of Public Health & Environment: Air Pollution Control Division, 2016. [Photo] Johnson, Jack.

Municipal Solid Waste Diversion Rate

What is it? Why is it important?

This measure describes the amount of municipal solid waste (MSW), or the everyday waste generated by homes and businesses, is recycled or composted and therefore prevented from entering the landfill. Burying the minimum possible amount of waste in the landfill is an essential part of waste management. Recycling, composting and reuse rates show Aspen's progress towards achieving minimal burial of municipal solid waste (waste that would go in a trash can, which does not include construction debris).

What does the data/trend say?

In 2014, the Aspen community diverted 21.3% of its municipal solid waste (MSW) through recycling and composting (Figure 1). This is consistent with the statewide 2014 diversion MSW diversion rate of 22.8 percent,¹ but lower than the 2013 national average of 34.3 percent.² Figure 2 shows the results of a trash audit, conducted at the PCSWC in 2015. It indicates that 85% of MSW stream is organics, paper, plastics, metals, and glass, most of which could be diverted through composting and recycling. It should be noted that once soiled, some items cannot be recycled. Clearly, Aspen has a large opportunity to expand what it diverts to decrease the volume that has to be landfilled. As of spring 2016, Pitkin County and Aspen are in the midst of developing a Roaring Fork Valley Comprehensive Waste Diversion Plan.³ This report proposes projects that will dramatically increase diversion of both municipal solid waste and debris from construction and demolition.

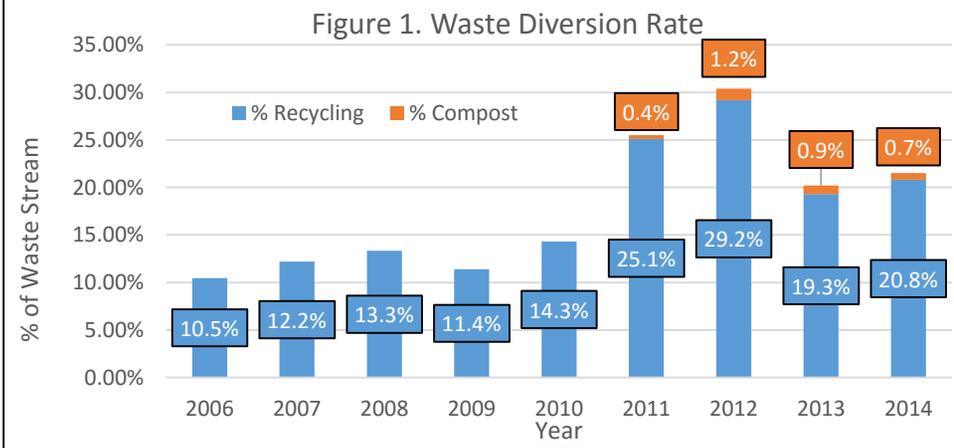
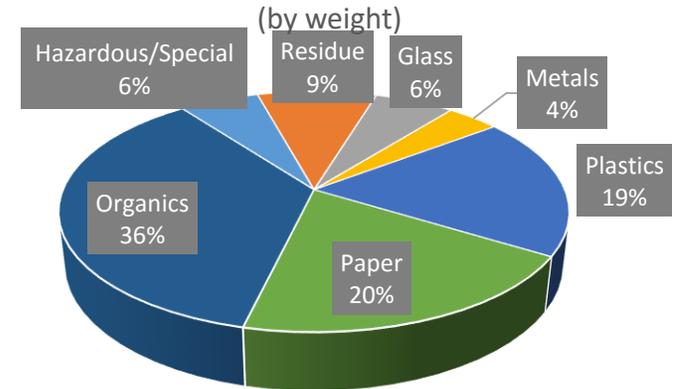


Figure 2. 2015 Municipal Solid Waste Composition



Targets

By 2035, diversion rates in Aspen will be at least 50%. Aspen's diversion rate in 2014 was 21.3%. Note that this target may be reevaluated after the Waste Study is presented to City Council and further direction is given on how to proceed.

Data Sourcing and Considerations

Diversion rates cannot take into account the substances that residents choose to reuse instead of recycle or compost. Figure 2 diversion rate increases in 2011 and 2012 can be attributed to the introduction of compost collection and a decrease in visitor activity in Aspen. Figure 2 data is compiled from annual hauler reports, which are self-reported and not verified by an outside source. Haulers base the recycling quantities that they report on number of customers and the volume of their bins. While these are the only available source of diversion data, it is important to note that they are not corroborated for consistency or accuracy.

Sources: [1][Figure 2 data] Colorado Department of Health & Environment. Colorado Solid Waste and Materials Management Program: 2014 Annual Report to the Colorado General Assembly. Rep. 2015. Web. <https://www.colorado.gov/pacific/sites/default/files/HM_sw-2014-rpt-to-gen-assembly.pdf>. [2]"Advancing Sustainable Materials Management: Facts and Figures." EPA. Environmental Protection Agency, Web. [Photo] Menges, Chris. 2015.

Amount of Landfill Space Available

What is it? Why is it important?

Built in 1964, the Pitkin County Landfill is a finite space that is approaching its capacity. When the space is full, Aspen will be forced to transport trash to other landfills, the closest of which are in Rifle, Eagle, Delta, and the Front Range. By measuring the years of life remaining on the landfill lifespan, Aspen can gauge the success of diversion efforts and plan for the future.

What does the data/trend say?

As of spring 2016, the Pitkin County Landfill estimates that it has **15 more years of operation**. This number is based upon the factors displayed in Figure 1. As these factors change, estimated landfill life will fluctuate as well. For example, in January of 2016, the Landfill purchased technology to dramatically increase its compaction rate from 1,583 lbs/cubic yard to 1,893 lbs/cubic yard.¹ This equipment will go a long way in conserving space. The Landfill has also developed a proposal, pending approval, to add an expansion (Figure 2) to the landfill to extend its life for approximately 10 more years.



The working surface of the Pitkin County Landfill.²

Figure 1. Factors Influencing Landfill Lifespan

Add to Lifespan

- Reduction in trash volume
- Increased diversion of reusable, recyclable, and compostable products
- Increased trash compaction
- Low-volume Spray-on daily cover*

Reduce Lifespan

- Increase in trash volume
- Increase in construction and demolition debris
- Reduced trash compaction
- High volume daily cover*

*For health and safety purposes, the working surface of the landfill is covered each night. The volume of this cover impacts remaining space available.

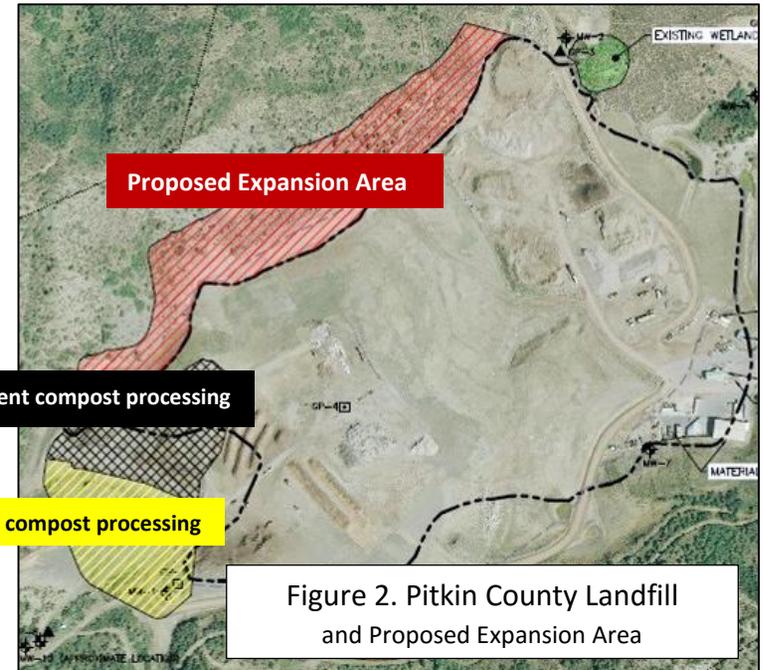


Figure 2. Pitkin County Landfill and Proposed Expansion Area

Targets

By 2020, the landfill will have at least 15 years of lifespan remaining. Increasing diversion of commercial food waste, yard waste, and construction and demolition debris is essential to helping Aspen reach this target. Policies that limit the addition of material into the landfill, reward reuse, and encourage purchasing with recycled materials are also vital.

Data Sourcing and Considerations

Estimated Landfill Lifespan was generated by the Pitkin County Landfill, through data they hold in regards to space available, incoming trash, and compaction rate. This is the only available data of its kind, and has not been evaluated for accuracy by a third party.

Sources: [1] Hall, Cathy, and Brian Pettet. Landfill Operations Update. Rep.: Pitkin County, March 15, 2016. [Figure 1 data] O'Connell, Liz. [Figure 2 data] Courtesy of Pitkin County Solid Waste Center. Hall, Cathy. [Photo] Menges, Chris. 2015.