

BFI Airport Recycling, Reuse, and Waste Reduction
Plan

DRAFT



BFI Airport Recycling, Reuse, and Waste Reduction Plan

1. Summary

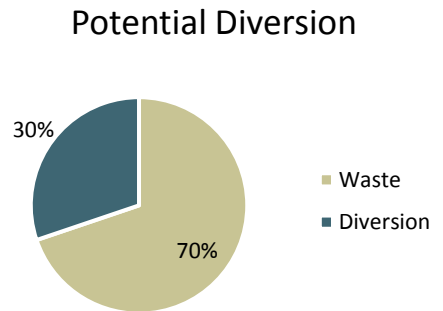
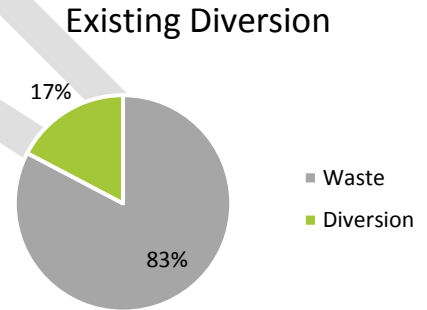
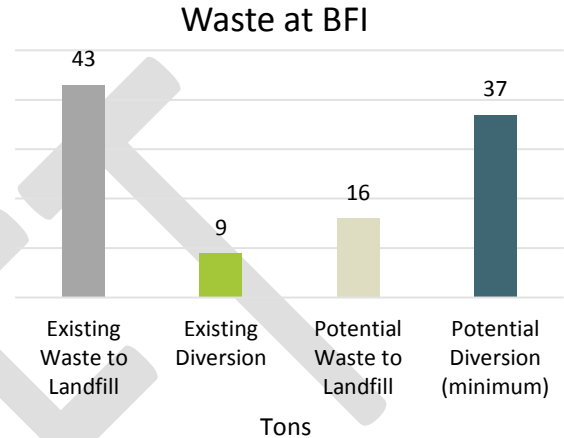
The King County International Airport-Boeing Field (BFI or the Airport) can reduce waste generation and increase landfill diversion through the following strategies:

- Tracking and voluntarily reporting waste metrics and diversion progress.
- Improving purchasing practices, reducing disposable items, and reusing supplies.
- Enhancing the existing recycling program.
- Establishing a set of tenant requirements and guidelines.

The existing program at BFI generates approximately 43 total tons of waste annually, as well as nine tons of recycling. These recommended strategies have the potential to divert at least an additional seven tons of waste annually.










Reducing waste generation and increasing landfill diversion align with the Airport’s efforts to operate the facility in a responsible manner.

Planning for solid waste and recycling under the on-going master plan fulfills the Airport’s federal obligation under the **Federal Aviation Administration (FAA) Modernization and Reauthorization Act of 2012** and subsequent regulation.



2. Recommendations

The following recommendations to improve waste management at BFI include waste reduction, reuse, and recycling strategies. Evaluation for each recommendation considered the estimated relative cost and diversion potential, the suggested implementation time frame, and noted alignment with best practices or standard programs. **Table 1** shows the key for quick comparison of the impact of each recommendation on waste diversion.

Table 1: Recommendation Key		
Item	Icons	Significance
Relative Cost		Low cost
		Medium cost
		High cost
Estimated Diversion Potential		Low diversion potential
		Medium diversion potential
		High diversion potential
Suggested Implementation Time Frame		Short range (<1 year)
		Medium range (1-3 years)
		Long range (3+ years)
Alignment	BMP	Best Management Practice
	TRUE	BMP and Total Resource Use and Efficiency (TRUE) Certification program element

A. Recommendation 1: Tracking & Reporting

Description

Monitoring waste metrics provides feedback on the efficiency of diversion efforts. Sharing this information with stakeholders has been shown to increase participation in diversion practices.

Action

It is recommended that the Airport begin to regularly estimate and track the volume of waste sent to the landfill and diverted through reduction, reuse, donation, recycling, or other strategies as well as the costs associated with these services. It is also recommended that the Airport discuss these trends with the waste hauler and share this information with program stakeholders (Airport staff and tenants).

Justification

The Airport does not currently track metrics associated with its waste. Trends associated with BFI's waste generation, landfill, diversion and associated costs could indicate opportunities for improvement.

Information Needed

- Waste generation, disposal, and cost estimates.
- Simple tracking tool (spreadsheet).
- Estimates of volume of waste diverted by various strategies and avoided costs.
- Mechanism for communicating progress to stakeholders.

Action Plan

- Collaborate with waste hauler to track quantity of waste generated and costs associated with waste program.
- As strategies are implemented, update tracking tool to reflect waste avoided, diverted, and costs.
- Evaluate data for additional opportunities to set and pursue waste diversion goals.
- Share and celebrate progress with stakeholders.

Relative Cost



Estimated Diversion



Time Frame



Alignment

TRUE

B. Recommendation 2: Improve Purchasing Practices, Reduce, & Reuse

Description

To reduce the facility's volume of waste sent to the landfill, the Airport should reduce waste generation and reuse materials where possible. BFI staff's existing purchasing practices may generate waste in the form of single-use and/or disposable items and supplies and tracking of these items could reveal opportunities for reduction and reuse.

Action

It is recommended that the Airport adopt a purchasing policy prioritizing durable (versus disposable) items and supplies that are reusable, recyclable, compostable, and/or made from recycled content. It is also recommended that the Airport identify supplies and materials which can be avoided, reused on site, or donated to a third party.

Justification

Waste reduction is the most environmentally preferred waste management strategy as determined by the **Environmental Protection Agency (EPA)**. Reduction and reuse simultaneously lower waste program costs by producing a smaller material stream.

Information Needed

- Purchasing records.
- Waste stream information.

Action Plan

- Adjust practices which generate waste (printing, housekeeping, etc.)
- Substitute durable alternatives for single use or disposable items in the administration office and staff areas.
- Reuse items and materials where possible and encourage reuse by passengers, tenants, and contractors.
- Adding water bottle filling station to Airport Operations Building (AOB) to reduce consumption of individual bottles of water.
- Collect and donate leftover food and ingredients from restaurant spaces or create a receptacle for unopened products (food & beverages, toiletries, etc.) through the United Services Operation (USO).

Relative Cost



Estimated Diversion



Time Frame



Alignment

BMP

C. Recommendation 3: Enhance Existing Recycling Program

Description

To reduce the facility's volume of waste sent to the landfill, the Airport should continue to recycle materials that cannot be reused or avoided and expand the program to include additional materials.

Action

It is recommended that the Airport maintain its existing recycling program and supplement current practices with additional receptacles, signage, an education campaign, the incorporation of more materials, and partnership with the waste hauler.

Justification

Convenient receptacles, effective signage, and educational campaigns have been shown to increase participation and improve compliance with a recycling program. Recycling bins should be readily visible, instructional recycling signage would increase effectivity, an awareness campaign for employees, tenants, or visitors further compounds the program's effectiveness. A formal partnership with a waste hauler would provide a resource for data and educational materials.

Information Needed

- Inventory of related signage and areas of significant waste generation.
- Protocol for communicating program to employees, tenants, and visitors.

Action Plan

- Convert surplus garbage cans into recycling bins with labeling.
- Collocate all recycling bins and garbage cans into pairs throughout the facility.
- Install color-coded, graphic instructional signage in public areas.
- Train employees on the recycling program to explain its purpose, requirements, and importance.
- Communicate information about the recycling program to tenants and visitors.
- Monitor and adjust recycling program using feedback from hauler.

Relative Cost



Estimated Diversion



Time Frame



Alignment

TRUE

D. Recommendation 4: Tenant Requirements

Description

Rules and Regulations, Minimum Standards, leases, and contracts are all vehicles through which the Airport can influence tenant behavior, including recycling.

Action

It is recommended that the Airport consider adding language pertaining to the waste diversion program, including recycling, to the facility's Rules and Regulations and/or Minimum Standards.

It is also recommended that as contracts and leases expire, extend, or renew, the Airport revise contract agreements to include waste management requirements or preferences, such as support of the recycling program.

Justification

The Airport's existing governance documents and agreements do not explicitly encourage or require waste diversion. Updating these documents to include a provision stating this preference or requirement could advance BFI's waste diversion program in areas beyond its direct control. Private hangar tenants, who are responsible for obtaining their own waste collection services, could be encouraged to consider their own waste diversion practices through these mechanisms.

Information Needed

- Existing Rules and Regulations and/or Minimum Standards.
- Current contracting template and protocol for revising.

Action Plan

- Revise Rules and Regulations and/or Minimum Standards to encourage or require waste diversion, including recycling.
- Encourage private hangar tenants to divert waste and encourage or require these tenants to obtain both waste and recycling collection services.
- Review governance documents and contracts on a regular basis to ensure they reflect BFI's goals.

Relative Cost



Estimated Diversion



Time Frame



Alignment

TRUE

3. Attachments

A. Additional Recommendations for Consideration

In addition to the primary recommendations stated previously, the Waste Plan Team suggested several other items that could be implemented at BFI. These supplementary recommendations may be found in **Table 2**.

Table 2: Additional Recommendations for BFI Waste and Recycling Plan	
Objectives and Targets	
-	Set Specific, Measurable, Achievable, Realistic, and Time-bound (SMART) Goals.
Recycle and Compost	
Paper	
-	Continue the paper recycling program.
-	Expand paper recycling program to additional areas, specifically airline deplaned newspapers and magazines and expired items from the newsstand.
Plastic Bottles, Aluminum Cans, and Plastic Cups	
-	Continue and expand the plastic bottle and aluminum can recycling program.
-	Coordinate plastic cup recycling with the airlines serving BFI.
Cardboard	
-	Continue the cardboard recycling program.
-	Provide feedback to tenants on the progress and performance of this program, solicit their feedback, and market the program to all tenants.
-	Approach Waste Management about the potential to collect and manage cardboard separately to protect value of cardboard stream.
Glass	
-	Continue the current glass recycling program and practices.
-	Provide feedback to tenants on the progress and performance of this program and solicit their feedback.
Other Recyclables	
-	Work with the waste hauling contractor to design and implement strategies for other materials as they are identified in the waste stream.
Green Waste	
-	Continue green waste compost collection program.
-	Evaluate how materials are managed and explore opportunities to align with the EPA hierarchy.
Food Waste	
-	Implement food composting program. <ul style="list-style-type: none"> o Start with coffee grounds, then expand to other pre-consumer food waste.
Paper Products	
-	Implement paper towel composting in restrooms using existing infrastructure and modified collection practices.
Energy from Waste (EfW)	
-	Utilize landfill facility with energy generation for all residual waste materials that cannot be reused, donated, recycled, or composted and track this stream.

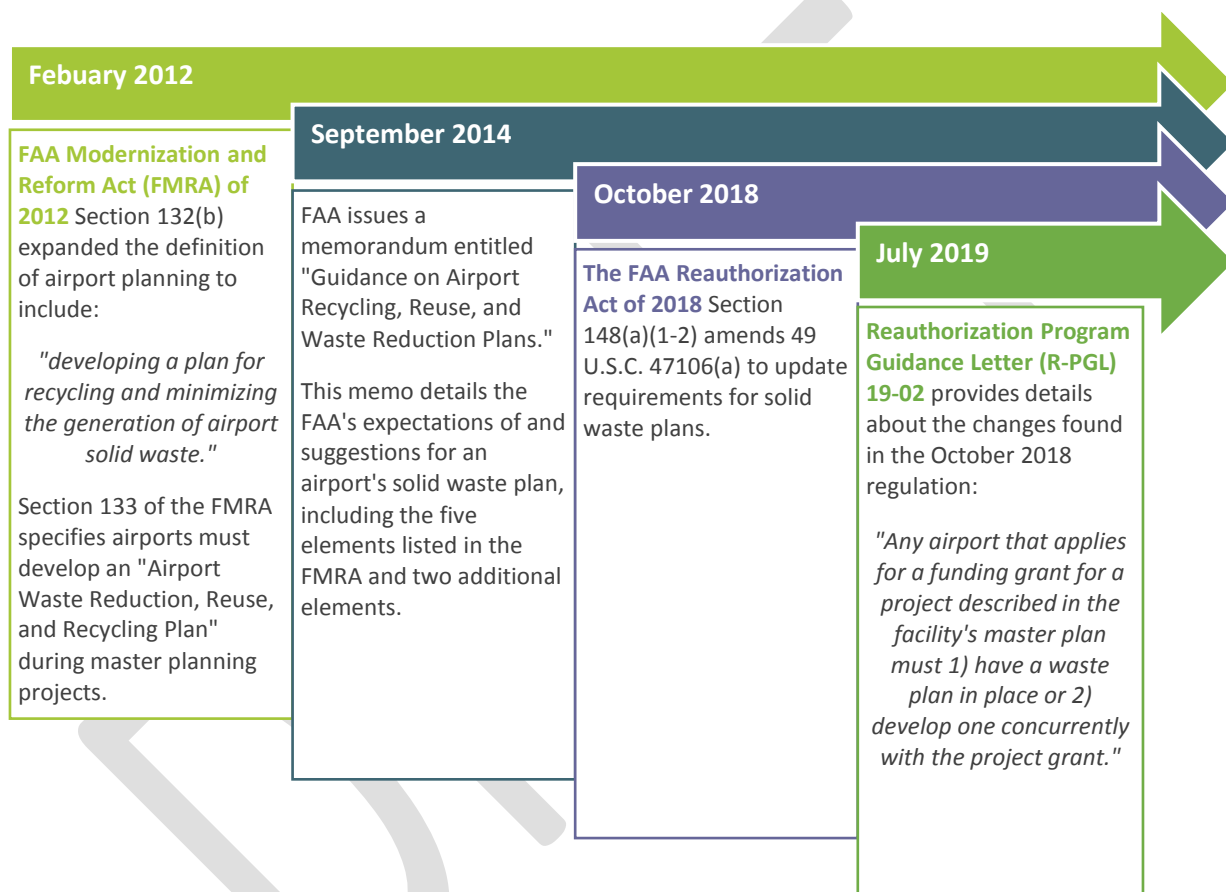
Other Recommendations
Purchasing Policies and Requirements
<ul style="list-style-type: none">- Enhance existing sustainable purchasing policy by identifying gaps and prioritizing waste reduction.<ul style="list-style-type: none">o Prioritize materials that are durable, reusable, recyclable, compostable, and/or made from recycled content.o Share with tenants to encourage them to adopt their own similar practices.
Additional Facilities and New Development
<ul style="list-style-type: none">- Expand program to areas outside Airport control (through collaboration with operators of areas excluded from this plan).- Incorporate recycling and waste management considerations as part of designing and constructing new development.
Continuous Improvement
<ul style="list-style-type: none">- Maintain and improve the recycling and waste program according to Plan Do Check Act cycle.

DRAFT

B. Regulatory Background

Figure 1 outlines the introduction timeline and specifics of FAA’s waste planning requirement. The FAA provides content guidance for airport waste plans in the September 2014 memo on the topic (available on the FAA’s website).

Figure 1: FAA Solid Waste Recycling Planning Requirement Timeline and Details



Sources: FAA; Mead & Hunt

Figure 2 details the elements which are required for a solid waste recycling plan per the FMRA (marked with an asterisk, *) or suggested for inclusion in a plan in the FAA Memo (two asterisks, **). **Figure 3** lists the factors influencing the scope and nature of an airport’s waste program, as described in the FAA memo.

Figure 2: Elements of Airport Solid Waste Management



Sources: FAA; Mead & Hunt

Figure 3: Factors Influencing Airport Solid Waste Management Programs



Sources: FAA; Mead & Hunt

C. Airport Information

Figure 4 shows a summary of background information about BFI, including its location, operations, air carrier, layout, ownership, and classification.

Figure 4: BFI Background Information



Source: King County International Airport-Boeing Field; Mead & Hunt Google Basemap (Earth n.d.); Washington County Map (Alexrk2 2009)

D. Plan Scope

Municipal Solid Waste (MSW) consists of everyday items that are used and then discarded. This plan focuses on the management of MSW and other materials that may be recycled or disposed of in a municipal solid waste landfill. There are five primary types of MSW generated at airports: **general MSW**, **food waste**, **green waste (yard waste)**, **deplaned waste**, and **construction and demolition (C&D) waste**. This plan does not address the management of other waste types regulated by federal, state, or local laws, specifically: hazardous, universal, or industrial waste; waste from international flights, or C&D waste that is subject to special requirements/handling.

Facilities at BFI include buildings and areas over which the Airport has a varying degree of control or influence over waste management practices. Some areas fall under direct control of Airport staff, while others BFI has influence over but not direct control. According to FAA guidance, areas over which the Airport has direct control or influence should be included in the Recycling, Reuse, and Waste Reduction Plan; areas outside the Airport’s control or influence may be excluded. **Table 3** lists a breakdown of the areas where BFI controls, or influences waste management, as well as areas where BFI neither controls nor influences waste practices.

Table 3: Areas of BFI Control on Buildings and/or Uses	
Management Level	Facilities
Areas under direct control	Passenger Terminal Building
	<i>Public use areas (curbs, restrooms, seating areas, etc.)</i>
	<i>Airport Administration offices and staff work areas</i>
	Airport Support Facilities
	<i>Emergency/Police/ARFF facilities</i>
Areas under influence <i>(Spaces owned by Airport, leased by tenants)</i>	<i>Airport Maintenance building</i>
	Passenger Terminal Building Tenants
	<i>Rental Car areas</i>
	<i>Airline areas</i>
	<i>Cafe</i>
	Contractor Activities (janitorial/custodial, construction, other)
	Other Tenants
	<i>Aviation Industrial facilities</i>
	<i>Air Cargo facilities</i>
	<i>Washington Army National Guard (WANG) facilities</i>
	<i>FBOs, tenant hangars, and leased buildings</i>
<i>FAA Air Traffic Control Tower (ATCT)</i>	
<i>Museum of Flight</i>	
Areas not under direct control or influence	Federal Inspection Services (FIS)
	<i>U.S. Customs and Border Protection</i>

Source: King County International Airport-Boeing Field

E. Current Waste Management Program

The waste diversion program at BFI primarily consists of recycling practices that facilities staff maintain. Tenant participation in the program is voluntary. **Figure 5** details the existing waste and recycling infrastructure in place at BFI.

Figure 5: Existing BFI Infrastructure



Source: BFI; Mead & Hunt.

The City of Seattle contracts with Waste Management to provide comprehensive garbage, recycling, food scrap and yard debris collection services. The municipal solid waste that is collected in dumpsters controlled by BFI, is collected by Waste Management of Seattle. Recycling collection services for Airport-controlled material collection is provided by Waste Management of Seattle and Seadrunar Recycling of Seattle (Seadrunar). Seadrunar is a private, non-profit company that provides free recycling programs to qualified businesses throughout the greater King County area. The profits from Seadrunar Recycling help fund the Seattle Drug and Narcotic Center, Inc. (Seadrunar), the oldest long-term residential drug and alcohol treatment facility in the Northwest. By using Seadrunar Recycling services, BFI helps to provide jobs for recovering addicts and keep waste out of the landfill.

BFI’s tenants (airlines, FBOs, and GA hangar tenants) are responsible for custodial activities in their areas including transferring waste to the appropriate dumpsters. **Figure 6** shows materials accepted in BFI’s existing recycling program.

Figure 6: Items Currently Recycled at BFI



Source: BFI; Mead & Hunt

F. Waste Audit

Information about the following categories was collected to assist with this plan:

- Airport buildings and facilities
- Areas that generate waste
- Types of waste generated in each area
- Materials that can be recycled under the current program.

An evaluation of BFI’s information and records, as well as aviation industry waste and recycling trends, supported efforts to identify the source, composition, and quantity of waste generated at BFI, including areas under the Airport’s direct control or influence. This information then served as a foundation to identify opportunities to improve and monitor program effectiveness.

Quantity

The project team estimated a total of 52 tons of MSW is generated at BFI annually, including nine tons of comingled recyclables. These volumes are based upon the capacity of and frequency of collection service for each of the facility’s dumpsters and the EPA’s volume-to-weight conversion factors for MSW and comingled recyclables (including glass). **Table 4** lists the location, size, and collection frequency of each Waste Management dumpster.

Table 4: Waste Management Dumpster Locations and Capacity Summary			
Dumpster Location	Recycling Dumpster Size	Trash Dumpster Size	Collections per Week
7300 Perimeter Rd (Airport office Building/Civil Aeronautics Authority Office and Warehouse).	-	6-yard	1
6711 Perimeter Rd. (GA hangars)	1-yard	-	1
7229 Perimeter Rd. (Passenger Terminal)	4-yard	6-yard	Recycling – 1 Trash – 2
6518 Ellis Ave. (Maintenance building)	-	8-yard	2
9220 E Marginal Way (T-hangars)	-	6-yard	1
8200 E Marginal Way (ATCT)	-	6-yard	1
8700 E Marginal Way (GA Hangars)	-	6-yard	1
8600 Perimeter Rd (GA Hangars)	(2) 96-gallon carts	-	1
Total	6 yards	38 yards	-

In addition to the waste and recycling collected by Waste Management listed in **Table 4**, Seadrunar operates several recycling dumpsters at BFI. Quantities and collection frequency details were not provided for the materials BFI recycles through Seadrunar, which include cardboard, paper, shredded paper, plastic, and aluminum cans. Providing this information would improve the accuracy of BFI’s total waste/recycling and the information listed in **1. Summary**. BFI also recycles yard waste from Airport maintenance activities. According to yard waste recycling records provided by BFI, the Airport recycled approximately 90 tons of yard waste in 2015.

Some tenants at BFI may have waste and recycling collection services through the City of Tukwila’s contract with Waste Management. Tukwila’s solid waste is ultimately taken to King County’s Cedar Hills Landfill for disposal. As part of the Solid Waste Interlocal Agreement (ILA) with King County, Tukwila and other parties will develop plans and alternatives to waste disposal at Cedar Hills Landfill in advance of its closure in 2025 (City of Tukwila 2015).

Sources and Composition

Based on the activities taking place at BFI, a varied waste stream can be expected. **Table 5** lists each area included in the scope of this plan and the type(s) of waste likely generated there. A sort could also be used to identify opportunities to improve the composition of the waste stream (by item substitution, by improving recycling to reduce the volume of waste, etc.).

A physical waste material sort could provide more detailed information about the specific composition of waste at BFI. This information may include:

- Types of items included in each general category
- Contamination rate of the recycling stream (items that are not recyclable in the recycling bins)
- Recovery rate for recycling. (the proportion of recyclable items that are segregated properly)

Purchases

BFI staff does not currently track the quantity and type of disposable items and supplies purchased for the facility. This information could provide insight on some of the materials coming into the airport that will go back out as waste (other materials are brought on-site by visitors, employees, and vendors). Identifying and tracking the type and quantity of all disposable items purchased for use at BFI, will allow the Airport to identify opportunities to reduce outgoing waste, including:

- Items that have reusable or recyclable alternatives (foam cups);
- Some items which could be eliminated (by converting paper forms to digital to reduce paper waste generated); and
- Some which indicate scale of the activity at BFI (paper towel and garbage bags).

Table 5: BFI Waste by Area and Material

Area Material	Office Paper	Newspapers	Magazines	Plastic	Aluminum	Cardboard	Glass	Food Waste	Paper Products	Liquids	Toiletries	Packaging	Styrofoam	Metals	Deplaned Waste	Green / Yard Waste	C&D Waste	Other Waste
Passenger Terminal Building																		
Public passenger areas <i>Curbs, ticketing lobby, restrooms, security screening queuing area, sterile gate areas, public "meet and greet" spaces, baggage claim area</i>		X	X	X	X			X	X	X	X	X						X
Tenant areas <i>Cafe, and associated activities</i>	X	X	X	X	X	X	X	X	X	X		X						X
Airline areas <i>Offices, ticketing counters, gate stations, breakrooms, underwing services, and deplaned waste</i>	X	X	X	X	X	X		X	X	X		X			X			X
Airport Administration Offices	X	X	X	X	X	X		X	X			X						X
Other Airport Maintained Buildings and Areas																		
Maintenance Building	X	X	X	X	X	X		X	X						X	X	X	X
Airport Maintenance Activities														X	X	X	X	X
FBO Facilities	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X

Source: King County International Airport-Boeing Field

G. Feasibility Analysis

Many factors impact the feasibility of recycling at BFI; some are universal, and others are specific to the facility. The following sections describe the more influential of these factors.

Commitment and Support

The willingness of BFI, BFI staff, and the Airport's contractors and tenants to support the facility's recycling program are critical to the success of such a program. Without committing resources such as funding, labor and time, space, and access to secure areas, a waste management program could struggle.

Airport Policy and Local Dedications

BFI's administration has supported the recycling program in the past, and it is expected that this will continue in the foreseeable future. The administration has previously implemented other sustainability projects, one project being the energy retrofitting and LED lighting upgrade projects completed in the passenger terminal building. BFI's recycling program is also driven by the administration staff's commitment to "doing the right thing" for the environment. The recycling program at BFI was established to reduce the quantity of material disposed of in the landfill and to conserve environmental and financial resources. BFI staff's commitment and practices drive the program; it is also supported by well developed, local recycling infrastructure.

The City of Tukwila provides free business recycling program assistance to help businesses and their tenants save money and prevent waste by starting or improving on-site recycling, waste prevention or "buy recycled" programs. All Businesses in the City of Tukwila that have garbage service through Waste Management are eligible for recycling dumpsters or carts and service at no additional cost. Businesses are eligible for recycling 150% of the level of their garbage service.

The vision of King County's Solid Waste Division is to achieve zero waste of resources and enhance the environment through collaboration and innovation. Part of this Division's mission is to continuously improve waste prevention, resource recovery, and waste disposal. King County provides tools and assistance to help its cities promote and enable responsible procurement practices, recycling and salvage-materials use, and lead by example through programs and operations. King County's Cedar Hills Landfill is also the site of the nation's third-largest landfill gas energy project. Methane gas from garbage is processed and purified, then sold to Puget Sound Energy power plants to be used to generate electricity. Converting landfill gas to electricity in this way reduces the landfill's greenhouse gas emissions and provides additional revenue to the County's Solid Waste Division, keeping disposal rates low for residents across King County.

Based on the resources allocated to these programs, BFI, the City of Tukwila, and King County appear to generally support recycling, practical waste management, and sustainable operations.

The mission of Waste Management is to provide efficient, easy, and sustainable solutions that help its customers reduce, reuse, and recycle. This commitment aligns with continued support of BFI's recycling programs.

Airline Policies

BFI's two airlines, Kenmore Air Express and JSX, do not appear to have any specific waste or recycling guidelines for their operations. Offering recycling for deplaned waste through a willing airline at BFI aligns the Airport with goal to reduce waste generation wherever feasible.

Technical and Economic Factors

Local Markets and Infrastructure

Markets for recycled materials fluctuate widely based on many factors and interactions. Local waste haulers typically accept materials that can be recycled cost-effectively in the area. Manufacturers purchasing recycled material want it to be predictable and ready for use; therefore, recycling facilities are particular about what materials they accept and prefer materials that are of high value and clean and easy to separate.

The materials listed in **Table 6** are accepted under the commercial recycling programs of both Seattle and Tukwila. As noted above, inclusion in such programs typically indicates that the market and/or infrastructure for these materials is strong. BFI currently recycles all the materials accepted in the commercial recycling programs for the Cities Seattle and Tukwila.

Table 6: Materials Accepted for Commercial Recycling in the Cities of Seattle and Tukwila

Cardboard	Mixed paper, newspaper, magazines
Tin and aluminum	Glass
Plastic bottles, tubs, and jugs	

Source: Waste Management

The King County Solid Waste Division operates one landfill, the Cedar Hills Regional Landfill, and maintains several closed landfills. This Division also contracts with a renewable energy company to generate renewable energy from landfill gas. City of Seattle Public Utilities operates the City of Seattle Recycling and Disposal Transfer Stations, which provide recycling and garbage disposal to City of Seattle businesses and residents.

Logistical Considerations and Constraints

To maintain a recycling program at BFI, certain elements must be in place. These include:

- A proactive and engaged custodial staff
- A willing and affordable hauling contractor
- Space for bins, dumpsters, and compactors
- Hauler access to secure areas of the facility (including airside ramps and sterile areas).

At present, these elements appear unconstrained. Additional resources including custodial labor, waste hauling services, space, and airport access are anticipated to be available to support the continuation and/or expansion of the recycling program at BFI.

Contractual Issues

A detailed evaluation of BFI’s contracts is included in **3.H Review of Waste Management Contracts and Tenant Leases**. Any major contractual issues with maintaining and improving the recycling program at BFI are not anticipated. BFI and the waste and recycling collection contractor will need to continue to collaborate to support the facility’s recycling program.

Recycling, Landfill, and Energy-From-Waste Facility Requirements

The recycling facility and landfill that accept waste from BFI have specific acceptance criteria and requirements. Adherence to these specifications protects the safety of employees handling these materials; the integrity and operation of the equipment and infrastructure used to transfer, sort, and convert these materials; and the value of the recyclable stream.

Components that seem recyclable (plastic, glass, or metal parts) comprise some items generated at BFI; however, the recycling facility has specific material standards, so it is important that non-recyclable items are not included in the facility’s recycling stream.

Waste items that may be generated at BFI, but are prohibited at the recycling facility include:

- Styrofoam
- Plastic bags
- Saran wrap
- Frozen food packaging
- Plastic clamshells
- Bakery containers
- Paper/plastic plates
- Paper napkins
- Paper/plastic cups
- Waxed cardboard
- Plastic lids and caps
- Liquid in container
- Lightbulbs
- Batteries
- Other garbage

Waste material that may be generated at BFI but is prohibited by the Cedar Grove Landfill includes hazardous waste, radioactive waste, large batteries, paint, and C&D waste. Some waste items cannot be recycled or landfilled, for example hazardous waste and chemicals, paint, batteries, and C&D waste. These items must be managed through hazardous waste or universal waste programs or disposed of at a specialized landfill.

Costs

BFI strives to be as self-sustaining as feasible; therefore, it is imperative that programs implemented and maintained at the facility, including recycling, are as cost-effective as possible.

Guidelines and Policies

To evaluate BFI’s existing recycling plan in the context of local, state, and national requirements, the consultant reviewed federal, State of Oregon, and local waste and recycling regulations and policies/factors.

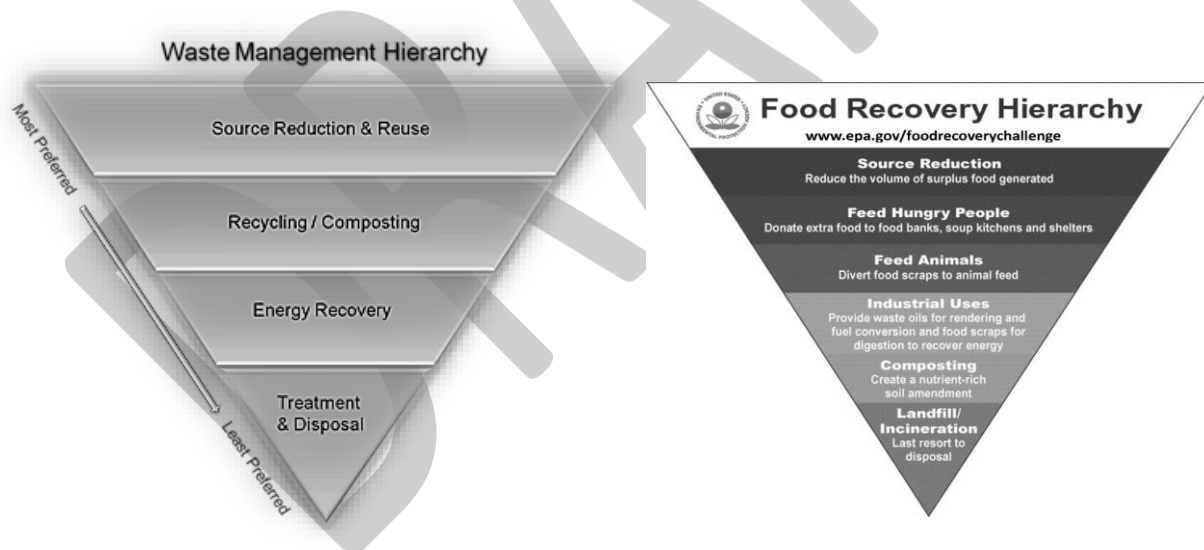
Federal

As described in **Regulatory Background**, the FAA’s definition of airport planning includes planning for recycling and waste minimization.

The United States **Environmental Protection Agency (EPA)** is responsible for developing a solid waste management program under the **Resource Conservation and Recovery Act (RCRA)** and related policies and guidance. RCRA provides the framework for management of hazardous and non-hazardous waste. All generators of hazardous waste, including airports, are required to comply with RCRA and all other federal waste laws and regulations.

Figure 7 shows a hierarchy of waste management strategies developed by the EPA. This hierarchy on the left ranks these strategies from most- to least-environmentally preferred and places emphasis on reducing, reusing, and recycling. In addition to the general waste management hierarchy, the EPA has also developed a preference ranking of management strategies for food waste, as shown in the figure at the right.

Figure 7: Waste Management and Food Recovery Hierarchies



Source: United States Environmental Protection Agency, (Waste Management Hierarchy n.d.), (Food Recovery Hierarchy n.d.)

State

The Washington State Department of Ecology has primary authority for waste management at the state level. The Department assists local governments in developing solid waste management plans, provides resources for the development of such plans, and reviews waste facility permits for conformance with state law. The state establishes authorities, minimum standards, and planning requirements, and delegates the responsibilities for implementation on the county and city level. The Department's website offers a collection of information and resources for waste management in the State of Washington and can serve as a valuable resource for BFI's waste and recycling efforts.

The State of Washington's 2009 comprehensive solid waste plan, *Beyond Waste*, established "reduce, reuse, and recycle" as the fundamental principle of waste reduction for solid waste management. The State does not have mandatory collection laws, a container deposit program, or disposal bans for recyclable materials such as aluminum, glass or plastic, but it does ban the disposal of electronics, lead acid batteries, used oil, and mercury lights. The State also mandates solid waste planning. The State of Washington requires that all counties establish a Solid Waste Advisory Committee (SWAC) with the responsibility to develop solid waste programs and policies.

All counties and cities in Washington are required to have a solid waste management plan (under RCW 70.95.080). These plans outline waste management over a 20-year horizon including consideration of population growth and generators of waste. King County, including the cities of Seattle and Milton along with several other jurisdictions, met their waste planning requirement by developing and adopting the King County Solid Waste Management Plan (SWMP) in 2001. The King County SWMP is currently being updated. The City of Seattle also has its own SWMP, which was revised in 2013.

In addition to the requirements for cities and counties, Washington State law also requires airports that receive scheduled commercial service to provide receptacles in its facility for the disposal of at least two of the following materials: aluminum, glass, newspaper, plastic, and tin. BFI is recycling each of these materials.

Local

Since the BFI property boundary is entirely within King County, BFI must follow the local ordinances enacted by the County. BFI's program is influenced by the policies of the City of Seattle and the City of Tukwila as well.

As noted in the Draft 2018 King County Comprehensive Solid Waste Management Plan (CSWMP), the County is assigned operating authority for transfer and disposal services, is tasked with providing support and assistance to the cities within the County for the establishment of waste prevention and recycling programs and is the planning authority for solid waste. Each city in the County is designated the authority for collection services within their corporate boundaries and directs solid waste generated and/or collected within those boundaries to the King County transfer and disposal system. Seattle's disposable non-recyclable waste is hauled by rail to the Columbia Ridge Landfill in Gilliam County, Oregon. Disposable non-recyclable waste from the City of Tukwila is disposed of at the King County operated landfill, Cedar Hills Regional Landfill, which is expected to reach capacity in 2025.

The solid waste management policies and goals of King County, the City of Seattle, and the City of Tukwila are summarized below:

King County

As outlined in King County Code, Title 10, § 10.14.020, King County has a goal to achieve zero waste of resources by 2030 through maximum feasible and cost-effective prevention, reuse and reduction of solid wastes going into its landfills and other processing facilities. (King County 2020)

The County recognizes that waste reduction and recycling are the highest priority of the viable solid waste management options, and has adopted this goal, with the intent to aggressively pursue zero waste. King County is currently updating its Solid Waste Management Plan (SWMP). The January 2018 Draft version was reviewed under this project. The final plan may provide additional guidance and support for recycling at BFI.

City of Seattle

The City of Seattle aims to Divert most of the city's solid waste away from landfills by increasing recycling, composting, and promoting products that are made to be reused, repaired, or recycled back into nature or the marketplace. The City of Seattle has been actively pursuing aggressive recycling goals since 2007 when Seattle City Council adopted Resolution 30990 (the *Zero Waste Resolution*). In 2013 the City Council revised these recycling goals to include:

- Recycling 75 percent of the City's MSW by 2022.
- Recycling 70 percent of C&D debris by the year 2020.

City of Tukwila

The City of Tukwila Comprehensive Plan (2015) outlines specific goals related to solid waste management including reducing the solid waste stream and encouraging reuse and recycling, and actively participating in a uniform regional approach to solid waste management.

BFI's solid waste management program aligns with the solid waste efforts of King County, the City of Seattle, and the City of Tukwila. BFI recycles most the material types collected by Waste Management and Seadrumar, including paper, cardboard, plastic bottles and containers, and cans (aluminum and tin).

Based on the availability of residential and commercial recycling, the project team assumes the residents of the communities surrounding BFI, and therefore the employees and passengers, have been exposed to recycling, receive on-going messaging about its importance, and are generally supportive of recycling efforts.

The King County Solid Waste Division does not provide direct collection services but supports collection of a wide range of waste materials through its transfer facilities and special collection programs that are served by private-sector companies. Most cities in the King County service area contract directly with one or more of the private companies for collection services. The City of Seattle is not included in King County's service area and has its own system for garbage, recyclables, and organics collection that is provided by Waste Management of Seattle.

H. Review of Waste Management Contracts and Tenant Leases

The FAA memorandum titled “Guidance on Airport Recycling, Reuse, and Waste Reduction Plans” explains that the purpose of reviewing waste management contracts is to “identify opportunities for improving (waste) program scope and efficiency, as well as identify constraints.” By reviewing contracts and tenant leases for language pertaining to waste management practices, the waste plan may appropriately identify opportunities to encourage responsible waste management for all levels of Airport activity.

In general, BFI’s contracts and leases address housekeeping requirements and related expectations for managing trash and provide limited information about recycling. These contracts and leases do not necessarily impede recycling or other waste management strategies; however, they do not explicitly require conformance with or support of BFI’s recycling and related efforts. The following sections describe the content of various Airport contracts related to waste and recycling.

Custodial and Waste Hauling Contracts

BFI does not contract for custodial services for the areas under airport control; these areas are maintained by King County employees.

Waste collection services at BFI are provided by Waste Management. Both Waste Management and Seadrumar collect recycling at BFI. BFI does not have contractual agreements with Waste Management or Seadrumar. BFI is serviced by the City of Seattle’s contract with Waste Management for garbage, recycling, and food and yard waste collection services. This collection contract covers all residential and commercial customers by area. The City’s solid waste franchise agreement outlines the responsibilities of Waste Management, including:

- Collect and dispose of all garbage and compostables at a transfer station owned by the City.
- Collect and deliver recyclables to a Private Facility located in the Duwamish Industrial Area (DIA) as directed by the City.
- Provide necessary collection vehicles, containers, facilities, and personnel.

Tenant Leases and Service Contracts

Tenant leases and service contracts were not reviewed under this project. BFI indicated that lease agreements with tenants generally do not include specifics pertaining to waste management or recycling preferences. Airport leases often include basic requirements pertaining to trash removal and janitorial activities in leased areas. It is assumed that BFI’s leases require tenants to perform general maintenance including cleaning and keeping the property clean and orderly but may not specify which party is responsible for trash removal.

Funding

Waste and recycling collection are funded in BFI’s maintenance operating budget. BFI does not currently receive payment or rebates for recycled materials.

I. Financial Analysis

According to the FAA memo “Guidance on Airport Recycling, Reuse, and Waste Reduction Plans,” an analysis of the financial aspects of waste management assists airport sponsors in determining the cost versus benefit of all existing and proposed enhancements to an airport’s practices and should include capital costs, physical infrastructure, transport, and labor. Financial metrics associated with waste at an Airport, most commonly documents such as regular invoices from a waste contractor, are compiled into an all-encompassing financial analysis. This analysis may identify the overall cost of the current waste management program and, more critically, illuminate potential strategies for cost savings or revenue reduction as part of the waste plan.

Airport staff provided Waste Management waste collection invoices from January 2015 for review under this project. The invoices included costs for terminal waste collection, airfield waste collection, and general waste collection (specific single collection events), as well as the fees for collection of recyclables collected by Waste Management. The recycling services provided to BFI by Seadrunar are free. Based on the one month of data from December 2015, on average, BFI spends approximately \$73,590 each fiscal year (July 1 to June 30) for collection of waste and recycling by Waste Management.

Invoices for collection of scrap metal, waste oil, and compost by other haulers were not provided. BFI pays to have waste syringes collected from the restrooms and shredded paper collected from the offices about once a year.

To estimate approximate annual costs for recycling, information about the charges associated with the collection of the recycling dumpster and carts and other services is needed. After supplementing the information compiled and analyzed in this document, BFI can make informed solid waste management decisions over time. Using the information provided in this plan and all available cost information, BFI can begin to analyze the program’s financials, evaluate costs, and determine if enhancements should be implemented. If expansion of the program is not technically or economically feasible at this time, this information will help BFI determine when improvements might be feasible.

Citations

Sources

- City of Tukwila. 2015. "Comprehensive Land Use Plan ." *City of Tukwila Government website*. Accessed August 04, 2018. <http://www.tukwilawa.gov/departments/community-development/comprehensive-plan/>
- n.d. *Food Recovery Hierarchy*. Environmental Protection Agency.
- King County. 2020. "Title 10 Solid Waste." April 2. https://www.kingcounty.gov/council/legislation/kc_code/13_Title_10.aspx
- n.d. *Waste Management Hierarchy*. Environmental Protection Agency.

Images

- Alexrk2. 2009. Washington County Map. Wikipedia.
- Earth, Google. n.d. Satellite Imagery - 2019. Google.
- Environmental Protection Agency. n.d. *Food Recovery Hierarchy*. Environmental Protection Agency.
- . n.d. *Waste Management Hierarchy*. Environmental Protection Agency.

References

- City of Seattle. 2018. *Seattle Municipal Code, Title 21 Utilities*. July. Accessed August 3, 2018. https://library.municode.com/wa/seattle/codes/municipal_code?nodeId=TIT21UT
- City of Tukwila. *Recycling and Waste Prevention Services*. <http://www.tukwilawa.gov/departments/community-development/recycling-services/>
- Federal Aviation Administration. September 30, 2014. *Guidance on Airport Recycling, Reuse, and Waste Reductions Plans*. Memorandum, U.S. Department of Transportation.
- Office of Resource Conservation and Recovery. 2016. "Volume-to-Weight Conversion Factors." *U.S. EPA*. April. https://www.epa.gov/sites/production/files/2016-04/documents/volume_to_weight_conversion_factors_memorandum_04192016_508f.nl.pdf

Additional Reading

- Environmental Protection Agency. n.d. *Sustainable Materials Management: EPA*. Accessed December 2019. <https://www.epa.gov/smm/sustainable-materials-management-non-hazardous-materials-and-waste-management-hierarchy>
- Federal Aviation Administration. 2019. *Airport Recycling, Reuse, and Waste Reduction*. February 5. Accessed December 2019. https://www.faa.gov/airports/environmental/airport_recycling/
- Turner, Morgan E. 2018. *Airport Waste Management and Recycling Practices*. Madison, WI: The National Academies of Sciences, Engineering, and Medicine.

J. Glossary

(sorted by chronology)

Federal Aviation Administration (FAA) – regulatory body of the US government that regulates all national aviation activities.

FAA Modernization and Reform Act of 2012 (FMRA) – legislation that seeks to improve aviation safety and capacity of the national airspace system and provide a stable funding system.

Environmental Protection Agency (EPA) – independent agency of the US government that establishes policies that protect the natural environment.

FAA Reauthorization Act of 2018 – reauthorization of FMRA 2012 to extend funding and administrative authority to the FAA.

Reauthorization Program Guidance Letter (R-PGL) 19-02 – implements provisions to FAA Reauthorization Act of 2018 that changed project eligibility, scope, or funding under 49 U.S.C., Chapter 471.

Municipal Solid Waste (MSW) – everyday items that are used and then discarded. There are five primary types of MSW generated at airports:

- **General MSW** – common inorganic waste, such as product packaging, disposable utensils, plates and cups, bottles, and newspaper. Less common items, such as furniture and clothing, are also considered general MSW.
- **Food waste** – either food that is not consumed or the waste generated and discarded during food preparation. Food waste and green waste make up a waste stream known as compostable waste.
- **Green waste (yard waste)** – tree, shrub and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance activities. Food waste and green waste make up a waste stream known as compostable waste.
- **Deplaned waste** – waste removed from passenger aircraft. These materials include bottles and cans, newspaper and mixed paper, plastic cups, service ware, food waste, food-soiled paper, and paper towels.
- **Construction and demolition (C&D) waste** – any non-hazardous solid waste from land clearing, excavation, and/or the construction, demolition, renovation or repair of structures, roads, and utilities. C&D waste commonly includes concrete, wood, metals, drywall, carpet, plastic, pipes, land clearing debris, cardboard, and salvaged building components.

Resource Conservation and Recovery Act (RCRA) – federal law of the US governing the disposal of solid or hazardous waste.