APPENDIX C: RECYCLING PLAN

AIRPORT RECYCLING, REUSE, AND WASTE REDUCTION

The primary objective of this section is to provide the County of San Bernardino and its airport administration with recommendations for future improvements and processes that promote sustainable principles in addressing airport operations and aviation demand. By making sustainability a priority in the planning process and identifying best management practices, the airport can become a more environmentally friendly economic hub.

REGULATORY GUIDELINES

FAA MODERNIZATION AND REFORM ACT OF 2012

The *FAA Modernization and Reform Act of 2012* (FMRA), which amended Title 49 United States Code (USC), included several changes to the Airport Improvement Program (AIP). Two of these changes are related to recycling, reuse, and waste reduction at airports:

- Section 132(b) of the FMRA expanded the definition of airport planning to include "developing a plan for recycling and minimizing the generation of airport solid waste, consistent with applicable State and local recycling laws, including the cost of a waste audit."

- Section 133 of the FMRA added a provision requiring any airport that has or plans to prepare an ALP narrative report and receives AIP funding for an eligible project to ensure the new or updated master plan addresses issues related to solid waste and recycling at the airport, including the following:

    - The feasibility of solid waste recycling at the airport
    - Minimizing the generation of solid waste at the airport
    - Operation and maintenance requirements
    - A review of waste management contracts
    - The potential for cost savings or generation of income

STATE OF CALIFORNIA SOLID WASTE MANAGEMENT

In the State of California, California's Department of Resources Recycling and Recovery (CalRecycle) and local enforcement agencies manage the operation of solid waste facilities.[1] It is a priority of CalRecycle to mitigate the impacts of solid waste on public health and safety and the environment by enforcing compliance with state regulations through education, permitting, solid waste facility inspections, and more.

[1] https://calrecycle.ca.gov/swfacilities/

SOLID WASTE

Typically, airport sponsors have purview over waste-handling services in facilities they own and operate, such as airport-owned hangars and maintenance facilities. Tenants of airport-owned buildings/hangars or tenants that own their own facilities are usually responsible for coordinating their own waste-handling services. While the focus of this plan is airport-operated facilities, the airport should work to incorporate facility-wide strategies that create consistency in waste disposal mechanisms.

For airports, waste can generally be divided into eight categories.[2]

- **Municipal solid waste** (MSW) is more commonly known as trash or garbage and consists of everyday items that are used and then discarded, such as product packing.
- **Construction and demolition (C&D) waste** is considered non-hazardous trash resulting from land-clearing, excavation, demolition, and renovation or repair of structures, roads, and utilities, including concrete, wood, metals, drywall, carpet, plastic, pipe, cardboard, and salvaged building components. C&D waste is also generally labelled as MSW.
- **Green waste** is a form of MSW yard waste consisting of tree, shrub, and grass clippings, as well as leaves, weeds, small branches, seeds, and pods.
- **Food waste** includes unconsumed food products or waste generated and discarded during food preparation and is also considered MSW.
- **Deplaned waste** is waste removed from passenger aircraft. Deplaned waste includes bottles, cans, mixed paper (newspapers, napkins, and paper towels), plastic cups, service ware, food waste, and food-soiled paper/packaging.
- **Lavatory waste** is a special waste that is emptied through a hose and pumped into a lavatory service vehicle. The waste is then transported to a triturator[3] facility for pretreatment prior to discharge in the sanitary sewage system. Chemicals in lavatory waste can present environmental and human health risks if mishandled; therefore, caution must be taken to ensure lavatory waste is not released to the public sanitary sewage system prior to pretreatment.
- **Spill cleanup and remediation wastes** are special wastes generated during cleanup of spills and/or remediation of contamination from several types of sites on an airport.
- **Hazardous wastes** are also governed by the *Resource Conservation and Recovery Act* (RCRA), as well as regulations for certain hazardous waste, known as universal waste, which is described in Title 40 CFR Part 237, *The Universal Waste Rule.* Common sources of aviation hazardous waste are included below:
    - Solvents
    - Caustic part washes
    - Heavy metal paint waste and paint chips

[2] FAA, Recycling, Reuse, and Waste Reductions at Airports, April 24, 2013
[3] A triturator facility turns lavatory waste into fine particulates for further processing.

- Wastewater sludges from metal etching and electroplating
- Unused explosives and monomers
- Nickel cadmium batteries
- Waste pesticides

As shown on **Exhibit C1**, there are multiple areas where the airport potentially contributes to the waste stream, including the terminal building, on-airport tenants (fixed base operators [FBOs]/specialized aviation operators [SASOs], etc.), hangars, airfields, aircraft ground support equipment, and airport construction projects. To create a comprehensive waste reduction and recycling plan for the airport, all potential inputs must be considered.

EXISTING SERVICES

The airport currently contracts with Burrtec for solid waste services and World Oil for hazardous waste, such as aircraft oil, light bulbs, and paint. Electronic waste is not currently recycled at the airport. Recycling items collected at the airport include cardboard and compostable items, such as green waste and food. At APV, waste is separated into different bins for collection of the various streams of waste.

Tenants at the airport are in charge of managing their own solid waste and recycling providers but tend to utilize the same solid waste and recycling providers, with the exception of Midfield and CHP, which have their own recycling systems in place. Current lease agreements require tenants to comply with general rules and regulations that incorporate recycling compliance guidelines for local jurisdictions.

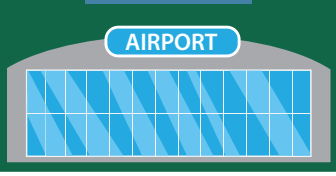
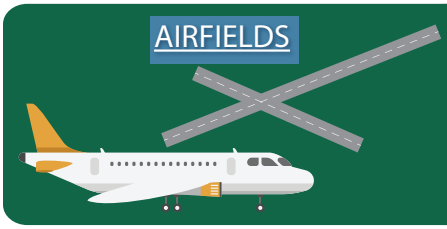
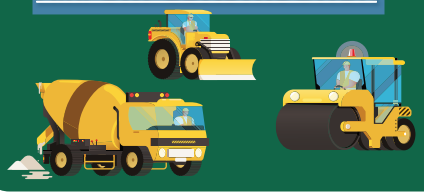
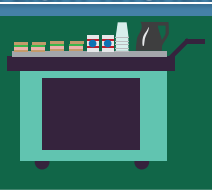
SOLID WASTE MANAGEMENT SYSTEM

Airports generally utilize either centralized or decentralized waste management systems. The differences between the two methods are described below and summarized on **Exhibit C2**.

- **Centralized waste management system |** With a centralized management system, the airport provides receptacles for the collection of waste, recyclable materials, or compostable materials and contracts for their removal by a single local provider.[4] The centralized waste management system allows for more participation from airport tenants that may not be incentivized to recycle on their own and can reduce the overall cost of service for all involved. A centralized strategy can be inefficient for some airports because it requires more effort and oversight on the part of airport management; however, the centralized system is advantageous in that it involves fewer working components in the overall management of the solid waste and recycling efforts. It also allows greater control by the airport sponsor over the type(s), placement, and maintenance of dumpsters, thereby saving space and eliminating the need for tenants to have individual containers.

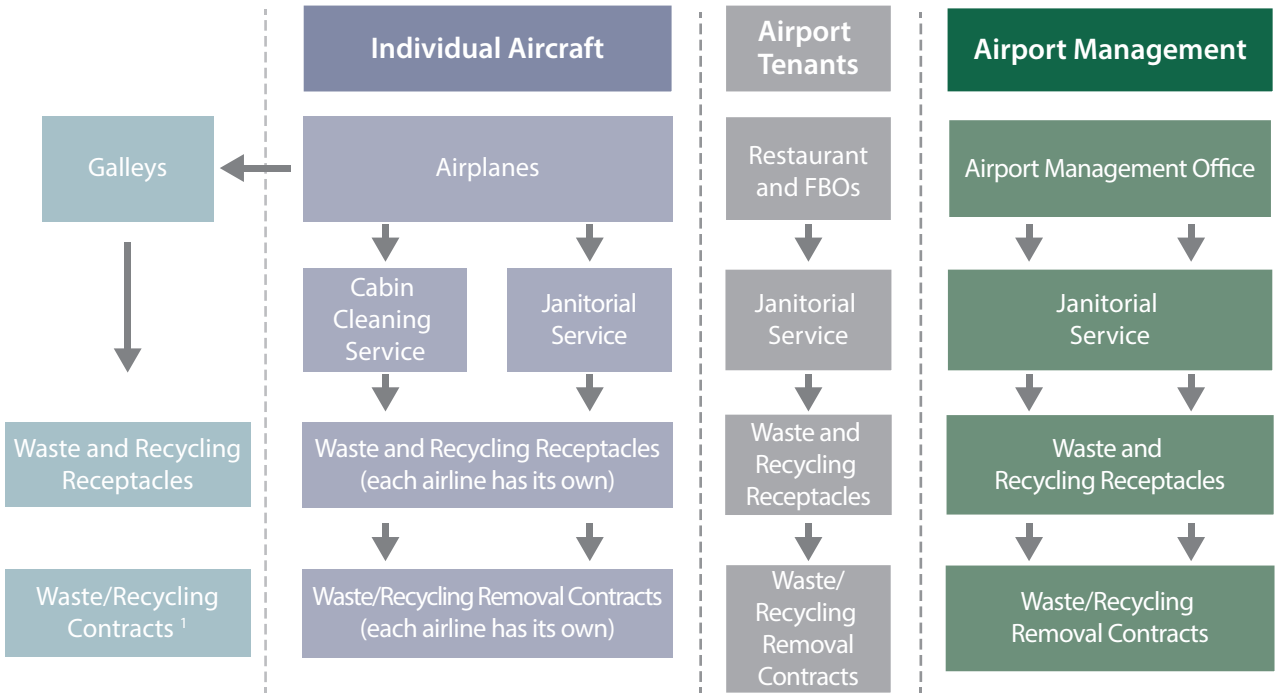
[4] National Academies of Sciences, Engineering, and Medicine, Airport Cooperative Research Program, Synthesis 92, Airport Waste Management and Recycling Practices, 2018

AIRPORT WASTE STREAMS

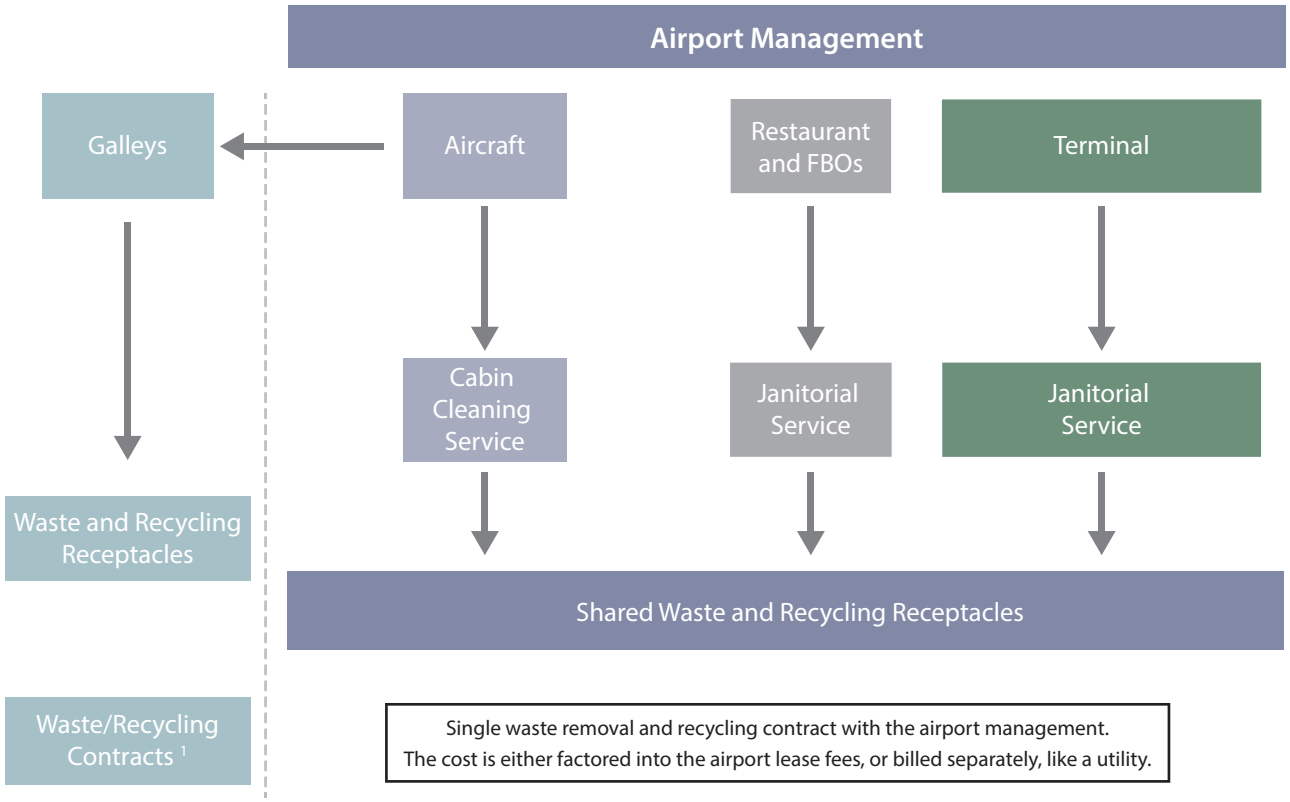
AIRPORT AREA	POTENTIAL INPUTS	POTENTIAL OUTPUTS
TERMINALS 	Restaurants Shops Passengers Employees	Food Waste, Paper Plastic, Aluminum Cans Trash, Grease & Oil Green Waste Deplaned Waste
AIRFIELDS 	Aircraft Operations	Runway Rubber Green Waste
AIRCRAFT 	Aircraft Ground Support Equipment (GSE)	Vehicle Waste Plastic Wastewater Hazmat
AIRPORT CONSTRUCTION 	Construction Re-Construction Demolition	Reused Concrete Reused Asphalt Vehicle Waste Soils, Building Materials Wood, General Waste
FLIGHT KITCHENS 	Aircraft Food Services	Food Waste Waste Water Plastic Wood
ADMINISTRATIVE OFFICES 	Employees	Food Waste Paper, Plastic Aluminum Cans Trash

Source: Recycling, Reuse, and Waste Reduction at Airports, FAA (April 24, 2013)

Components of a Decentralized Airport Waste Management System



Components of a Centralized Airport Waste Management System



[1] Galleys typically manage their own waste even if an airport relies on a centralized system

Source: Natural Resources Defense Council, Trash Landings: How Airlines and Airports Can Clean Up Their Recycling Programs, December 2006.

- **Decentralized waste management system |** Under a decentralized waste management system, the airport provides waste containers and contracts for the hauling of waste materials in the airport-operated spaces only; however, airport tenants (such as FBOs, retail shops, and others) manage the waste from their leased spaces with separate contracts, billing, and hauling schedules. A decentralized management system can increase the number of receptacles on airport property and the number of trips by a waste collection service provider, should tenants' and the airport's collection schedules differ.

SOLID WASTE AND RECYCLING GOALS

To maximize waste reduction and introduce recycling efforts at the airport, the following recommendations are made.

Goal 1: Reduce the Amount of Solid Waste Generated

- Create a centralized waste management system at the airport. Currently, APV participates in a decentralized waste management system because airport tenants are responsible for overseeing their own waste management. Airport staff could consider engaging tenants to create a centralized waste management system, which would streamline waste management efforts at APV.

  Considerations:

  - Implementation of incentives for tenants to either enhance existing recycling practices or join the airport's recycling program should be considered.

- Assign the responsibility of waste management to a dedicated individual or group. Having one person or a group of people oversee and manage solid waste at the airport would create efficient and cost-saving solid waste management solutions. People dedicated to this operational aspect of the airport would gain familiarity with waste processes and could help identify areas of improvement and cost-saving measures.

- Provide education for airport employees. To minimize waste within the airport, it is crucial to inform airport employees and provide them with a thorough education on waste management at both individual and group levels. As part of the onboarding process, new employees should be given the tools needed to achieve a thorough understanding of the airport's solid waste goals.

- Audit the current waste management system. The continuation of an effective program requires accurate data on current waste rates. An airport can gain insight into its waste stream in several ways, such as requesting weights from the hauler, tracking the volume, or reviewing the bills; however, managing the waste system starts with a waste audit, which is an analysis of the types of waste produced. A waste audit is the most comprehensive and intensive way to assess waste stream composition, opportunities for waste reduction, and capture of recyclables and should include the following actions.

- Examination of records
    - Evaluate waste hauling and disposal records and contracts
    - Examine supply and equipment invoices
    - Identify other waste management costs (commodity rebates, container costs, etc.)
    - Track waste from the point of origin
    - Establish a baseline for metrics
- Facility walkthrough conducted by the airport
- Gather qualitative waste information to determine major waste components and waste-gathering practices

- Create a tracking and reporting system. Track solid waste generated to allow the airport to identify areas where a significant amount of waste is generated, which will help the airport estimate annual waste volumes. Understanding the cyclical nature of waste generation will allow the airport to estimate costs and will identify areas of improvement.

Goal 2: Continue to Encourage Recycling Practices at APV

- Reduce waste through controlled purchasing practices and the consumption of nonessential products. The airport can control the amount of waste generated by prioritizing the purchase of items or supplies that are reusable, recyclable, compostable, or made from recycled materials.

- Provide tenant education. It is crucial to encourage participation to ensure buy-in of any future recycling efforts that may be undertaken at APV. To ensure recycling is part of the airport's everyday business, airport administration should provide training and education to support personnel, tenants, and others who conduct business at the airport. In-person meetings with airport tenants could be held to create mutual understanding of the airport's solid waste and recycling goals and how tenants play a vital role in the airport's overall success.

Goal 3: Establish Construction and Demolition Goals

- Implement construction waste requirements in contracts for construction projects. Construction contracts should highlight ways to repurpose and reuse materials/salvage and explain how recyclable materials are defined in the construction process. Additionally, these contracts should establish standards and specifications in the procurement process and contracting when starting a new construction project at APV. Other action items to consider when drafting a contract for a construction project include preparing a construction waste management (CWM) plan, assigning a waste management coordinator, and tracking and reporting requirements under the CWM plan.

- Create a CWM plan. Have the airport and its contractors adopt a CWM plan when applicable. A typical CWM plan should encompass goals and strategies to manage a project's C&D waste. A CWM plan should also identify the types and quantities by weight for any proposed demolition, site-clearing, and/or construction waste that may be generated by the project.

Other items to include in a CWM plan include the following:

- Complete a materials handling estimate worksheet for all applicable project waste streams.
- Identify where recyclable materials storage and collection points will be situated.
- Create a plan to communicate recycling goals with employees and subcontractors.
- Create a waste reduction work plan to identify what materials can be salvaged or recycled, how waste is disposed of, and the method for collecting and transporting waste streams.

The construction waste management plan should consider the following construction and demolition debris for recycling or reuse:	
Earth, soil, dirt	Wood
Concrete reclaimed asphalt pavement	Gypsum drywall
Bricks/masonry (cinder blocks, mortar, etc.)	Plastics
Rock, stone, gravel	Plaster
Ferrous metal (iron, steel, etc.)	Paint
Nonferrous metal (aluminum, copper, etc.)	Plumbing fixtures and piping
Roofing shingles and other roof materials	Land-clearing debris
Cardboard, paper, packaging	Non-asbestos insulation
Sand	

At the end of each project, as part of the CWM plan, documentation that includes tracking reporting, and invoicing should also be submitted to demonstrate which CWM plan goals were met.