

Appendix 9 Wayne County Airport Authority Detroit Metropolitan Airport Case Example

Appendix 9
Wayne County Airport Authority
Detroit Metropolitan Airport (DTW)

Detroit, Michigan

The Wayne County Airport Authority is committed to environmentally responsible operations at Detroit Metropolitan Airport (DTW), including waste reduction. The Authority's Department of Environment & Sustainability Mission Statement guides measures to decrease DTW's impact on future generations. DTW has an established sustainability program which includes a goal to increase recycling and landfill diversion. The Authority maintains a waste management program in the buildings and areas under its control, including its offices, work areas, buildings, and grounds. Authority staff support sustainable strategies for areas and activities controlled by other stakeholders.

The Department of Environment & Sustainability has primary responsibility for recycling and other diversion programs at DTW. The Sustainability Program Administrator develops procedures; provides training and education to employees and tenants; and coordinates with stakeholders to continuously improve recycling and diversion efforts. Janitorial, cabin cleaning, and waste/recycling collection services are provided by third-party contractors. Some are contracted directly by the Authority, while others are contracted by an airline consortium, individual airlines, or a facility maintenance company.

The Maintenance Department administers and funds the waste collection contracts; waste activities are funded and monitored by the Maintenance Department while the Department of Environment & Sustainability funds and monitors recycling, composting, and related education. The Department of Environment & Sustainability receives recycling quantity data from the collection contractor. Waste generation quantities are estimated from container sizes, collection schedules, visual observations, and previous studies/audits.

Authority employees have access to recycling for paper, cardboard, aluminum cans, plastic bottles, batteries and lightbulbs; these programs have high employee participation and employees provide feedback and ideas for improvement of the program. Much of the paper purchased for employee use has recycled content. The Authority's employee recycling procedure is included at the end of this case example; this procedure is the basis for recycling training during the employee on-boarding process and on-going education. Employees also receive emails about recycling and waste practices. Authority staff recently relocated to a new administration building. Office paper generated by the relocation of Authority staff was recycled. Prior to the move, monthly paper recycling totaled between 2,000 and 5,000 pounds. For one month during the move, the total reached 49,000 pounds. The Authority also offered the surplus furniture from the former site at auction.

During a recent campaign, the Authority's Department of Environment & Sustainability issued all employees reusable beverage tumblers (Figure 1) to decrease use of single serve containers (disposable water bottles, coffee cups, etc.). The tumblers feature the Authority's sustainability logo. Tumblers have also been distributed during new employee on-boarding and in summer intern welcome packages; to date, approximately 900 tumblers have been distributed.

Over the course of their summer employment, interns in the Department of Environment & Sustainability conducted visual inspections of exterior dumpsters and noted the volume of materials as well as unusual items. Through this program, it was discovered that the facility's Public Safety Building generated a significant volume of cardboard. In response, the Authority coordinated with their recycling collection contractor to provide cardboard collection in this area. Once this program was in place, employees stationed in this building expressed their surprise at the amount of cardboard generated; the addition of this infrastructure raised employee awareness of the materials generated by their activities and the Authority's overall recycling program.

The Department of Environment & Sustainability contracted for a waste composition study to identify strategies to increase landfill diversion. The Authority also developed an Airport Recycling, Reuse, and Waste Reduction Plan (included at the end of this case example) under their Airport Master Plan.

Recycling bins and garbage cans in DTW's McNamara Terminal are provided by the airline and subcontractor operating this facility; they include conjoined bins for recycling and waste streams as well as standalone cans (Figures 2 and 3). Waste generated from the terminal buildings is collected in a system of dumpsters and compactors. The recycling compactors at the McNamara Terminal are located outside the building and access to them is restricted to supervisors from the building maintenance contractor through a standard key.

The Department of Environment & Sustainability conducts training for tenant employees and hosts meetings with tenants on specific strategies. Waste and recycling services are included in the tenants' lease rates. Some of DTW's airlines participate in the recycling program, including recycling materials from deplaned waste.

Standard drinking fountains in the North Terminal are being replaced with drinking fountains featuring bottle refill stations (Figure 4). This replacement is being phased in waves and will eventually feature new signage alerting passengers to the availability of these fixtures. The Authority's McNamara Terminal and new administration building also feature bottle refill stations.

The Authority implemented a food rescue program primarily to address social responsibility; however, this program also diverts material from the landfill. The Authority applied for and received a grant from the Michigan Department of Environmental Quality to support the food rescue program. Concessionaires and airline lounges set aside edible food items which are collected and donated to a local non-profit organization for distribution to those in need. The Authority purchased a cooler for this program (Figure 5). Other items, such as toiletries, can also be donated through this program. The Authority is working with program stakeholders to institutionalize the program to ensure its continuation through changes in contractors and personnel and other transitions.

Looking ahead, the Authority is planning on expanding its recently implemented coffee grounds composting program for food and beverage tenants to its new administration building. DTW is also evaluating strategies outlined in the sustainability plan; composition study; and recycling, reuse and waste reduction plan.



Figure 1: Reusable beverage tumblers provided to Authority employees, courtesy of Wayne County Airport Authority



Figure 2: Terminal conjoined bins for recycling and waste streams as well as standalone cans, courtesy of Wayne County Airport Authority



Figure 3: Terminal conjoined bins for recycling and waste streams as well as standalone cans, courtesy of Wayne County Airport Authority

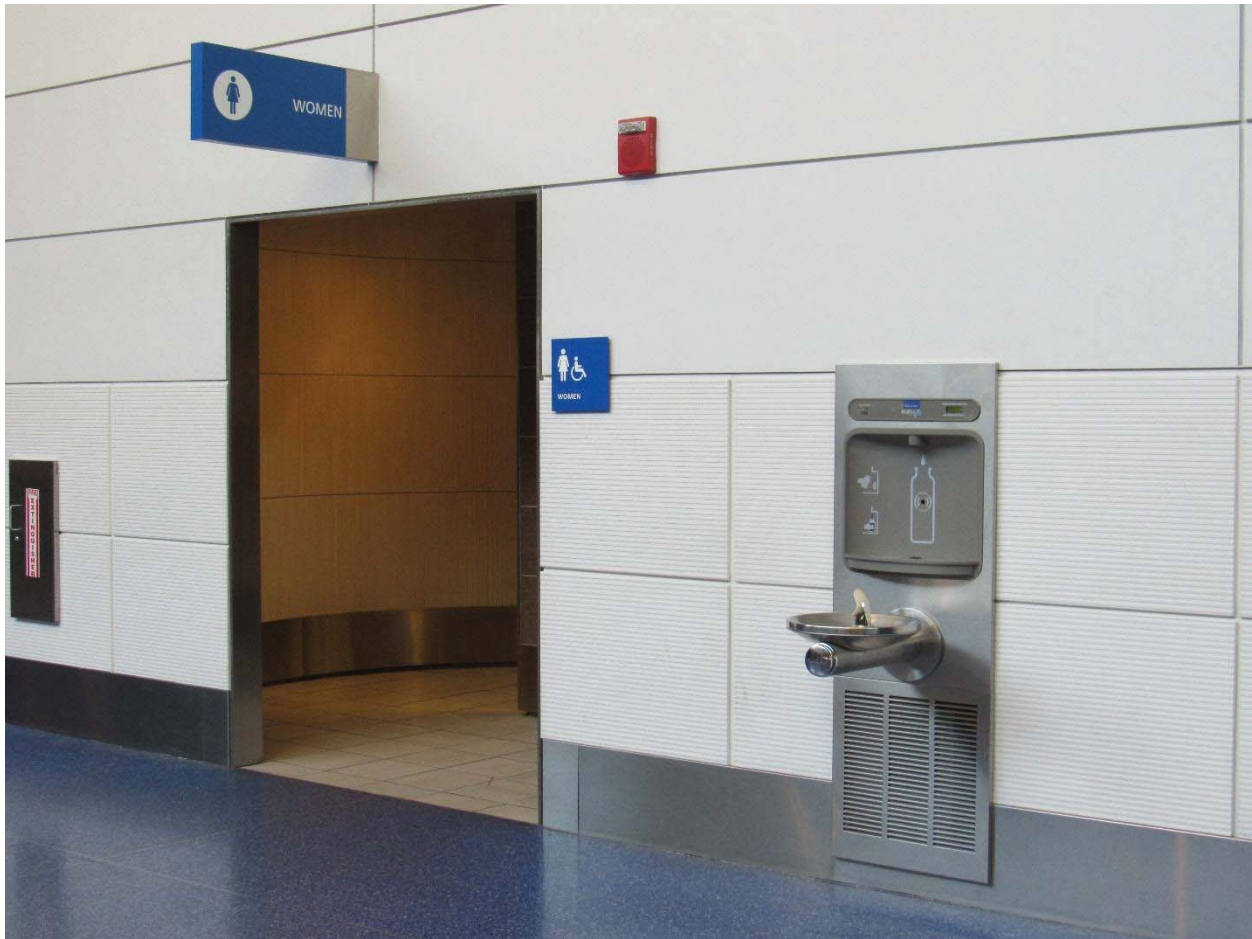


Figure 4: Terminal bottle refill station, courtesy of Wayne County Airport Authority



Figure 5: Cooler for food donation program, courtesy of Wayne County Airport Authority



Wayne County Airport Authority Workplace Recycling Policy – December 2015

I. Purpose

The Wayne County Airport Authority expects its employees to recycle paper, plastics, and other materials whenever possible and provides containers for this purpose. This document describes the various materials that can be recycled, where the appropriate containers are located within various WCAA facilities, and the reporting that will be provided to WCAA employees to document the quantities of material recycled. This program seeks to reduce waste and to help conserve natural resources.

II. Materials That Should Be Recycled

- Office Paper, Newspaper & Magazines
- Cardboard
- Plastic Bottles
- Batteries
- Toner Cartridges
- Scrap Metal

III. Location of Recycling Program Collection Containers

The attached map displays the Smith Building locations of the containers to be used to recycle the above materials. If you would like an additional container(s), or you would like to move a container to a new location, please contact Denise Quiroz: 942-3674.

IV. Program Specifics

- **Office Paper, Newspaper & Magazines:**
 - a. All office paper (white, colored, glossy, etc.) newspapers and magazines can be recycled together.
 - b. Confidential documents placed in locked recycling bins will be shredded. Keys to unlock bins (to facilitate recycle of large, bulky documents) are available in the Procurement, Payroll, Human Resources, and E&S Offices.
 - c. Employees may use small blue recycling bins at their desk or nearby work spaces for paper recycling. It is the employee's responsibility to transfer contents of these small bins into the proper larger recycling bins. Staples should be removed if possible.
 - d. No paper food wrappers should be included in the recyclables. All recycled paper items should be free of food debris.
- **Cardboard:**
 - a. Cardboard to be recycled should be placed in the large cardboard receptacles in the Ticket Lobby Level of the Smith Building (near the freight elevator). Alternately, cardboard boxes can be broken down and stacked by the freight elevator doors on the Mezzanine and Third Floor levels of the Smith Building; janitorial staff will take them to the Lobby Level recycling area.
 - b. Cardboard boxes generated at other WCAA buildings should be broken down and stacked next to the Paper Recycling bins in these buildings.
 - c. All cardboard should be free of food debris. Cardboard food containers, such as pizza boxes, should not be included in the recyclables.



WCAA Workplace Recycling Policy

- **Plastic Bottles:**

- a. Plastic bottles with the numbers 1, 2, 5, and 7 can be recycled. Recyclable plastics have a stamp with the triangular recycling symbol that encloses one of the above numbers. Examples of the various types of recyclable plastic bottles are shown below:

Number	Material Name	Example
1	Polyethylene, PET, PETE	Water bottle, soft drink bottle
2	HDPE, high density polyethylene	Milk jugs, detergent bottles
5	Polypropylene	Ketchup, syrup bottles
7	Other mixed plastics	Squeeze bottle

- b. All recyclable plastic bottles should be rinsed (if not water bottles), free of debris, and placed into the recycle bins labeled "Plastic Bottles". All of the above types of plastic bottles can be mixed together.

- **Toner Cartridges:**

- a. Toner cartridges in copy machines that are serviced by Priority Systems, Inc. are recycled by that firm.
- b. For other copy machines, spent toner cartridges purchased through Staples should be returned for recycle using free shipping boxes that are available from the Staples catalog.

- **Batteries:**

- a. A container for depleted alkaline batteries are located in the Smith Building Mail Room, on the Mezzanine Level.
- b. When a battery container is full, put a Work Order in to the Maintenance Department and the batteries will be taken to a central battery recycling collection point in Building 703. A vendor removes and recycles the batteries collected at Building 703.
- c. A container for recycling radio batteries, rechargeable batteries, and cellphones is located in Technology Services on the Ticket Lobby Level of the Smith Building. Technology Services is responsible for the recycling of these batteries.

- **Metal:**

If you have a significant quantity of metal that needs to be recycled, please contact Sara Kaplan, WCAA Sustainability Administrator at (734) 942-2269.

V. Reporting

The WCAA Department of Environment & Sustainability (E&S) will provide quarterly reports to WCAA staff documenting the quantities of all the above materials that were recycled the previous quarter.



WCAA Workplace Recycling Policy

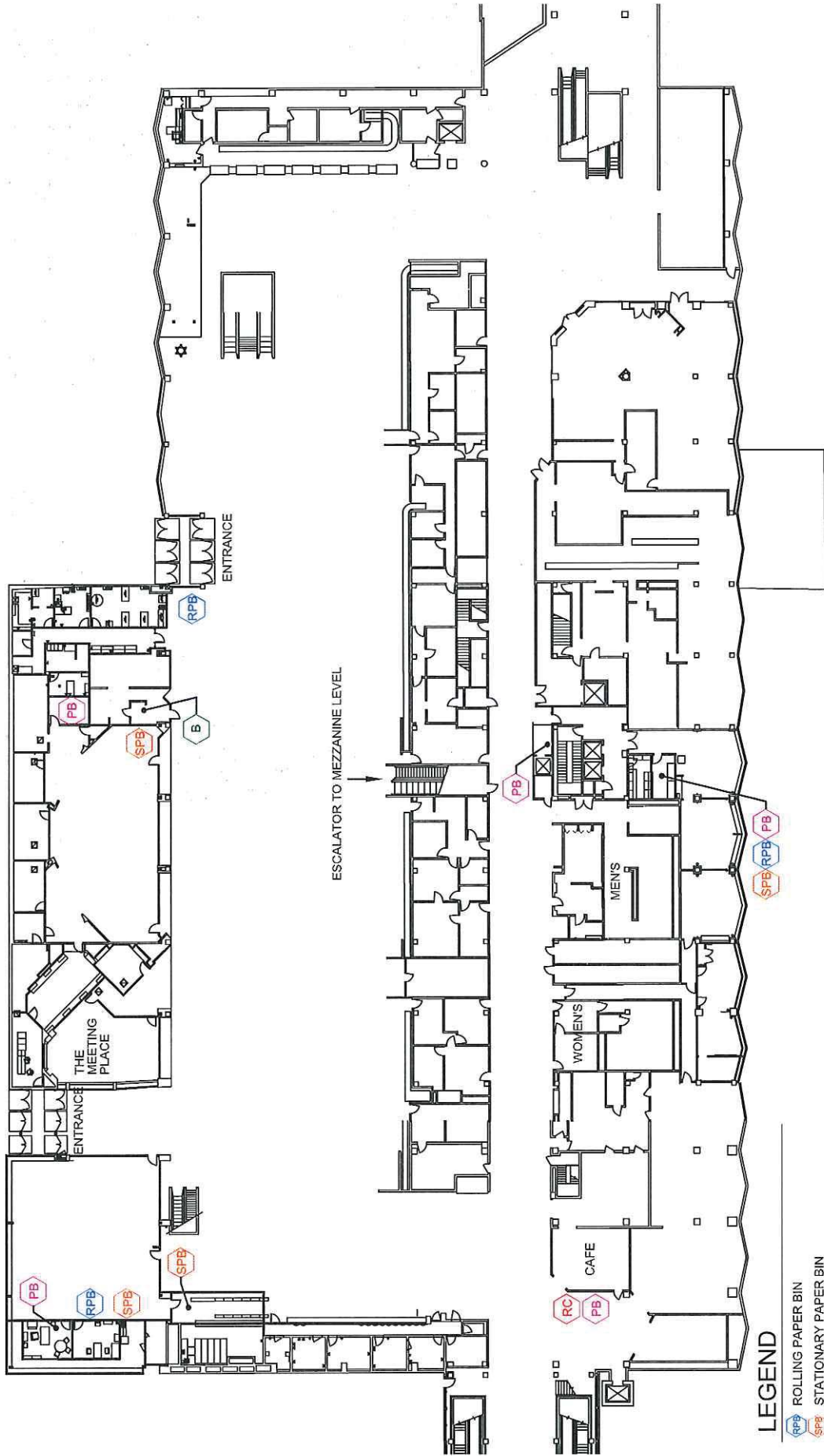
VI. Miscellaneous

- All Wayne County Airport Authority employees are expected to comply with this recycling program and to maximize opportunities to recycle whenever possible.
- All recycling bins are labeled indicating the materials that should be placed in them. Please follow these recycling program guidelines carefully and put the correct materials in the proper recycling containers because when recycled material is contaminated, it is no longer able to be recycled and must be disposed of as regular trash.

Please avoid placing refundable bottles and cans in the trash, there is a box for returnable bottles and cans in the Administration kitchen area.

This policy may be amended and additional materials may be added in the future.

DRAFT



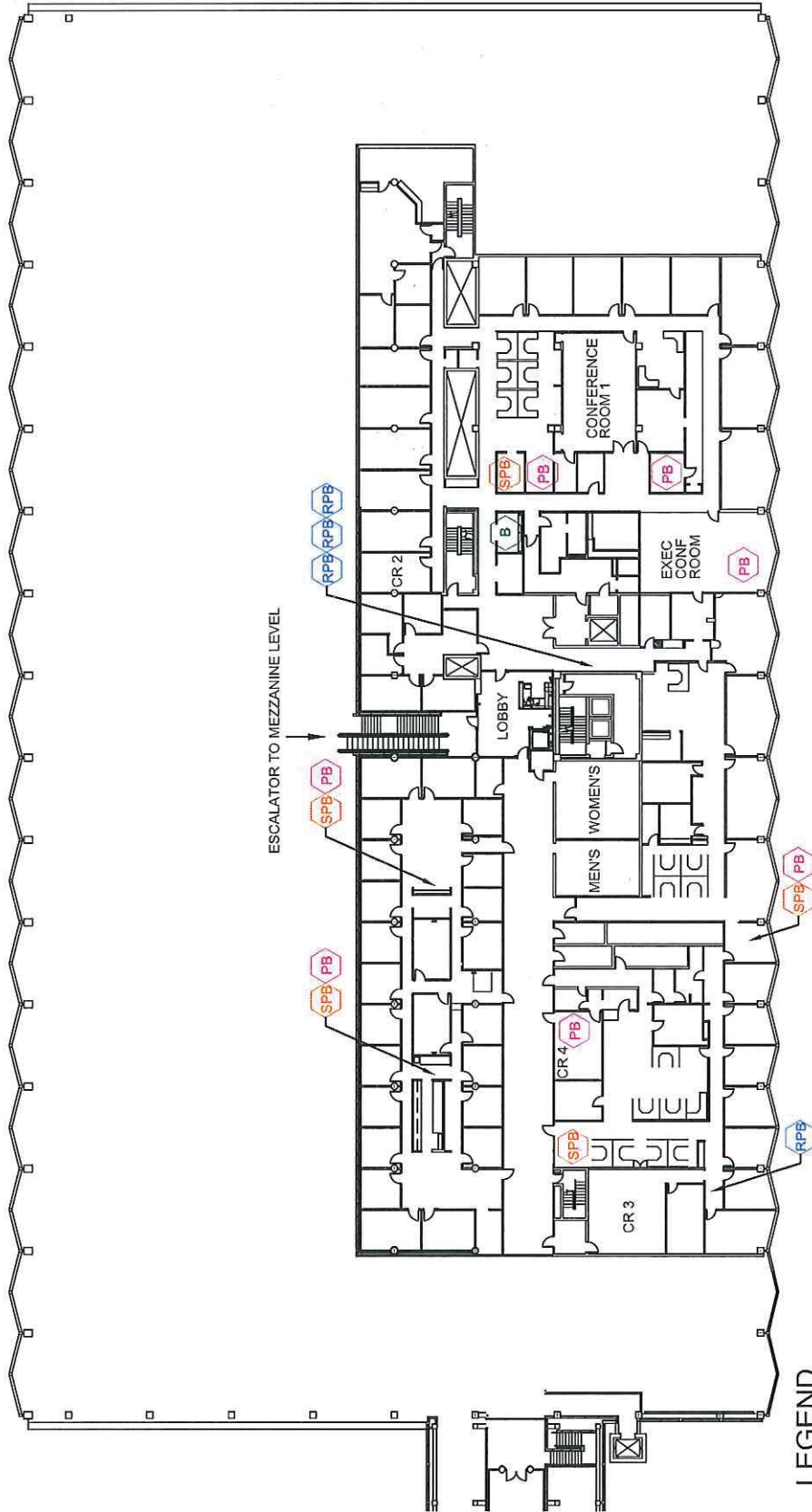
LEGEND

- ROLLING PAPER BIN
- STATIONARY PAPER BIN
- PLASTIC BOTTLES
- REFUNDABLE CANS
- BATTERIES

LC SMITH BUILDING - MAIN LEVEL

SCALE: 1/32" = 1'-0"

North Arrow / Graphic Scale 	Airport Information FAA Identifier: DTTW Safety Area: 1000 ft x 1000 ft Point: 4300 ft x 2700 ft LON: 82° 21' 15.274" Airport Elevation: 568.9 MSL	BY DATE REVISION		L.C. SMITH BUILDING RECYCLE BIN LOCATIONS	1 / 3
				Drawn By: _____ Approved By: _____ Date: 12/15/15 Job No: _____	



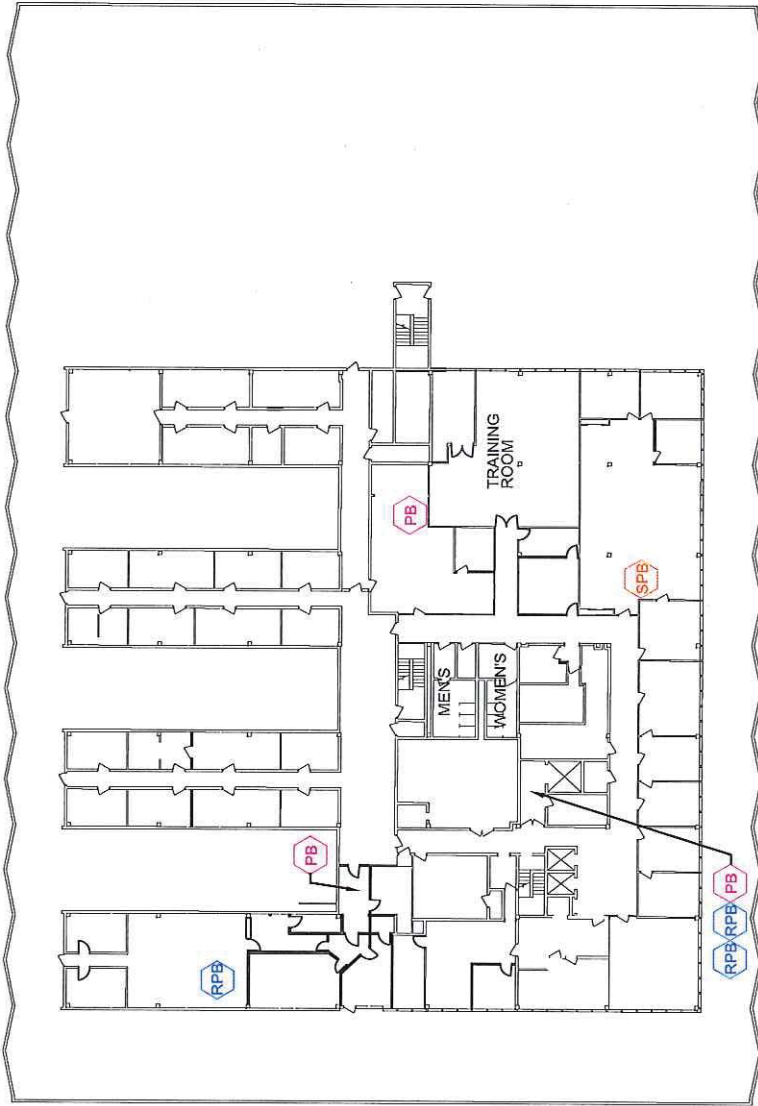
LEGEND

- ROLLING PAPER BIN
- STATIONARY PAPER BIN
- PLASTIC BOTTLES
- REFUNDABLE CANS
- BATTERIES






LC SMITH BUILDING - MEZZANINE LEVEL

SCALE: 1/32" = 1'-0"

 North Arrow / Graphic Scale 0 32 64 GRAPHIC SCALE IN FEET N	Airport Information FAA Identifier: DTW Elevation: 656 feet IATA Code: DTW ICAO Code: KDTW Airport Elevation: 644 ft MSL	<table border="1"> <thead> <tr> <th>BY DATE</th> <th>REVISION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	BY DATE	REVISION																			 DETROIT METRO • WILLOW RUN WAYNE COUNTY AIRPORT AUTHORITY	L.C. SMITH BUILDING RECYCLE BIN LOCATIONS Date: 12/13/15 Approved By:	2 3
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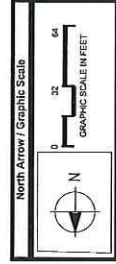


LEGEND

-  ROLLING PAPER BIN
-  STATIONARY PAPER BIN
-  PLASTIC BOTTLES
-  REFUNDABLE CANS
-  BATTERIES

LC SMITH BUILDING - THIRD FLOOR

SCALE: 1/32" = 1'-0"



BY	DATE	REVISION



DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

L.C. SMITH BUILDING
RECYCLE BIN LOCATIONS

Drawn By: _____ Date: 12.13.15
Approved By: _____ Job No: _____

Airport Recycling, Reuse, and Waste Reduction Plan

[FINAL]

May 2017



DETROIT METROPOLITAN AIRPORT



DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY



Report
Prepared by

**Mead
& Hunt**

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Executive Summary

The Wayne County Airport Authority (WCAA) is in the process of completing an Airport Master Plan Update for Detroit Metropolitan Airport (DTW). The Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 (FMRA) requires that this effort include a feasibility analysis for solid waste and recycling. To meet this requirement, the consultant assessed DTW's existing recycling program and developed recommendations to divert waste from the landfill through strategies such as waste reduction, reuse, and recycling.

DTW currently has a waste management program for several materials at buildings that WCAA controls. In addition, various stakeholders have implemented recycling and other waste management strategies at buildings not controlled by the WCAA. By conducting facility walk-throughs, waste composition studies, interviews with WCAA staff, and discussions with various Airport tenants, the consultant documented existing practices to identify potential opportunities to increase and improve recycling participation. This information formed the basis for recommendations for DTW's operations, waste streams, and other influencing factors. Willow Run Airport (YIP) is included in some of the descriptions because some of the WCAA's contracts and programs also include YIP.

Highlights of these recommendations include:

- Establish goals and objectives
- Track and communicate progress
- Consider installing liquid collection stations at security checkpoints
- Evaluate the opportunity to collect and donate unopened food, beverages, and toiletries
- Continue plastic, aluminum, and paper recycling and food-recovery programs
- Expand recycling to other areas, including deplaned airline waste
- Continue to reuse materials and other items where possible
- Implement simple education program for employees, tenants, and contractors
- Co-locate recycling stations and garbage cans
- Expand and improve signage, specifically at security checkpoints
- Consider improvements to contracts and leases and purchasing policy and practices
- Maintain and improve recycling programs following the Plan-Do-Check-Act cycle

The range of these recommendations gives the WCAA and program stakeholders the flexibility to implement those strategies that are most compatible with changing conditions and available resources (such as labor and space), and progressively increase landfill diversion over time through a phased program of waste reduction, reuse, and recycling.

1. Introduction

A. Regulatory Background and Project Purpose

Section 132(b) of the FAA FMRA expanded the definition of airport planning to include “developing a plan for recycling and minimizing the generation of airport solid waste.” FMRA Section 133 added a requirement that addresses waste management. This requirement applies to airports planning to prepare or update a master plan, or with a completed master plan, that receive Airport Improvement Program (AIP) funding for an eligible project. Airports fitting these criteria are to ensure that new or updated master plans address issues related to solid waste recycling: 1) assess the feasibility of solid waste recycling, 2) minimize the generation of solid waste, 3) define operational and maintenance requirements, 4) review waste management contracts, and 5) evaluate the potential for cost savings or revenue generation.

In September 2014, the FAA released a memorandum titled “Guidance on Airport Recycling, Reuse, and Waste Reduction Plans.” This memo details the FAA’s expectations and suggestions for an airport’s recycling plan. This guidance applies to Federally-obligated airports preparing or updating a master plan, carrying out other planning efforts, or undertaking a standalone recycling project.

The scope and nature of an airport’s waste and recycling program and associated plan depend on several factors that include: the airport size, location and layout; the amount and type of waste generated; markets for recyclable commodities; costs for recycling; available local infrastructure; and the willingness of an airport and its tenants to implement recycling and other strategies.

In compliance with FMRA and in accordance with the FAA’s guidance memo, this *Airport Recycling, Reuse, and Waste Reduction Plan* (Plan) was developed for DTW as part of the on-going Airport Master Plan Update project. This Plan documents and assesses DTW’s existing waste and recycling program based on the factors and variables listed above and provides recommendations for improvement. The content of this Plan was governed by the extent and accuracy of available information.

B. Airport Description

DTW is a commercial service, large-hub primary airport. The WCAA has operational jurisdiction for the management of DTW and can implement facility or policy changes and influence use, cost, and operation.

DTW is located in the City of Romulus, Michigan, in Wayne County, 20 miles west of Detroit and 25 miles east of Ann Arbor. More information about DTW, including operations, activity levels and airline information, can be found on DTW’s website (www.Metroairport.com) and in the Assessment of Existing Conditions section of DTW Airport Master Plan Update Report.

C. Waste Definitions and Plan Focus

The focus of this plan is on Municipal Solid Waste (MSW), which consists of everyday items that are used and then discarded. The following five primary types of MSW are generated at airports:

- a. General MSW consists of 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.
- b. Food waste is either food that is not consumed or the waste generated and discarded during food preparation.
- c. Green waste consists of tree, shrub and grass clippings, leaves, weeds, small branches, seeds, pods, and similar debris generated by landscape maintenance. Green waste and food waste together may be referred to as “compostables.”
- d. Deplaned waste is MSW that is 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.
- e. Construction and Demolition Waste (C&D) is generally categorized as MSW and is 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.

This Plan focuses on the management of MSW and other materials such as cans, paper, cardboard etc. that can be recycled or disposed of in a landfill. This Plan does not address the management of other types of waste, specifically hazardous waste, universal waste (batteries, fluorescent light bulbs/ballasts, etc.), industrial waste (used solvents, etc.), or waste deplaned from international flights, which is regulated by separate federal, state, and local laws. C&D debris that is subject to special requirements and requires special handling is also not included in this Plan.

D. Key Airport Buildings and Plan Scope

DTW is a large facility encompassing numerous buildings and associated infrastructure. More information about each of the buildings at DTW is available in the Airport Master Plan Update Report.

The WCAA has direct control of waste management in several buildings and areas at DTW, and has influence, but not direct control, over several others. Per FAA guidance, areas over which the Airport Sponsor (in this case, the WCAA) has direct control or influence should be included in the recycling, reuse, and waste reduction plan, while areas outside Airport Sponsor control or influence may be excluded.

Table 1 summarizes the areas at DTW under the control or influence of the WCAA. The WCAA has control over waste management in spaces dedicated for WCAA use, such as offices, and those where the WCAA employees work, such as the buildings and grounds maintenance areas and the areas staffed by the WCAA firefighting and public safety employees.

The WCAA's influence is through agreements and contracts for activities related to waste management in numerous leased areas, including those in the North Terminal and other buildings, while Delta Air Lines (Delta) operates and is responsible for activities in the McNamara Terminal. The WCAA has a contract for joint management of the North Terminal with the Detroit Airlines' North Terminal Consortium (DANTEC). On behalf of the North Terminal airlines, DANTEC contracts with waste hauling contractors and janitorial service providers for back of house spaces, while the WCAA contracts for these services within the public and WCAA-operated areas of this building. In the McNamara Terminal, Delta is responsible for waste management, including the contracting of janitorial, cabin cleaning, and waste hauling contractors.

In addition to the airlines, the WCAA leases space to food service providers, rental car agencies, and a hotel company. These tenants manage waste in their areas, either directly or through a contractor. The WCAA also leases space to a fixed base operator and several cargo companies who are responsible for the waste generated in their areas. Tenant leases are managed by the WCAA's Department of Concession and Quality Assurance.

Areas at DTW where the WCAA has limited control or influence include the Airport Traffic Control Tower operated by the FAA and spaces occupied by US Customs and Border Protection, the Transportation Security Administration (TSA), and other federal agencies; therefore, all of these are excluded from the Plan.

Due to the scale of operations and waste generation at DTW, the scope of this Plan focuses on the largest generators/centers of waste (the passenger terminals) and the areas where the WCAA has the most control or influence and can implement strategies (the WCAA offices). The items under control of WCAA are underlined in **Table 1**.

Table 1: Waste Management Areas and Activities at DTW

Under WCAA Control	Under WCAA Influence	Outside WCAA Control or Influence*
<ul style="list-style-type: none"> • <u>WCAA Offices in Smith Building (603) and elsewhere at Airport</u> • <u>Future WCAA Offices (new office building)</u> • WCAA Building Maintenance areas in each terminal, including storage and office spaces • Non-leased terminal space, including space for building systems and utilities • Aircraft Rescue and Fire Fighting Facilities (802, 509, and 737) • WCAA Public Safety (351) • Airport Maintenance Facility (703) • Vehicle Equipment Repair Facility (704) • Snow Removal Equipment Storage Facility (705) • Facilities Field Office (349) • WCAA Maintenance Facility (Previous Northwest Hangar, 711) • Ground Support Equipment Fuel Facilities (823 and 472) • Fuel Pumping Station (282) • Ground Transportation Facilities – one in each terminal’s parking structure • Parking Areas – two terminal garages, surface lots, cell phone lots, and employee parking areas • Berry Terminal Building • Former GA hangar and Maintenance Building (ASIG, 356 and 357) • Old Executive Terminal/Hangar (348) 	<ul style="list-style-type: none"> • <u>McNamara Terminal – Delta</u> • <u>North Terminal – WCAA and DANTeC</u> • <u>Terminal Restaurant Areas (both terminals)</u> – concession tenants • <u>Terminal Retail Areas (both terminals)</u> – retail tenants • <u>Terminal Restrooms (both terminals)</u> • <u>Terminal Airline Spaces</u>, including baggage claims, baggage handling, office space, operational space, departure lounges, passenger gates, and ticket counters – various airlines • Airport Hotel - Westin • Car Rental Facilities – Budget-Payless, Hertz-Firefly, Avis, Alamo-National, Dollar-Thrifty, and Enterprise • Airline Catering and Flight Kitchen (505) – Delta/LSG Sky Chefs • FedEx Maintenance (714) • Delta Equipment Repair, Prospect Airport Services (820) • Aircraft Maintenance Facilities – Delta (516, 518, and 715) and Spirit (719) • Deicing Control Facilities (Delta 430 and 470, Integrated Deicing Services 538-A, 532, and 600) • Fuel Farm and Offices – Delta (720A-F, 720G, 722) • Waste Disposal and Triturator Buildings (527 and 822) – DANTeC and Delta • Air Cargo Facilities – UPS (427), Delta Cargo (536, 536-A, 514 with Swissport), FedEx (723, 714), USPS, DHL Express • Combined Use Air Cargo Building – Southwest Airlines and Air General (614) • Fixed Base Operator – Signature Flight Support (530, 408) • Hangars – Endeavor Air/Delta (359), Signature (360), Olympia Aviation (400), Masco Flight Operations (406), and Skywest (425) • HSS Security (351) • Construction and Demolition Projects - Contractor 	<ul style="list-style-type: none"> • Airport Traffic Control Tower – FAA • Federal Inspection Service Facilities - US Customs and Border Protection • Security Screening Areas and Offices – TSA, including two checkpoints at North Terminal, five at McNamara Terminal

Key: Areas of focus for this plan (Building #)

*excluded from Airport Recycling, Reuse, and Waste Reduction Plan

Source: WCAA Existing Airport Layout Drawing, Updated September 30, 2016

2. Existing Program

The WCAA maintains a recycling program that includes several stakeholders and addresses waste generation at both DTW and the WCAA's second airport, Willow Run Airport (YIP). This section of the Plan describes the elements of this program.

A. Drivers

Recycling and conscientious waste management at DTW is driven by the WCAA's commitment to environmentally responsible operations and is guided by the WCAA's Department of Environment & Sustainability (E&S Department) Mission Statement:

Ensuring that current WCAA operations comply in letter and spirit with applicable environmental regulations, including holding non-compliant parties accountable for their actions.

Collaboratively planning with, and educating internal and external stakeholders toward implementing efficient, sustainable measures to decrease the Airports' impact on future generations.

The WCAA has devoted resources, including financial and employee labor, to establishing and promoting a recycling program in its offices and to designing strategies to address waste generation at both DTW and YIP. Although YIP is not specifically included in the scope of this Plan, certain waste streams from that airport are incorporated into DTW's program, and therefore, are mentioned in this Plan because they play a role in the decisions necessary to implement changes.

B. Operation and Maintenance Requirements, Roles and Responsibilities

Wayne County Airport Authority Areas

The E&S Department is responsible for implementing a recycling program in the WCAA-controlled areas at DTW and YIP through the following key roles and responsibilities:

- The E&S Department Director supports sustainability and environmental compliance efforts throughout the organization, allocating resources and reporting on performance to others within the WCAA.
- The Sustainability Program Administrator developed and instituted a written Recycling Policy (see **Appendix H1: Wayne County Airport Authority Workplace Recycling Policy**); provides

training and education to WCAA and tenant staff about this policy and the program; and manages the WCAA's food recovery program.

- The Senior Administrative Analyst maintains records of recycling and waste data as provided by the recycling collection contractor.
- WCAA employees are responsible for following the WCAA's Recycling Policy in their work areas.

The WCAA contracts with Diverse Facility Solutions (DFS) for janitorial services in the WCAA offices at DTW. DFS is responsible for transferring waste and plastic recyclables generated in these areas to the appropriate dumpsters and containers at the building. WCAA employees are responsible for transferring paper and cardboard to the correct dumpsters. A waste hauling contractor, currently Waste Management, Inc., collects the garbage from the Smith Building. A separate contractor, currently Royal Oak Recycling, collects the recyclable materials from this building.

North Terminal

The WCAA and DANTeC are jointly responsible for waste management at the North Terminal, including contracting for janitorial services, currently provided by ISS Facility Services (ISS), and waste hauling, currently provided by Waste Management, Inc. ISS collects waste materials from airline, tenant, and public spaces and transfers them to the dumpsters and compactors. Waste Management, Inc. removes these containers for disposal. Each airline in the North Terminal contracts with a third-party company for aircraft cabin cleaning. Royal Oak Recycling collects paper generated in this terminal.

McNamara Terminal

Delta contracts with ABM for its facility maintenance. Together, Delta and ABM are responsible for waste management at the McNamara Terminal; they contract with DFS for janitorial, and with Advanced Disposal for waste hauling. DFS collects waste and recyclable materials from airline, tenant, and public spaces and transfers them to the appropriate dumpsters and compactors. Advanced Disposal collects the materials in the dumpsters for processing and disposal. Prospect Airport Services (Prospect) is Delta's current contractor for aircraft cabin cleaning services.

C. Infrastructure

Waste and recycling infrastructure is a critical part of waste management. The waste management infrastructure used by the WCAA includes recycling bins, garbage cans, dumpsters, and compactors.

Recycling Bins and Garbage Cans

WCAA office areas and each of the passenger terminals are equipped with numerous recycling bins and garbage cans. In the WCAA areas, employees have individual recycling bins and garbage cans in their offices and also have access to containers in common areas, such as meeting rooms and restrooms.

In the North Terminal, a network of round, grey garbage cans and recycling bins are located throughout the public and passenger areas. These containers were introduced in 2008 when the terminal opened, and the WCAA is in the process of replacing these containers. This process is described in more detail in **Appendix H2: Detroit Metropolitan Airport North Terminal Waste Composition Study: Results and Recommendations Report**. The North Terminal's current recycling containers are pictured in **Figure 1**.



Figure 1: North Terminal Recycling Bins and Garbage Cans

In the McNamara Terminal, a network of recycling stations and standalone garbage cans for passenger use are located throughout the facility. These containers were introduced in 2010. These containers are described in more detail in **Appendix H3: Detroit Metropolitan Airport McNamara Terminal Waste Composition Study: Results and Recommendations Report**. The McNamara Terminal’s recycling stations are pictured in **Figure 2**.



Figure 2: McNamara Terminal Recycling Bins and Garbage Can

Dumpsters and Compactors

There are four garbage dumpsters/compactors in the North Terminal. There are more than 20 dumpsters and compactors for garbage and four for recycling at the McNamara Terminal. The recycling compactors are located outside the building and locked, restricting access only to ABM's supervisors who are issued a standard key. There is also one empty trash room which could be used in the future for expanding recycling facilities, if needed.

D. Recycling, Reuse, and Waste Reduction Efforts

WCAA Offices

The WCAA employees stationed at the Smith Building and in other WCAA areas at DTW currently recycle office paper, newspapers, and magazines; cardboard; plastic bottles; batteries; toner cartridges; and scrap metal. WCAA employees located at YIP separate paper, metal, and e-waste on-site, which is then delivered to the Smith Building and combined with the materials generated at WCAA areas at DTW. To further advance the WCAA's commitment to reducing waste, and in celebration of Earth Day in 2016, WCAA issued all employees reusable beverage tumblers to decrease use of single serve containers (disposable water bottles, coffee cups, etc.).

Green Waste, Construction and Demolition Waste, and Other Programs

The WCAA also manages waste generated by landscaping and construction activities, universal waste, and hazardous waste.

During construction and major infrastructure projects at DTW, WCAA requires contractors to reuse C&D waste, such as asphalt, concrete, aggregate, and other materials wherever possible. C&D waste is not included in the volume or weight calculations detailed in this Plan.

North Terminal

As noted in the North Terminal Waste Composition Study report, this building has experienced issues with passenger/public area recycling bins being relocated without authorization and with contamination of recyclable materials by non-recyclable garbage. Due to these challenges, potentially recyclable materials generated in the public areas of this terminal are currently disposed of as waste.

Several airlines in the North Terminal contract for collecting and shredding of office paper. In addition, airline employees collect and return aluminum cans under the State's beverage container refund program.

McNamara Terminal

Passengers traveling through DTW's McNamara Terminal can recycle plastic beverage containers; aluminum cans; and paper items such as newspapers, magazines, and printer paper. Deplaned recyclables from inbound domestic flights are intended to be transferred to a recycling dumpster/compactor for collecting and processing. Lapses in this practice may occur during especially busy periods, for example during poor weather or other events that cause delays for inbound flights. Delta employees recycle paper and collect aluminum cans for return under the refund program.

Tenant Efforts

In addition to the recycling programs operated by the WCAA, DANTeC, and Delta, tenants leasing or otherwise using space at DTW, including the Westin Hotel, FAA tower, TSA, cargo companies, and several others, contract with housekeeping and/or waste management service providers, and may be recycling on their own through these agreements.

Bradford Logistics manages certain recyclables under its contract with Delta to provide centralized receiving and distribution services at the McNamara Terminal. This includes delivery of Royal Oak Recycling bins for paper recycling to terminal tenants that have requested the service, and coordination of bin collection. In the past, this was a free service for the tenants. However, because of challenges related to contamination of the collected paper, the program is now focused on areas with cleaner streams and a fee has been implemented for this service.

Previously, a program for recycling cardboard from tenant operations was implemented in association with the Westin Hotel's cardboard collection program that used Royal Oak Recycling. The program was subsequently suspended due to cost. There have been recent discussions about resurrecting this program in light of the prevalence of cardboard in the McNamara terminal's waste stream, estimated by one study to be 18 percent. Bradford Logistics and ABM have expressed interest in providing the labor for collecting this material onsite, and Delta has expressed interest in funding its pickup and transfer by Advanced Disposal to Royal Oak Recycling's facility. The proceeds of this program were proposed to be returned to Bradford Logistics. As of the time of this writing, the program has not been implemented.

Restaurants at both terminals employ dedicated containers for waste grease that Bradford Logistics staff empty into a large tank. Collected grease is recycled by a specialized contractor. The McNamara Terminal generates approximately 1,500 gallons of liquid cooking grease and 600 gallons of solid grill scrapings (collected in five gallon pails) each year.

3. Waste Audit

WCAA, DANTeC, and Delta staff provided information about areas at DTW that generate waste, the types of waste generated in each area, the collection schedule for waste materials, and the materials that can be recycled under the current programs. These representatives have informally observed passenger and employee waste and recycling related behaviors and, for the purpose of this Plan, provided descriptions of how waste flows through DTW based on these observations. They also described waste and recycling collection and hauling practices. This section identifies the waste sources, quantities of waste by focus area, record of performance, composition of the waste streams, and purchasing practices.

A. Sources

All of the buildings and areas listed in **Table 1: Areas and Activities at DTW – Waste Management** found in **Section 1D: Key Airport Buildings and Plan Scope** are potential sources of waste and recyclable materials. In addition, recyclable materials generated at WCAA offices at YIP are delivered to the Smith Building at DTW and combined with recyclables generated from the WCAA DTW offices.

The Detroit area is home to teams for four major professional sports, and several museums and historical attractions tied to the auto industry and Motown music. The area also hosts several nationally promoted annual events, including the North American International Auto Show and the Detroit Grand Prix. These attractions and events, as well as the holiday travel seasons, may drive peaks in passenger volumes and waste generation at DTW.

B. Quantity

WCAA Offices

According to information provided by Royal Oak Recycling via WCAA's E&S Department, 15.6 tons of recyclable paper, plastics, and cardboard were collected from WCAA offices in the Smith Building during fiscal year 2015 (October 2014 through September 2015); 26.6 tons were collected during fiscal year 2016 (October 2015 through September 2016). During the first five months of fiscal year 2017 (October 2016 through February 2017), 10.6 tons of recyclables had been collected from the Smith Building. Based on this information, WCAA generates about 2 tons of recyclables each month. Table 2

According to Royal Oak's data, 74.8 tons of metal were collected from WCAA areas in fiscal year 2016 and 19.5 tons had been collected between October 2016 and February 2017. This equals approximately 5 tons of metal generated each month.

Table 2. Summary of recycling in Smith Building			
Smith Building	Fiscal Year 2015	Fiscal Year 2016	Fiscal Year 2017 (first five months)
Tons of recycling collected	15.6	26.6	10.6

Source: Royal Oak Recycling, 2016

North Terminal

Information provided by WCAA’s E&S Department indicates that the North Terminal generates approximately 1,550 tons of waste per year, or approximately 129 tons per month.

Data provided by Royal Oak Recycling show that approximately 2.8 tons of recyclable paper was collected from the North Terminal between May and September 2016, and 0.9 tons was collected between October 2016 and February 2017. Based on this information, the North Terminal is separating approximately 0.4 tons of collected recyclable paper per month.

McNamara Terminal

Information provided by Delta indicates that the McNamara Terminal generates approximately 7,540 tons of waste and 3.8 tons of recyclable material, but excluding paper, each year. These values are approximately equal to 628 tons of waste and 0.3 tons of recyclables per month.

Data from Royal Oak Recycling show 18.9 tons of recyclable paper collected from Bradford Logistics between May and September 2016, and 26.5 tons collected between October 2016 and February 2017. Based on this information, the McNamara Terminal is separating about 4.5 tons of recyclable paper each month. This is in addition to the other recyclables described above.

C. Performance

Based on the quantity information above, the recycling rates for the North Terminal and McNamara Terminal are shown in Table 3. The recycling rate for the WCAA offices at DTW are not included in the table because total waste quantities were not available at the time of this writing.

Table 3. Summary of monthly recycling rates at the North and McNamara Terminals.			
Terminal	Monthly Waste Generated (including recyclables) (tons/month)	Monthly Recyclables Separated (tons/month)	Effective Recycling Rate
North Terminal	129.4	0.4	0.3%
McNamara Terminal	632.8	4.8	0.8%

It should be noted that these figures do not account for paper collected by third party contractors for shredding, aluminum cans returned for refund, or recycling of C&D debris.

D. Composition

Waste composition studies were conducted at each terminal to obtain a detailed understanding of the waste stream at DTW. **Appendices B** and **C** contain the results and recommendation reports for these projects.

Figures 3 and **4** show the composition of the terminals’ waste streams included in the study efforts.

Figure 3: Waste Stream Composition - DTW North Terminal Public/Passenger and Airline Spaces

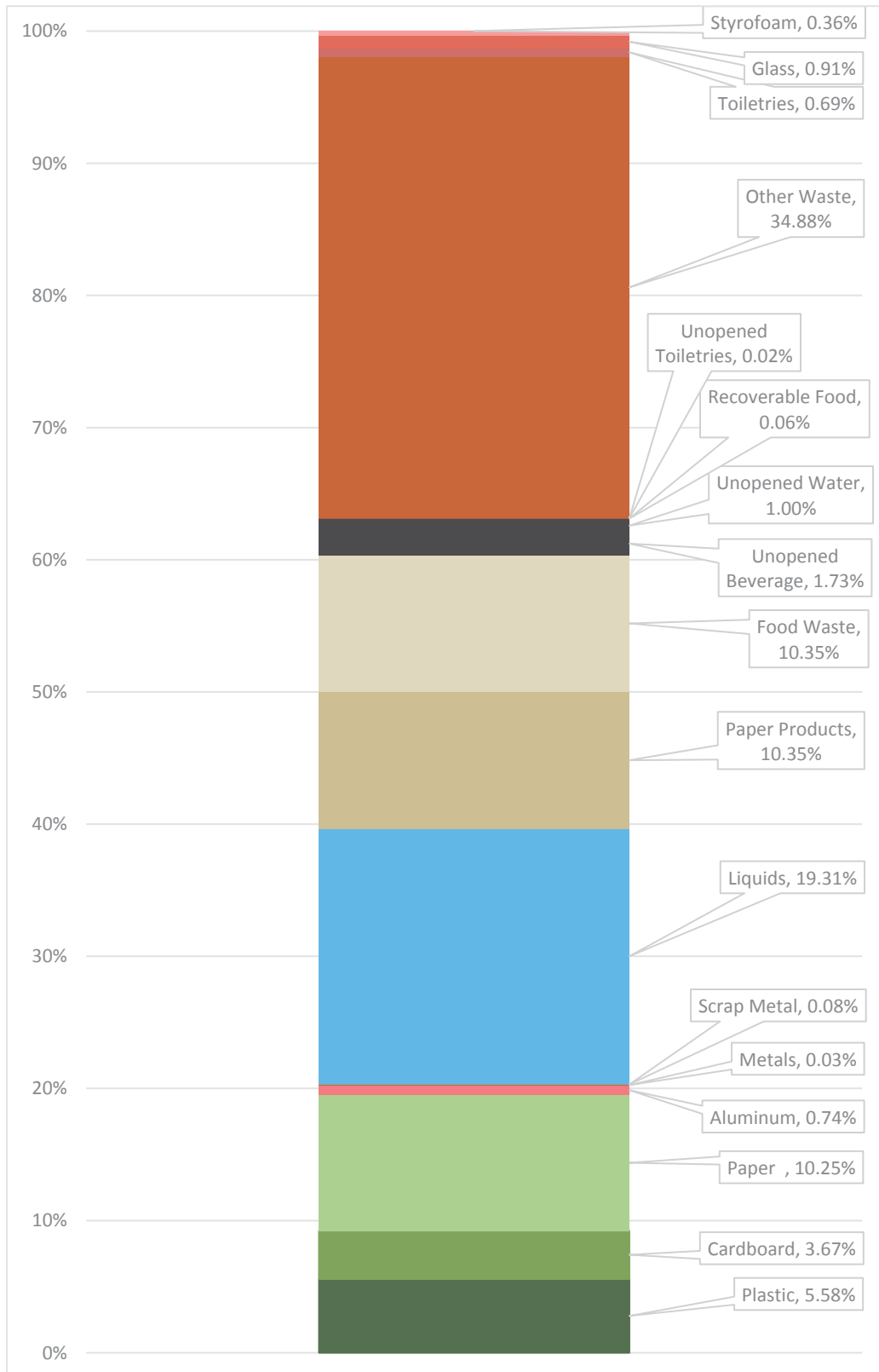
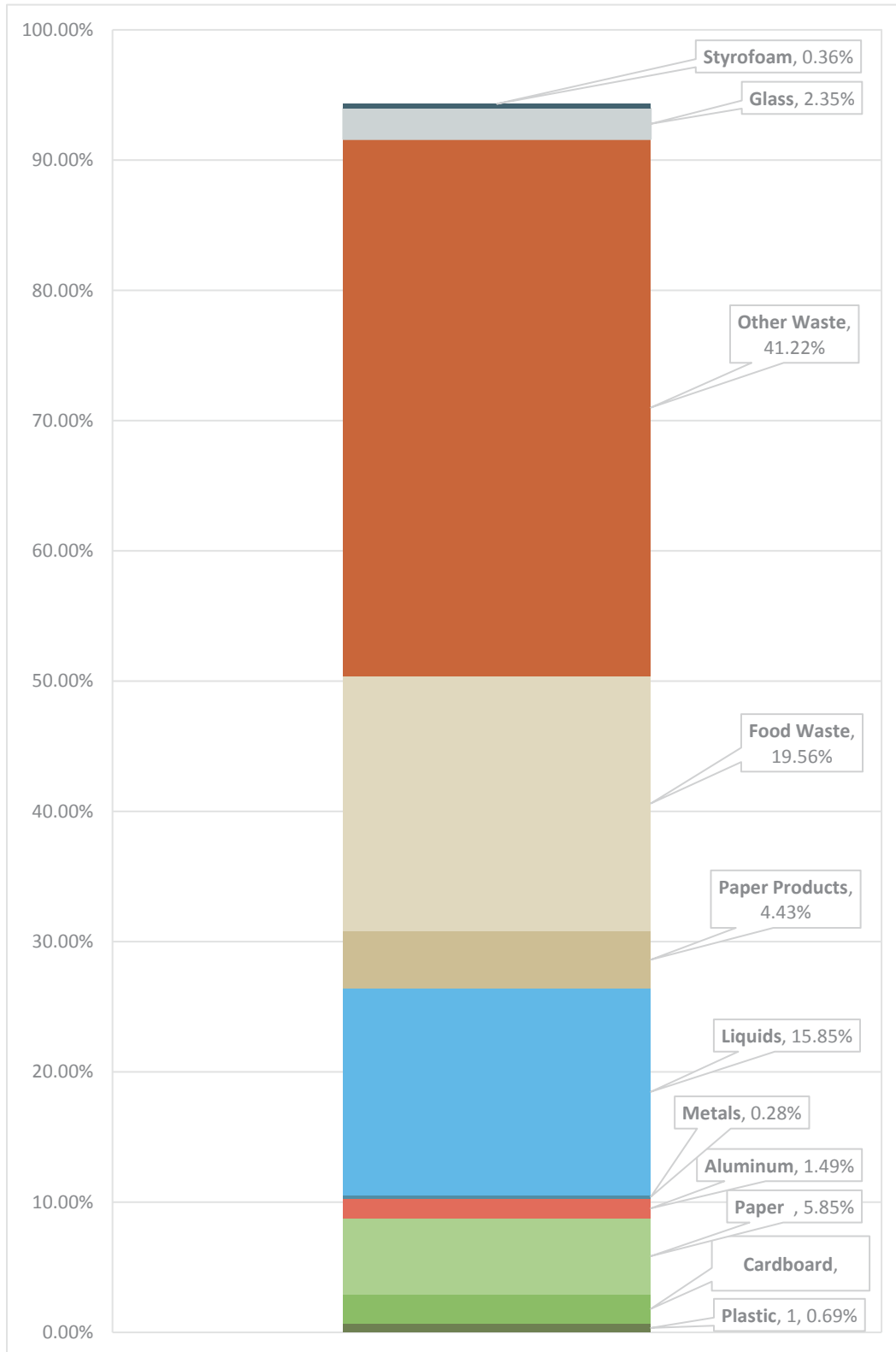


Figure 4: Waste Stream Composition - DTW McNamara Terminal (Overall)



E. Purchasing Practices

Information on the WCAA and tenant purchasing practices was not available for review at the time of this writing. Reviewing purchase histories can help identify supplies and materials that are contributing to the waste stream and may be replaced with durable/multi-use alternatives. Some examples are ceramic coffee mugs, bulk cleaning supplies, and cleaning textiles that are laundered instead of being thrown away.

Future collection and evaluation of purchasing practices by WCAA, DANTeC, Delta, restaurant and retail tenants, and other operators at DTW would provide a basis for assessing the potential for purchasing alternative supplies and products to reduce quantities of material for landfill disposal.

4. Review of Waste Management Contracts

As noted in **Section 1B: Airport Description**, FMRA lists the review of waste management contracts as an element of addressing solid waste recycling at an airport. The FAA memorandum titled “Guidance on Airport Recycling, Reuse, and Waste Reduction Plans” explains that the purpose of reviewing these contracts is to “identify opportunities for improving [recycling] program scope and efficiency, as well as identify constraints” and notes that “this information can signal the airport’s next opportunity to add recycling, reuse, and waste reduction objectives to existing leases and contracts.”

The specific information relative to the expiration, extension and/or renewal dates of DTW’s numerous leases was not reviewed under this project. However, as these contracts come up, it would be worth a review to identify opportunities add recycling, reuse, and waste reduction objectives to these leases and contracts.

A. Waste Contracts

[WCAA Waste Management Contract](#)

WCAA issued Requests for Bids (RFBs) for dumpster and roll-off trash removal services at WCAA managed spaces at DTW and YIP in 2004, 2007, 2010, and 2015. Waste Management was awarded this work in 2007, 2010, and 2015. The 2015 contract expires after five years. Under this contract, the included dumpsters are serviced on a scheduled basis and charged per pick up. Recycling services are not included in this contract.

[DANTEC Waste Management Contract](#)

DANTEC provided a copy of several pages of its contract with Waste Management for review under this project. These included the sections related to authority and execution; equal employment opportunity; conditional assignment of the agreement to WCAA; and performance guarantee. The sections related to the specific services provided were not included, and therefore were not reviewed under this project. A review of the complete document is needed to identify any challenges to or opportunities for recycling presented by this agreement.

The DANTEC/Waste Management contract outlines the fee structure for rental of compactors and dumpsters; for hauling of waste and recyclables; and pricing per ton of waste and recyclables. Of note, the price for a closed top recycling container is the same as for an indoor waste compactor; similarly the hauling charge for waste and recyclables are the same. The per-ton cost for waste under this contract is

less than for recyclables, an arrangement that does not incentivize recycling by DANTeC. Increasing the rate per ton for waste under any updates to this contract could help incentivize recycling in the future.

[McNamara Terminal Advanced Disposal Contract](#)

Delta/ABM's contract with Advanced Disposal was not available for review in preparing this Plan. A collaborative review of this contract by Delta, ABM, and WCAA would identify opportunities to increase recycling and reduce waste generation. Any identified adjustments to the contracted services that come out of such a review could be incorporated into future contracts.

B. Recycling Contracts

Royal Oak Recycling's services are provided under a purchase order agreement with WCAA. This agreement includes the materials generated at YIP. Recycling from areas managed by DANTeC is included in the Waste Management contract described above. Recycling from areas managed by Delta is included in the Advanced Disposal contract described above.

C. Housekeeping Contracts

WCAA's, DANTeC's, and Delta's contract for janitorial services including aircraft cabin cleaning for the airlines were not provided for review under this project. These contracts should also be reviewed to determine if they create opportunities for additional recycling-related activities and if they can be improved during the next contract cycle.

D. Tenant Leases

WCAA's Concessions and Quality Assurance Department is responsible for managing tenant leases in both terminal buildings as well as outlying facilities at DTW. Per communication with the E&S Department, tenant leases do not currently require participation in the WCAA's recycling program or standalone recycling and waste management efforts.

5. Recycling Feasibility

A variety of factors impact the feasibility of recycling at DTW. Some of these are universal to airports and similar facilities, while others are specific to DTW. The following sections describe the more influential of these factors.

A. Commitment and Support

The willingness of the WCAA, DTW staff, and DTW's tenants and contractors to commit to and support DTW's recycling program is a major factor in the success of such a program. Without the commitment of resources such as funding, labor and time, space, and access to secure areas, a recycling program could struggle.

WCAA Departments

WCAA's E&S Department has demonstrated commitment to and support for recycling and responsible waste management at DTW. The Department developed a written recycling policy for WCAA employees, devoted resources to studying the composition of waste at both terminals, and provides the labor for the food recovery program.

A few aspects of a facility-wide recycling program fall under the purview of other WCAA departments, including Concessions and Quality Assurance and Facilities. The Concessions and Quality Assurance Department assisted in the coordination for the waste study at the McNamara Terminal. The Maintenance Department developed a Request for Proposals for the purchase of new recycling bins for the North Terminal with the input of the E&S Department. Increased cooperation and participation by these departments will be key in future efforts to improve or expand recycling at DTW. As a service provider for WCAA, DANTeC operates under the WCAA's goals. DANTeC facilitated elements of the waste study at the North Terminal.

Airline Participation

Per corporate policy, Delta is "committed to minimizing waste streams through diversion and re-use, waste recycling programs, and [waste reduction]." Delta has taken steps to facilitate and promote recycling in the McNamara Terminal. In addition, Delta's Sky Club Lounge donates food to and otherwise supports the WCAA's food recovery program.

Of the eight airlines that operate at the North Terminal, five have established sustainability programs that include elements of waste management and recycling.

United Airlines is “committed to operating sustainably and responsibly” and has recycled over 28 million pounds of aluminum cans, paper, and plastic from flights and facilities. In 2014, United began to replace its hot beverage cups with fully recyclable alternatives made from recycled plastic water bottles.

Alaska Airlines’ environmental strategy includes working to reduce waste from flights and other facilities, including recycling and composting of coffee grounds. Alaska’s 2015 goal was to increase recycling capture rate on flights from 79 percent to 85 percent. The airline specifically mentions that their recycling goals are “limited by local infrastructure as many airports and municipalities have different protocols and capabilities for co-mingled recycling.” Alaska has worked with a reuse company to salvage leather from old plane seats and reuse the material in consumer goods. The airline is also working with inflight crews to keep unused disposable items such as cups and napkins on aircraft instead of returning them to the catering carts, where they are thrown away in the unstocking process. Alaska’s goal is to ensure all inflight service ware items are recyclable, reusable, and/or sustainably sourced. Alaska has also taken steps to reduce dependence on printed paper through the use of iPads, iPhones, and tailored applications (apps) in their operations.

Southwest Airlines is “committed to conservation and mitigation of [the airline’s] environmental impacts.” Southwest also partnered with a reuse company to “upcycle” seat leather into new products. Southwest has diverted more than 4,100 tons of material from landfills through recycling.

JetBlue Airline’s sustainability website states that “by...recycling much of our waste, we cut costs.” In 2012, JetBlue launched an onboard recycling program under which inflight crew members separate bottles and cans and the ground crews process these materials for recycling at the landing destination. In the first year, this program recycled 28 million cans and bottles and donated the money earned to charity. JetBlue has also worked with a reuse company to transform waste crew member uniforms into new items.

Virgin Atlantic focuses on its environmental footprint, including reducing waste. As part of this effort, the airline has recycled or donated blankets, newspapers and magazines, furniture, aircraft seat foam, carpet, and electrical goods. Virgin has also worked with a reuse company to create bags from recycled seat covers and design crew uniforms made from recycled plastic bottle material.

B. Technical and Economic Factors

Technical and economic factors play a large roll in recycling at a given facility. This includes elements such as the types of materials recycled in the area, existing recycling facilities and other infrastructure, logistical or legal constraints (such as janitorial services or limits on food reuse).

[Local Markets and Infrastructure](#)

Markets for recycled materials fluctuate widely based on several factors and interactions. For economic reasons, local waste haulers typically only 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 about what materials they accept and prefer materials that are of high value, clean, and easy to separate.

The materials listed in **Table 4** are accepted under the residential recycling programs in the region. As previously noted, inclusion in such programs generally indicates that the market and/or infrastructure for these materials is strong. DTW currently recycles those materials highlighted in blue.

Table 4: Materials Accepted in Area Recycling Programs			
<i>City of Detroit</i>	<i>City of Romulus</i>	<i>City of Ypsilanti</i>	<i>City of Ann Arbor</i>
<ul style="list-style-type: none"> • Paper – newspaper, magazines, junk mail, office paper, telephone books • Boxes – cardboard boxes, boxboard • Plastics - #1-7, jugs, tubs, bottles • Metals – tin and steel food cans, aluminum beverage cans, aluminum foil and pie plates, pots and pans • Glass – bottles and jars, clear and colored glass 	<ul style="list-style-type: none"> • Newspaper • Plastic containers • Cans • Glass 	<ul style="list-style-type: none"> • Paper – newspaper, magazines, junk mail • Boxes – cardboard boxes, boxboard • Plastics - #1, 2, 4, 5, 6, and 7 • Metals – tin cans, aluminum beverage cans, aluminum foil and trays • Glass – bottles and jars, clear and colored glass • Milk cartons and juice boxes • Rechargeable batteries • Styrofoam 	<ul style="list-style-type: none"> • Paper – newspaper, magazines, junk mail, office paper • Boxes – cardboard boxes, boxboard • Plastics - #1, 2, 4, 5, 6, and 7 • Metals – tin cans, aluminum beverage cans • Glass – bottles and jars clear and colored glass • Milk cartons and juice boxes

Note: DTW recycles those materials highlighted in blue.

There are several recycling centers within 15 miles of DTW. Royal Oak Recycling is located 1.5 miles north of DTW and accepts commercial paper, cardboard, plastic, and metals. Taylor Recycling (three miles from DTW) processes cardboard, paper, glass, wood, and metals. Red Metal Recycling (13 miles) and Weiser Recycling (six miles) accept metals. Based on the types of material that DTW recycles, the area’s network of recycling options is anticipated to be able to serve DTW’s on-going recycling needs.

There are four landfill facilities within ten miles of DTW. Two of these are owned and operated by Waste Management (Woodland Meadows and Detroit West Area), one is owned by Republic Services (Sauk Trail Hills) and one is owned by the City of Riverview (Riverview Land Preserve). The Michigan Department of Environmental Quality (MDEQ) calculated that Woodland Meadows had 10 years of remaining capacity, Sauk Trail Hills had 17 years, and River Land Preserve had 14 years as of January

2016. Based on this information from MDEQ, the area landfills have adequate capacity for the foreseeable future (10-15 years).

Logistical Considerations and Constraints

Certain elements must be in place to maintain a recycling program at DTW. These include proactive and engaged janitorial contractors, willing haulers, space for bins and dumpsters, and access to secure areas (including airside ramps and sterile terminal areas).

The food recovery program has specific requirements that ensure food safety and maximize the volumes of food donated to the receiving organization(s). Perishable food designated for donation must be refrigerated in restaurants' back of house areas until it is collected by WCAA E&S Department staff and delivered to a refrigerated area at the dock. Holding this food until it is collected takes up space, which is a limited resource for airport restaurants. In addition, moving collected food throughout the McNamara Terminal to the docks has been a challenge because of the location of the docks (at a different elevation than the terminal curbside, etc.) and screening procedures for employees that must accommodate the collection equipment (bins and carts). Initially, Bradford Logistics was assisting in food collection on a shared daily schedule with E&S Department staff. However, the program is currently operated solely by Department staff and subject to their availability. As a result of these challenges, the WCAA is evaluating donating the food to the USO Freedom Centers and/or an organization that is willing to take over the entire collection process.

The levels of delegation for tasks associated with waste management also pose challenges. For example, Delta contracts with Prospect to service arriving aircraft cabins. Delta's flight crews separate recyclables aboard flights per company policy, but it is Prospect employees' responsibility to take recyclable materials off the aircraft to the appropriate compactor. During busy periods or at gates that are long distances from a recycling compactor, Prospect staff may not be able to transport waste and recyclable materials to both a waste compactor and a recycling compactor, and still be able to service their next aircraft in a timely manner. An additional challenge is that the compactors may be locked, and Prospect staff may not all have ready access to the keys. WCAA and the janitorial contractor ISS may face the same issues at the North Terminal, and the distance to a recycling compactor may be an even greater issue if recycling is implemented there.

Purchasing practices are another element of waste management that is distributed among different organizations at DTW that may have little or no coordination. Because each organization operates slightly differently, it may be difficult to identify opportunities to make different procurement choices that reduce waste. However, due to the multiple levels of responsibility at DTW, improved communication and coordination will be key to removing or minimizing roadblocks such as time, labor, supply needs, or other challenges. A guide for more sustainable procurement could be developed with input from all the organizations.

Restaurants, janitorial contractors, and other stakeholders in recycling at DTW can sometimes experience significant employee turnover. This turnover can make it difficult to maintain consistency in waste reduction and recycling practices. A steady influx of new employees creates a continuous demand for training on all aspects of the employer's policies, including day to day operations. Departing employees take their experience and knowledge with them, including any tips or tricks for timing or completing recycling tasks. Development of general recycling information that can be provided to any new employee (WCAA, airline, tenant) would help address this challenge.

Another challenge faced by the airlines, restaurants, other tenants, and contractors is that a portion of the infrastructure for recycling is located in restricted and/or secured areas and not all employees have access to these spaces. As a result, these businesses and companies must schedule their workforce so that employees are available to transfer materials to the waste and recycling dumpsters and compactors, or to the dock at the times when they are open without interrupting other operations.

Contractual Issues

An evaluation of DTW's contracts is presented in **Section 4: Review of Waste Management Contracts**. There are no identified major contractual issues with maintaining and improving the recycling program at DTW. The complexity of the DTW facility and community, with space leased to various airlines and tenants and their subcontracting of custodial and waste collection services, does pose challenges. The success of DTW's recycling program depends on the WCAA, airlines, and tenants working cooperatively to support it.

As noted in **Section 4: Review of Waste Management Contracts**, the fee structure within DANTeC's contract with Waste Management does not incentivize recycling at the North Terminal, because the costs are the same for container rental and material hauling, and more on a per-ton basis for recyclable materials.

This contract does not include mechanisms to offset the higher costs through rebates or credits based on the value of recyclable materials. The contract does incentivize waste reduction because, as the volume of waste generated at the North Terminal is decreased, the total cost to DANTeC would go down based on less frequent and fewer container pick-ups.

In addition, the WCAA's agreement with DANTeC includes fees and charges paid by the member airlines for various services at the North Terminal. These charges include facility improvements and utilities. Changes to waste management at this facility, for example, introduction of recycling service, could raise the cost to the airlines. WCAA would need to discuss and negotiate costs for recycling at the North Terminal with both DANTeC and the member airlines. Similarly, the WCAA's agreement with Delta includes fees and charges for services at the McNamara Terminal, including improvements and utilities. Changes to waste management that would affect the cost to Delta would need to be discussed and negotiated with the airline.

Recycling and Landfill Facility Requirements

The recycling facilities and landfills that accept waste from DTW 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.

Items generated at DTW may be comprised of components that seem recyclable (plastic, glass, or metal parts), but recycling facilities have specific material standards, and the presence of non-recyclable materials may result in rejection of an entire load. For this reason, it is important that non-recyclable items are not included in DTW's recycling stream.

Other items generated at DTW may require special handling and/or be prohibited or restricted from disposal in an MSW landfill. Examples include beverage containers (included under the State's refund program), tires, yard clippings, appliances, asbestos, drums, lead acid batteries, radioactive waste, medical waste, hazardous waste, septage, sewage, and used oil. It is paramount that restricted and regulated wastes are not included in DTW's MSW stream.

C. Federal, State, and Local Policies and Guidelines

Federal, State of Michigan, and local waste and recycling regulations and policies and factors were reviewed to evaluate DTW's existing recycling plan in the context of applicable requirements.

Federal

At the federal level, 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 and are generally not covered under this plan.

As described in **Section 1A: Regulatory Background and Project Purpose**, the FAA's definition of airport planning was updated in 2010 through FMRA to include planning for recycling and waste minimization. The WCAA is required to address solid waste as part of an airport master planning project. The FAA provides guidance on airport waste and recycling in the September 2014 memo on the topic as well as in a synthesis document prepared in 2013 (both available on the FAA's website).

The EPA has developed a hierarchy of waste management strategies. This hierarchy (**Figure 5**, left) ranks these strategies from most- to least-environmentally preferred, with 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 (**Figure 5**, right).

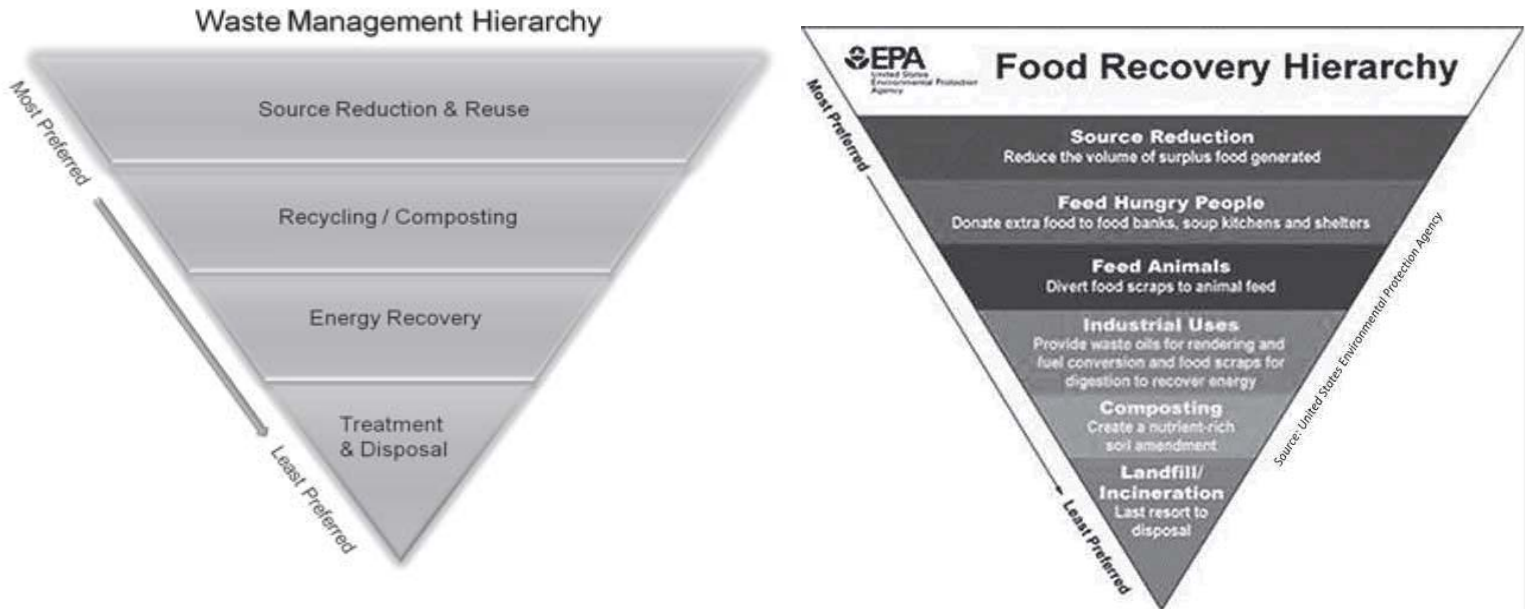


Figure 5: Waste Management Hierarchy (left) and Food Recovery Hierarchy (right)
Source: United States Environmental Protection Agency

State

At the state level, the MDEQ oversees solid waste management and recycling. The State's current recycling initiative is focused on making recycling easier and providing convenient access to residential recycling. The State has set a goal to double the residential recycling rate from 15 percent to 30 percent within 2 years (by 2019)

The Michigan Beverage Container Act was enacted in 1976 to reduce litter and conserve resources. The Act places a \$0.10 deposit on metal, glass, paper, and plastic containers under one gallon that contain beer, soft drinks, carbonated and mineral water, wine coolers, or canned cocktails. Retail customers and restaurants pay \$0.10 per container at the point of sale and receive this back as a refund when the containers are returned. As of 2014, 94.2 percent of eligible containers were redeemed with 75 percent of unredeemed deposits used for state environmental programs, and the remainder going to retailers who participate in the program.

Local

The Wayne County Department of Public Services Environmental Services Group Land Resource Management Division (LRMD) oversees landfills, transfer stations, and processing facilities in the County and enforces County and State waste regulations at these facilities. The LRMD's solid waste goals and objectives include increasing the awareness of the need for recycling to reduce reliance on landfills.

All counties in the state are required to prepare a solid waste management plan (SWMP). The LRMD is responsible for developing, enforcing, tracking, and supporting the County's SWMP, which was updated in 2000. The LRMD provides materials for education and information to the public, school groups, and businesses and industry in the County, as well as information and support to local businesses intending to start recycling programs.

Community Culture

Waste and recycling projects at other airports have confirmed that passengers have an interest in recycling. Residents in the Cities of Detroit, Romulus, Ypsilanti, and Ann Arbor have access to curbside recycling and many also have access to drop-off locations. Based on the area's recycling programs, area residents have many opportunities to recycle and are familiar with general recycling practices. Cities such as Romulus have identified increasing recycling in their Master Plan. The area's recycling rate is likely similar to that of the State of Michigan, which is at 15 percent. Passengers and employees who recycle at home or at other businesses in the Detroit area are likely to expect DTW to have a recycling program, and participate in that program. As a large national and international hub airport, a large number of passengers travelling through DTW have seen and participated in various levels of recycling and sustainability programs at other airports, and may expect this service at DTW.

Other Incentives

As noted in **Section 5A: Federal, State, and Local Policies and Guidelines**, the majority of the airlines serving DTW have recycling programs. Aligning the DTW recycling program with the airlines' corporate practices provides the opportunity for the WCAA to achieve its waste reduction and recycling program goals while also helping the airlines achieve theirs.

The organization that receives the food recovery program donations has expressed sincere gratitude to the WCAA for the support of their mission. This contribution to the community of southwest Detroit provides an incentive tied to the social responsibility element of sustainability. In addition, because this program is funded by an MDEQ grant, there is a financial incentive to meet the program objectives established under the grant agreement. The USO Freedom Centers and a second food pantry organization have expressed interest in receiving food from this program and may provide additional societal incentives for its continuation or expansion.

WCAA is currently constructing a new administration building adjacent to the North Terminal, providing both an incentive and opportunity to address waste management head on in the process. This building has been designed to meet Leadership in Energy & Environmental Design (LEED) criteria for new construction. According to the WCAA E&S Department, waste bins and recycling containers will be incorporated into the new breakroom spaces and a recycling center, or storage area, is planned for the facility. The new space will prompt adjustments to WCAA's current workplace recycling program for the correct fit of containers and proper disposal. With these adjustments, the recycling program in the new facility will satisfy a prerequisite for the Materials and Resources section of LEED credentials. Obtaining this prerequisite, as well as the associated C&D waste management planning, will potentially lead to up to 13 Materials and Resources LEED credits. In addition, moving WCAA employees to a new building is an excellent opportunity to establish new practices and habits. Employee recycling habits are ingrained in their current routines. A change in working environment can lead to positive behavioral changes increasing participation and conformance to the recycling policy.

6. Cost Savings and Revenue Generation

The costs associated with a recycling program are dependent on available infrastructure, material markets, and the type of waste generated. These costs often include capital costs for containers, landfill tipping fees, hauling costs, material rebates, and labor. Generally, demonstrated reductions in costs are an important part of ensuring the viability and success of an airport's recycling and waste reduction efforts. As a result, the FMRA requires an evaluation of the potential cost savings and revenue generation opportunities for an Airport Recycling, Reuse, and Waste Reduction Plan.

Waste handling and recycling collection for WCAA areas is funded under the WCAA's annual operating budget. DANTeC budgets for waste management costs for the North Terminal; likewise, Delta budgets for waste and recycling in its budget for the operation of the McNamara Terminal.

WCAA's waste collection contractor, Waste Management, collects waste on a scheduled basis and charges per pull (or pick up). Based on the bid tabulations from the WCAA's 2015 RFB for dumpster and roll-off trash removal services, WCAA expects to pay approximately \$437,800 over the five-year contract with Waste Management.

Delta and ABM's waste management contractor, Advanced Disposal, collects waste and recyclables on an on-call basis. When a compactor is full, it automatically notifies Advanced Disposal to request service. Advanced Disposal estimates the annual cost and then credits Delta/ABM for any costs that are not actually incurred, essentially, when the actual pulls are fewer than accounted for in the estimate. During year six of the contract with Advanced Disposal (March 2015 through February 2016), the estimated cost was about \$650,700 and at the end of this time-period about \$63,090 was refunded. Delta does not receive a credit or rebate for recyclable material.

Based on the fee structure and anticipated volumes described in DANTeC's contract with Waste Management, DANTeC anticipates spending approximately \$83,000 each year for waste removal and recycling service at the North Terminal.

Assuming all of the waste collection at DTW is charged on a per pull basis, reducing the volume of waste generated from WCAA offices, the North Terminal, and the McNamara Terminal would reduce costs by decreasing the number and frequency of required pickups. The DANTeC contract includes fees for both pick-ups and tonnage, so waste reduction strategies could generate additional cost savings.

WCAA and DANTeC's contracts are not structured to reduce costs by diverting materials to recycling. Depending on the fee structure for recycling collection versus waste collection, it is possible that Delta could achieve a financial benefit from diversion to recycling.

Source separated recyclable materials are a potential source of revenue generation through rebates or credits from the collection companies. Rebates, credits, and similar programs would have to be negotiated in the next round of contracts for these services. If the WCAA, Delta, or DANTeC are interested in receiving income from recyclable materials, two key elements need to be considered: 1) how to incentivize the waste haulers support for recycling instead of penalizing them through reduced waste payments, and 2) how this revenue would be credited to the various organizations responsible for waste management and recycling at DTW.

7. Recommendations

This section presents recommendations for WCAA, including waste reduction, reuse, and recycling strategies, based on the information presented in previous sections of this document. The objectives and targets are described, along with recommendations for tracking and reporting. There are recommended strategies for reduction and reuse and for recycling and composting. This section discusses the role of education and outreach along with recommended methods and training. Finally, this section describes the containers and bins as well as the signage and labeling to lead to increased participation in recycling and reduce contamination.

A. Objectives and Targets

It is recommended that DTW set specific, measurable, achievable, realistic, and time-bound (SMART) goals for its waste and recycling program. Well-defined objectives and targets provide a basis and foundation for subsequent activities and actions. Monitoring progress toward such goals requires tracking, and can also provide information on progress and improvements that can be used in marketing and education efforts.

Set WCAA Goals

The WCAA should consider adopting or otherwise incorporating the following potential objectives and targets:

- Recycle 15 percent of waste generated in new WCAA office building (equal to current State of Michigan residential recycling rate)
- See to 100 percent completion of WCAA employee recycling awareness training
- Divert 100 percent of coffee grounds generated in new WCAA office building (dependent on identifying an organization interested in and willing to accept grounds)
- Update WCAA staff on program progress annually (for example, via email or website)
- Present recycling information at Airline Council meeting once each year
- Conduct annual inspections of recycling and waste practices

Support DANTeC and Delta Goals

The waste source, quantity and composition information provided in **Section 3: Waste Audit** and detailed in the waste composition study reports provide baseline data for establishing objectives and targets for the terminal buildings. It is recommended that WCAA work with DANTeC and Delta to establish recycling goals compatible with the airlines' corporate objectives for these areas.

Based on the observed levels of recyclables in the terminal waste streams, the following ideas for terminal goals should be considered:

- Recycle five percent of waste generated in the public passenger areas, which is half the recyclable portion of ten percent,
- Install at least one liquid collection station at each terminal,
- See that 100 percent of airline employees and contractors complete recycling awareness training,
- Reduce number of standalone garbage cans, and
- Make sure that 100 percent of airline areas have access to paper recycling.

B. Tracking and Reporting

Tracking

As described in **Section 2B: Operation and Maintenance Requirements, Roles, and Responsibilities** WCAA currently tracks the volume of recyclables collected by Royal Oak Recycling from the WCAA Administration Offices, North Terminal, and the DTW dock (McNamara Terminal recycling). WCAA also tracks the volume of food donated through the food recovery program. Delta tracks the volume of waste collected by Advanced Disposal through ABM. It is recommended that this information be combined at least annually, used to calculate WCAA and terminal recycling rates, based on percent of waste stream recycled. These data can be graphed to visually communicate on-going trends in waste generation and recycling.

Reporting

DTW's waste and recycling performance is not currently reported to interested parties or stakeholders in the program. It is recommended that the WCAA consider establishing a regular reporting schedule and this information be proactively presented to the WCAA management and employees, tenants, and interested external stakeholders. A set of bar graphs and pie charts showing trends and patterns in the recycling data can be an effective means of communicating this information. Reporting should be at least on an annual basis. The purposes of this reporting are to remind the employees, tenants, and users of the recycling program and its benefits; to communicate the WCAA's commitment to its recycling program and its broader commitment to sustainability; and to solicit feedback and suggestions for improving the recycling program.

Updating

As the program is adjusted and improved, it is recommended that DTW update the tracking document to accommodate additional material streams or new sources of data, for example, the pounds of coffee grounds collected for composting. The reporting schedule should also be revised as needed to accommodate changes to the program. It is expected that the reporting schedule would initially increase in frequency as the program evolves and new strategies are implemented, and then potentially return to a lesser frequency as the program matures.

C. Reduce and Reuse

Waste reduction is the most environmentally preferred waste management strategy. It is recommended that DTW focus on moving materials up the waste management hierarchy as a key strategy in reducing the facility's environmental impacts. Waste reduction can be accomplished in many ways, including reusing items.

It is recommended that the WCAA evaluate the following reduction and reuse strategies to determine which, if any, are feasible and prudent for implementation at DTW.

- Install liquid collection stations
- Encourage employee and passenger reuse of durable water bottles by refilling at bottle filling stations/drinking fountains
- Collect and donate unopened food, beverage, and toiletry items subject to TSA restrictions
- Provide reusable coffee mugs, such as ceramic or thermal mugs, to WCAA employees (inspired by beverage tumbler program)
- Establish central office supply storage and encourage WCAA employees to return unused/unwanted supplies to this area for others to use
- Set the WCAA printers and copiers to default to double-sided printing
- Use cloud-based file storage and document sharing systems to reduce need for paper copies
- Share one subscription to industry journals and trade magazines and route copies (rather than receiving a copy for each employee); move to electronic subscriptions where possible

As reduction and reuse practices are adopted, it is recommended that the WCAA share information about these strategies with passengers, airlines, tenants, and contractors and encourage these stakeholders to implement them where feasible in their own activities.

Several of the recommendations are further detailed below, where additional information will be helpful for implementing these measures.

Liquids Collection

The North Terminal Waste Composition Study found that garbage cans and recycling containers located in the security queuing areas and other non-sterile areas receive a significant amount of liquids due to TSA restrictions. The same is likely true at the McNamara Terminal. Liquids add significant weight to the waste stream, contaminate other materials like paper, and may be rejected by a recycler, which will result in them being landfilled. Liquid collection stations are becoming more common at Airports around the country to combat liquids in the waste and recycling streams.

It is recommended that the WCAA work with DANTeC and Delta to evaluate installing liquid collection stations in security queuing areas to capture the liquids discarded here. Liquid collection stations can both reduce the weight of the waste stream generated in these areas and protect recyclable materials. These stations should be co-located with recycling bins so passengers can recycle the plastic bottles, aluminum cans and other containers they do not wish to retain and refill.

Liquid collection stations also encourage passengers to empty their reusable and disposable water bottles and refill them in the sterile area after clearing screening. A liquid collection station also acts as a final reminder to passengers about to enter the screening area that liquids greater than 3.4 fluid ounces are not allowed through screening, and thereby expedite the screening process by encouraging the removal of prohibited liquids from carry-on luggage.

Liquid collection stations are available from various manufacturers and can also be fabricated in-house. These stations require maintenance and servicing, specifically emptying into a designated drain. Stations should include signs indicating that passengers can empty their beverage containers and keep them to refill after they pass through security at bottle refill stations located throughout the terminal near the restrooms.

The use of liquid collection stations would require custodial staff and contractor time to empty these containers on a regular basis and deal with any issues, such as spills. Case studies from other airports show that the time required for staff to empty these stations is offset by the reduction in time dealing with liquids in the trash bags, which can contribute greatly to their weight.

It would be important to locate the liquid collection stations within the security screening queuing areas and with designated access to custodial stations with floor drains to allow for them to be emptied easily and quickly.

Liquid collection stations also provide a benefit to housekeeping staff. Without liquid collection, bags need to be emptied more frequently so that they do not exceed comfortable or safe handling weights. Diverting liquids to a collection station from the waste or recycling stream can reduce the overall weight of waste and recycling bags, which can reduce the frequency at which bags need to be emptied. Diverting the liquids will also reduce the need to reinforce the bags (double bag) to address the extra weight and potential for leaks.

Donation of Food, Beverages, and Toiletries

It is recommended that DTW investigate the feasibility of collecting unopened bottles of water, other beverages, food and toiletries that are restricted from carry-on luggage and donating them to a local charity or other organization. These items can be very heavy and add weight to the waste stream in the queuing area or TSA operation screening.

In compliance with TSA requirements, these items may need to be collected prior to the security checkpoint queuing area. Collection of these items would require containers at the security checkpoints and management by ISS and DFS staff to store the items until the receiving organization could collect them. Coordination between the WCAA, DANTeC, Delta, and the designated receiving organization will be needed. Additionally, information from a TSA representative may be required to assist with coordination on the location and details of this collection program. **Figure 6** presents an example of how this type of program has been implemented at McCarran International Airport (LAS) in Las Vegas, Nevada.



Figure 6: Example Donation Collection at McCarran International Airport (LAS)

D. Recycling and Composting

According to the EPA, recycling waste items to be processed into raw materials to make new products is the second most preferred waste management strategy after waste reduction. The FAA guidance expects an Airport's recycling, reuse, and waste reduction plan to document, at a minimum, the facility's existing program to recycle paper, plastic bottles, aluminum cans, and plastic cups. As discussed previously, recycling of these materials is carried out to various degrees at DTW.

Paper

It is recommended that DTW expand the existing paper recycling program at WCAA offices and encourage the expansion of the program at the McNamara Terminal and to additional areas. This effort should include encouraging increased recycling of paper by employees, tenants, and passengers.

Delta is currently recycling waste magazines and newspapers generated aboard commercial flights. It is recommended that the WCAA collaborate and coordinate with the airlines serving the North Terminal to evaluate adding paper items from deplaned waste and other activities to this program.

Plastic Bottles

It is recommended that DTW expand its program of collecting plastic bottles from the WCAA offices and YIP to additional areas and encourage increased recycling of plastic bottles by employees, tenants, and passengers. It is also recommended that WCAA encourage Delta to expand its program of recycling plastic bottles generated at the McNamara Terminal and aboard their flights.

It is recommended that the WCAA collaborate and coordinate with the airlines serving North Terminal to evaluate adding plastic bottles from deplaned waste and other activities to this program.

Aluminum Cans

It is recommended that the WCAA continue to encourage the practice of collecting and returning refundable cans, which has an exceptionally high capture rate.

It is recommended that the WCAA expand the program for collecting non-refundable aluminum cans collected from the WCAA offices, YIP, and McNamara Terminal for recycling to additional areas and encourage increased recycling of non-refundable aluminum cans by employees, tenants and passengers.

Delta is currently recycling non-refundable aluminum cans generated aboard commercial flights. It is recommended that the WCAA collaborate and coordinate with the airlines serving the North Terminal to evaluate adding aluminum cans from deplaned waste to the recycling program.

Plastic Cups

It is recommended that DTW collaborate and coordinate with the airlines serving the North Terminal to evaluate adding plastic cups from deplaned waste to the recycling program, similar to the program that Delta has at the McNamara Terminal.

Glass

Refundable glass containers generated at DTW is returned for the refund. However, non-refundable glass is currently landfilled because it is not accepted by recycling firms. Therefore, it is recommended that the current glass practices are continued and any efforts related to this material are focused on increasing the capture rate of refundable glass containers.

Cardboard

As noted previously, cardboard currently is not consistently recycled at DTW. It is recommended that the WCAA work with DANTeC, Delta, and their contractors as well as with the restaurants and retail stores to determine how this material might be collected onsite and hauled for recycling.

Other Recyclables

As other recyclable materials are identified in DTW's waste stream and occur in a consistent and significant quantity in the future, the WCAA should work with its employees, airlines, tenants, and janitorial and waste hauling contractors to design and implement strategies to separate, collect, and process these materials.

Food Waste

According to industry case studies and the composition studies completed at DTW's terminals, food waste is a major component of the waste stream at an Airport, on average about 35 percent.

It is recommended that the WCAA's food recovery program be continued and expanded as resources allow. Additional labor and support may be needed from Bradford Logistics and/or the restaurant tenants to maintain and grow this worthwhile program.

An additional potential opportunity for the food recovery program is LSG Sky Chef's facility near the North Terminal, which prepares meals, snacks, and beverages for an average of 260 flights per day, and other organizations that prepare large volumes of food at DTW. These include LSG Group; Delaware North, which manages several restaurants; HMS Host, which manages Starbucks; and McDonald's. Although these organizations have formal environmental policies and have committed to reducing and diverting waste, there may still be opportunities for collaboration. It is recommended to collect more information about these organizations' practices and policies and they are recognized and encouraged.

Composting of food waste at DTW is largely dependent on the availability of a local composting facility or other organization interested in accepting this material.

If a composting facility or other organization is found or established in the DTW area, the WCAA should evaluate implementing composting at DTW. In a terminal, pre-consumer food waste (waste generated by food preparation activities) is generally easier to compost because restaurant employees are at a facility more frequently and on a more regular basis than passengers so they are easier to train and educate on composting practices and requirements. The same is true of a flight catering facility like LSG Sky Chefs. The specific items accepted by a composting facility are dependent on that facility's design and the process used to break down the waste; some facilities accept all food waste (including meat and bones and breads) while others accept only vegetables and fruit.

One option for easing into composting gradually is to first implement a composting program for coffee grounds generated by restaurants in the terminals. Coffee grounds have a pleasant odor, are easily identifiable (therefore easy to separate), are typically uncontaminated by other materials, and are generated in a predictable manner and quantity. Once tenants are comfortable composting coffee grounds, other materials can be added by name (banana peels, apple cores, etc.) and/or by type (fruits, vegetables, etc.) until all food waste appropriate for composting is included.

Paper Products

Because the majority of DTW’s restrooms are equipped with paper towel dispensers and nearby garbage cans, the waste stream collected in these cans will primarily consist of paper towel. This stream can be expected to contain low contamination and a steady volume of material, making it an attractive material for composting.

Once If a commercial composting facility becomes available in the area in the future, it is recommended that the WCAA consider adopting composting of paper towels and other paper products (napkins and tissues) composting.

Because the majority of the Airport’s restrooms are equipped with paper towel dispensers and nearby garbage cans, the waste stream collected in these cans will primarily consist of paper towel. This stream can be expected to contain low contamination and a steady volume of material, making it an attractive material for composting.

No modifications to the paper towel dispensers or garbage bins would be needed to implement this type of program. Alternative bins would need to be conveniently located and clearly labeled to accept other waste generated in the restrooms that is not paper towel; and the bins reserved for paper towel should be labeled “Paper Towel Only – Collected for Composting” (or similar) to instruct use and explain how this material is managed. Each terminal would also need a dedicated storage container for this material and a procedure to collect and store it separately until it was collected by the waste hauling contractors for delivery to the composting facility.

E. Education and Outreach

Under the existing WCAA recycling program, education of WCAA employees, airlines, tenants, and contractors is achieved through inclusion in environmental awareness training programs, while awareness and education for passengers is primarily conducted through container signage/labels in the terminals. New WCAA employees receive a copy of the recycling policy during onboarding; this policy was distributed to all WCAA employees when it was adopted.

In-terminal Messaging

To supplement existing signage and labeling, it is recommended that the WCAA work with DANTeC and Delta to improve the in-terminal messaging for passengers and provide brief, clear instructions for recycling at DTW. Providing clear instructional signage at the recycling stations/recycling bins can improve passenger participation and reduce contamination.

On-going Training

It is also recommended that the WCAA E&S Department continue and expand its program of simple on-going training for employees, airlines, tenants, and contractors that explains the recycling program, including its purpose and requirements. Such a training program will promote program participation and compliance, resulting in increased recycling and reduced contamination. In addition, training can designate a contact and a mechanism to receive feedback and ideas for improvement.

Training on the recycling program at DTW does not need to be complicated. The format of training could take any number of forms, including emails, newsletters, posters, etc. The content of such training should include reminders and information about:

- The materials that are accepted for recycling at DTW and the location of the containers to be used for the program,
- Purchasing requirements, and
- The positive effect the program is having in reducing DTW's environmental impact.

Information from the EPA, the MDEQ, and the County's SWMP should also be incorporated into the training program. In addition, different stakeholders and organizations involved in collection, housekeeping, recycling, composting, and other waste activities (hauling contractors, recycling companies) could be asked to provide content, send email reminders, or to present during meetings.

WCAA should consider providing introductory level information to new tenants and contractors and provide materials such as postings, postcards, etc. to existing tenants and contractors for use with their employees.

Once a training and education program is implemented, it is recommended that WCAA actively maintain such a program to facilitate its continued success. The content of trainings and printed resources/materials should be updated as the program changes and grows.

F. Containers and Bins

It is recommended that WCAA adjust the type and placement of recycling and waste containers installed throughout the McNamara and North Terminals and other facilities at DTW to increase recycling participation and reduce contamination.

[McNamara Terminal Recycling Bins and Garbage Cans](#)

The existing recycling bins in McNamara Terminal are described in **Section 2C: Infrastructure**; no changes to the design of these containers are recommended at this time. The specially shaped lids provide an additional clue as to the contents of that container and the proper materials to dispose of within. It is recommended that the WCAA work with Delta, ABM, and DFS to standardize the placement of the recycling stations in the McNamara Terminal and minimize the number of standalone garbage cans.

[North Terminal Recycling Bins and Garbage Cans](#)

It is recommended that the WCAA work with DANTeC and ISS to co-locate recycling bins in the public and passenger areas of the North Terminal. This can be accomplished by formalizing the placement of the existing round recycling bins or through their replacement with recycling stations designed to accommodate three streams. Recommended alternatives to the bins in North Terminal are discussed in the Waste Composition Study Report (**Appendix H2**). In either case, the number of standalone garbage cans should also be limited. Co-locating the garbage cans with recycling bins is intended to increase participation in the recycling program and improve the recycling capture rate. Co-locating the containers means the containers have consistent availability and helps passengers differentiate between materials.

There are many standalone garbage cans in the North Terminal and they are typically closer or more available than a recycling station; therefore, in many cases, it is more convenient for passengers, employees, and tenants to locate and use a garbage can for all materials than to find and use a recycling bin. These containers could be repurposed as recycling containers in spaces with single-stream recyclables (in offices for paper, in breakrooms for bottles and cans, etc.).

Other Recycling Containers and Garbage Cans

No major changes are recommended to the design of the recycling containers and garbage cans in other areas at DTW other than to ensure they and their service schedule are right-sized for the existing and future volume of material collected under the current program and any future improvements.

It is recommended that DTW install additional recycling bins or stations in other areas as they are included in the program and resources allow. This could be accomplished through repurposing bins retired from the North Terminal. As the existing containers are retired or replaced, the WCAA or responsible party may want to consider standardizing the shape, color, and/or signage of these containers to aid in recognition.

G. Signage and Labeling

It is recommended that DTW's recycling signage be expanded and improved.

The recycling stations in McNamara are labeled for paper, bottles and cans, and trash; however, these labels can be difficult to read. The WCAA and Delta should consider providing additional signage that elaborates on the terminal's program and provides direction for passengers adjacent to recycling containers if contamination and compliance become issues in the future.

New signage should make use of color, images, and short, clear text to help improve understanding of which items are recyclable, and which should be thrown away. Once recycling is implemented in the North Terminal, instructional signage may be necessary to support the program.

One key location for recommended additional signage is in the security checkpoint queuing areas in each terminal. As described in **Section 7C: Reduce and Reuse**, the TSA restrictions compel the generation of waste, and items discovered in passenger luggage must be disposed of in accordance with the agency's policies.

In addition, restricted items discovered in passenger luggage by TSA can prompt further security screening, increasing congestion and wait times in the security line. Clear signage in these areas would help educate passengers on the restrictions as well as their options to comply with the restrictions to reduce wait times and prevent throwing these items away.

H. Other Recommendations

In addition to the strategies recommended above, the following strategies are recommended for DTW's waste and recycling program.

Contracts and Leases

It is recommended that WCAA develop contracts for waste and recycling services and infrastructure, including waste and recycling collection services and bins and containers that support and encourage recycling.

It is further recommended that the WCAA evaluate opportunities to include recycling and other waste management preferences and requirements in lease agreements with airlines, tenants, and other organizations that lease space at DTW. This could be as simple as a clause describing DTW's recycling program and requesting lease participation where possible, or as complex as specifying required actions for specific materials. Expiring leases represent an opportunity to negotiate such inclusions with existing tenants.

Purchasing Policies and Requirements

It is recommended that WCAA evaluate its procurement and purchasing policy to identify opportunities to require the use of sustainable materials and supplies. This could include durable items (versus single use disposable items), supplies containing recycled or post-consumer content (printer paper, paper towel, paper napkins, etc.), and supplies that offer manufacturer take-back or recycling programs at end of life (printer cartridges, batteries, etc.)

Additional Facilities and New Development

This plan focused on three areas where the WCAA has the most control or the majority of waste is generated. In the future, it is recommended that WCAA evaluate the existing recycling practices at additional facilities at DTW and determine how they might be included in the recycling program. The same is true of new development projects. As DTW grows and replaces facilities, these areas should be included in the recycling program as resources allow.

I. Continuous Improvement

This Plan has described the efforts already in place to manage waste and to reduce, reuse, and recycle waste materials. However, the best way to improve over time is by instituting a cycle of continuous improvement. It is recommended that the maintenance and improvement of the recycling program at DTW follow the Plan-Do-Check-Act (PDCA) cycle methodology. This report constitutes the “plan” element. The rest of the cycle follows the implementation of the recommendations, checks that they have the intended benefits, and then alters any elements that are not working. This results in a way to continually improve the program over time.

Plan

The recommended strategies and supporting references make up the “plan” portion of the process. The planning aspect of this cycle covers defining success (for example, 10 percent recycling by 2020), establishing materials and areas of focus, collecting baseline information (visual inspections, surveys, etc.), identifying sub-goals, and identifying strategies. In the future, additional areas of focus, baseline measurements, and goals could be desirable.

Do

Implementation of strategies included in this plan represents the “do” portion of the process. This involves implementing the recommendations in this plan and making progress toward achieving the goals. In “doing,” DTW will continue developing a culture of awareness for waste management and will begin to enhance the practices and processes for improving and optimizing its activities associated with reduction, reuse, recycling, composting, and other waste management elements at the facility.

Check

After implementing strategies, the “check” portion of the process involves the reporting aspect of the implementation process. As strategies are implemented, this step involves regularly tracking and checking the progress toward meeting the goals.

DTW has finite resources (financial, staffing, capital, etc.); therefore, the management and tracking of the plan must not be unnecessarily arduous. If tracking and checking become too difficult or time consuming, the entire plan may suffer.

Checking may include the development and use of tools for measuring success and identifying areas for improvement, including a simple mechanism for feedback and process for reviewing suggestions.

In addition to regular review of the program’s progress, the following scenarios may also trigger re-evaluation of the program and/or the constraints described in this report:

- New WCAA programs or goals
- New FAA or other federal programs or requirements
- New state recycling laws, requirements, or goals for businesses
- Expanded accepted materials
- New local infrastructure, for example, establishment of a composting facility
- New or changes in tenants or tenant programs or goals

Act

The “act” portion of the process encompasses taking what has been learned in the previous stages and acting in response. Asking “What did we learn?” and “How can we do better next time?” can be helpful. By re-evaluating the strategies, activities, goals, and metrics, adjustments can be identified and put into action.

It is recommended that meetings with a representation from WCAA, YIP Operations, and tenants participating in the program be held on a regular basis to drive the continuous improvement cycle, and thereby review the recycling program and plan and implement improvements/adjustments. It is recommended that participation in these meetings be on a voluntary basis initially.

J. Recommendations Summary

Table 5 summarizes the recommendations to increase recycling and landfill diversion and improve waste management at DTW as described in the preceding sections.

Recommendation Summary
<p>Table 5: DTW Recycling and Other Waste Management Recommendations</p> <p>Objectives and Targets/Tracking (All Facilities)</p> <ul style="list-style-type: none"> • Set SMART goals for waste and recycling program. • Support DANTeC and Delta Goals. • Combine tracking information, calculate recycling rates, and graph trends. • Establish regular reporting schedule and share information with stakeholders. <p>Reduce/Reuse (North Terminal and McNamara Terminal)</p> <ul style="list-style-type: none"> • Evaluate reduction and reuse strategies, such as liquid collection stations and donation of unopened food, beverages, and toiletry items subject to TSA restrictions. <p>Recycle/Compost</p> <ul style="list-style-type: none"> • Expand paper, plastic, and non-refundable aluminum can recycling to additional areas and encourage increased recycling of these materials in areas included in the existing program (North Terminal and McNamara Terminal). • Collaborate with North Terminal airlines to evaluate adding deplaned paper, plastic, non-refundable aluminum cans, and plastic cups to the recycling program (North Terminal) • Encourage collection and return of refundable cans and glass bottles (All facilities). • Work collaboratively to identify options for cardboard recycling (All facilities). • Design strategies for additional materials as they are identified (All facilities). • Continue and expand food recovery program (All facilities). • Recognize and encourage restaurant and catering company's food waste practices (All facilities). • Evaluate options to implement composting program (All facilities) <p>Energy-from-Waste</p> <ul style="list-style-type: none"> • Explore options to use local Waste to Energy (WTE) facility. <p>Education and Outreach</p> <ul style="list-style-type: none"> • Improve in-terminal messaging (North Terminal and McNamara Terminal) • Provide simple training for employees, airlines, tenants, and contractors. <p>Containers and Bins (McNamara and North Terminal)</p> <ul style="list-style-type: none"> • Work with Delta to standardize placement of recycling stations and minimize the number of standalone garbage cans in McNamara Terminal. • Work with DANTeC to co-locate recycling bins and minimize the number of standalone garbage cans in North Terminal. • Right size recycling containers and garbage cans in other areas; optimize service schedules. <p>Signage and Labeling (McNamara and North Terminal)</p> <ul style="list-style-type: none"> • Work with Delta to provide additional recycling signage in the McNamara Terminal. • Work with DANTeC to provide instructional signage once recycling is in place at the North Terminal. • Post additional signage in security checkpoint queuing areas. <p>Other Recommendations</p> <ul style="list-style-type: none"> • Involve WCAA E&S Department in contracting for waste and recycling services. • Evaluate opportunities to include recycling and other waste management considerations in airline, tenant, and other leases (Environment & Sustainability and Concessions and Quality Assurance). • Evaluate the procurement and purchasing policy for opportunities to require use of sustainable materials and supplies. • Evaluate existing practices at additional facilities and include these in the recycling program. • Include new development projects in the recycling program. • Maintain and improve the recycling program through PDCA cycle methodology.

8. Conclusion

This plan documents and supports DTW’s compliance with the FAA Modernization and Reform Act of 2012 and FAA guidance on the topic of recycling, reuse, and waste reduction. At DTW, WCAA has an established employee recycling program for its Administration Offices, Delta has elements of a recycling program in place in the McNamara Terminal, and DANTeC has the opportunity to implement recycling at the North Terminal. This Plan describes the existing program and outlines recommended improvements that will allow DTW to progressively increase landfill diversion and recycling volumes.

9. Appendices

Appendix H1: Wayne County Airport Authority Workplace Recycling Policy

**Appendix H2: Detroit Metropolitan Airport North Terminal Waste Composition Study:
Results and Recommendations Report**

**Appendix H3: Detroit Metropolitan Airport McNamara Terminal Waste Composition Study:
Results and Recommendations Report**



Wayne County Airport Authority **Workplace Recycling Policy – December 2015**

I. Purpose

The Wayne County Airport Authority expects its employees to recycle paper, plastics, and other materials whenever possible and provides containers for this purpose. This document describes the various materials that can be recycled, where the appropriate containers are located within various WCAA facilities, and the reporting that will be provided to WCAA employees to document the quantities of material recycled. This program seeks to reduce waste and to help conserve natural resources.

II. Materials That Should Be Recycled

- Office Paper, Newspaper & Magazines
- Cardboard
- Plastic Bottles
- Batteries
- Toner Cartridges
- Scrap Metal

III. Location of Recycling Program Collection Containers

The attached map displays the Smith Building locations of the containers to be used to recycle the above materials. If you would like an additional container(s), or you would like to move a container to a new location, please contact Denise Quiroz: 942-3674.

IV. Program Specifics

- **Office Paper, Newspaper & Magazines:**
 - a. All office paper (white, colored, glossy, etc.) newspapers and magazines can be recycled together.
 - b. Confidential documents placed in locked recycling bins will be shredded. Keys to unlock bins (to facilitate recycle of large, bulky documents) are available in the Procurement, Payroll, Human Resources, and E&S Offices.
 - c. Employees may use small blue recycling bins at their desk or nearby work spaces for paper recycling. It is the employee's responsibility to transfer contents of these small bins into the proper larger recycling bins. Staples should be removed if possible.
 - d. No paper food wrappers should be included in the recyclables. All recycled paper items should be free of food debris.
- **Cardboard:**
 - a. Cardboard to be recycled should be placed in the large cardboard receptacles in the Ticket Lobby Level of the Smith Building (near the freight elevator). Alternately, cardboard boxes can be broken down and stacked by the freight elevator doors on the Mezzanine and Third Floor levels of the Smith Building; janitorial staff will take them to the Lobby Level recycling area.
 - b. Cardboard boxes generated at other WCAA buildings should be broken down and stacked next to the Paper Recycling bins in these buildings.
 - c. All cardboard should be free of food debris. Cardboard food containers, such as pizza boxes, should not be included in the recyclables.



WCAA Workplace Recycling Policy

- **Plastic Bottles:**

- a. Plastic bottles with the numbers 1, 2, 5, and 7 can be recycled. Recyclable plastics have a stamp with the triangular recycling symbol that encloses one of the above numbers. Examples of the various types of recyclable plastic bottles are shown below:

Number	Material Name	Example
1	Polyethylene, PET, PETE	Water bottle, soft drink bottle
2	HDPE, high density polyethylene	Milk jugs, detergent bottles
5	Polypropylene	Ketchup, syrup bottles
7	Other mixed plastics	Squeeze bottle

- b. All recyclable plastic bottles should be rinsed (if not water bottles), free of debris, and placed into the recycle bins labeled "Plastic Bottles". All of the above types of plastic bottles can be mixed together.

- **Toner Cartridges:**

- a. Toner cartridges in copy machines that are serviced by Priority Systems, Inc. are recycled by that firm.
- b. For other copy machines, spent toner cartridges purchased through Staples should be returned for recycle using free shipping boxes that are available from the Staples catalog.

- **Batteries:**

- a. A container for depleted alkaline batteries are located in the Smith Building Mail Room, on the Mezzanine Level.
- b. When a battery container is full, put a Work Order in to the Maintenance Department and the batteries will be taken to a central battery recycling collection point in Building 703. A vendor removes and recycles the batteries collected at Building 703.
- c. A container for recycling radio batteries, rechargeable batteries, and cellphones is located in Technology Services on the Ticket Lobby Level of the Smith Building. Technology Services is responsible for the recycling of these batteries.

- **Metal:**

If you have a significant quantity of metal that needs to be recycled, please contact Sara Kaplan, WCAA Sustainability Administrator at (734) 942-2269.

V. Reporting

The WCAA Department of Environment & Sustainability (E&S) will provide quarterly reports to WCAA staff documenting the quantities of all the above materials that were recycled the previous quarter.



WCAA Workplace Recycling Policy

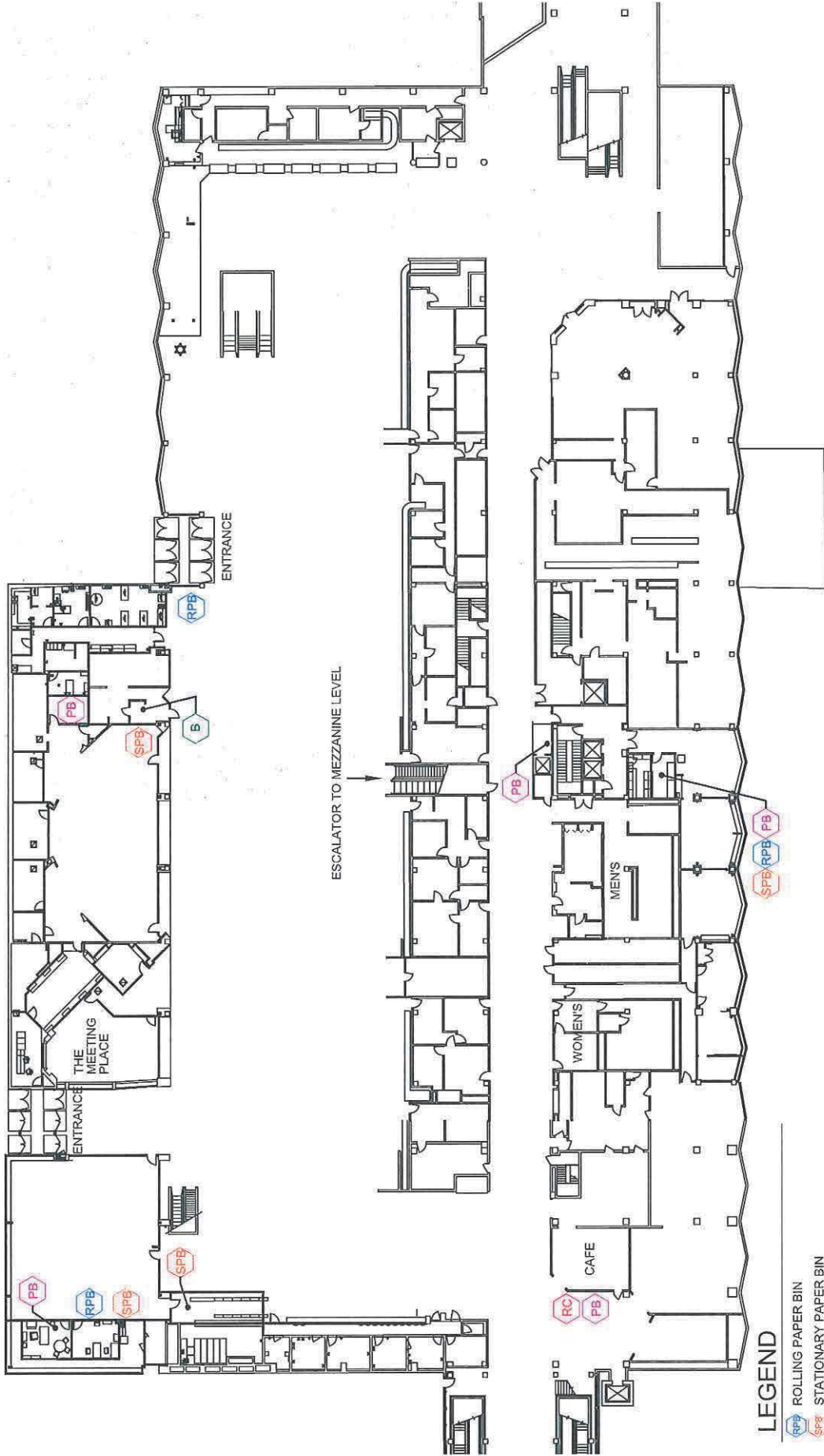
VI. Miscellaneous

- All Wayne County Airport Authority employees are expected to comply with this recycling program and to maximize opportunities to recycle whenever possible.
- All recycling bins are labeled indicating the materials that should be placed in them. Please follow these recycling program guidelines carefully and put the correct materials in the proper recycling containers because when recycled material is contaminated, it is no longer able to be recycled and must be disposed of as regular trash.

Please avoid placing refundable bottles and cans in the trash, there is a box for returnable bottles and cans in the Administration kitchen area.

This policy may be amended and additional materials may be added in the future.

DRAFT

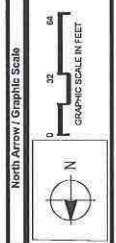


LC SMITH BUILDING - MAIN LEVEL

SCALE: 1/32" = 1'-0"

LEGEND

- ROLLING PAPER BIN
- STATIONARY PAPER BIN
- PLASTIC BOTTLES
- REFUNDABLE CANS
- BATTERIES

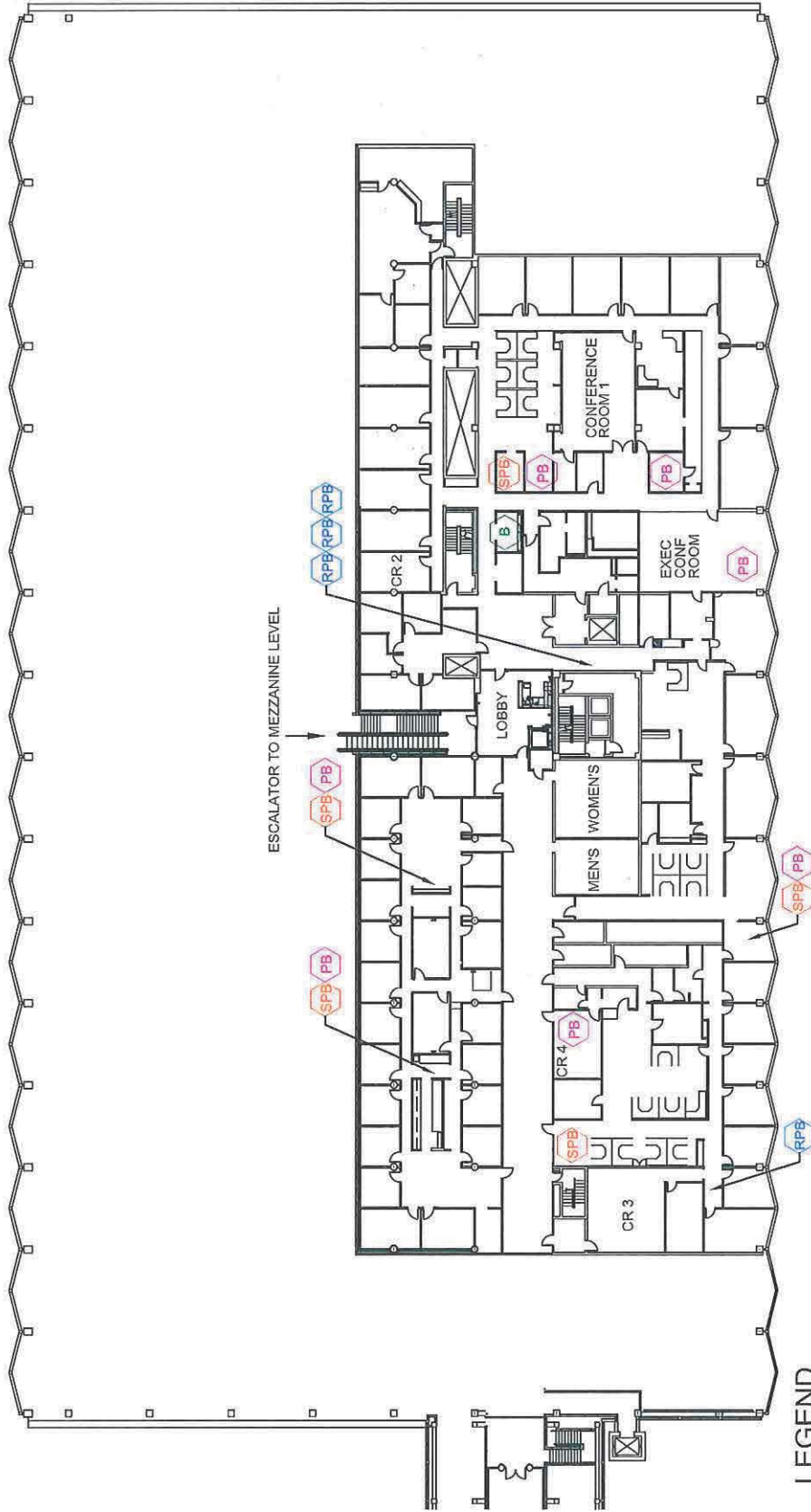


Airport Information

FAA Identifier: DTTW
 IATA Code: DTW
 City: Detroit, MI
 Country: US
 Airport Division: 6687/MSL

REVISION	BY	DATE





LEGEND

- ROLLING PAPER BIN
- STATIONARY PAPER BIN
- PLASTIC BOTTLES
- REFUNDABLE CANS
- BATTERIES

LC SMITH BUILDING - MEZZANINE LEVEL

SCALE: 1/32" = 1'-0"

North Arrow / Graphic Scale

GRAPHIC SCALE IN FEET

Airport Information

FAA Identifier: DTW
Geographic Reference Point:
LAT: 42° 17' 44.75"
LONG: 82° 21' 12.50"
Altitude: 540' MSL

BY DATE	REVISION

DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

L.C. SMITH BUILDING RECYCLE BIN LOCATIONS	2
Drawn By: _____ Date: 12/3/2015	3
Approved By: _____ Date: _____	

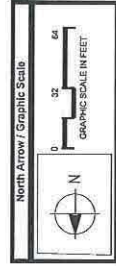


LEGEND

-  ROLLING PAPER BIN
-  STATIONARY PAPER BIN
-  PLASTIC BOTTLES
-  REFUNDABLE CANS
-  BATTERIES

LC SMITH BUILDING - THIRD FLOOR

SCALE: 1/32" = 1'-0"



BY DATE	REVISION



 DETROIT METRO • WILLOW RUN

 WAYNE COUNTY AIRPORT AUTHORITY

L.C. SMITH BUILDING RECYCLE BIN LOCATIONS	3 3
Drawn By: _____ Approved By: _____	Date: 12/15/15 Job No: _____



Results and Recommendations Report [FINAL]

May 2016

Detroit Metropolitan Airport North Terminal Waste Composition Study



DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

Report
Prepared by

**Mead
& Hunt**

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Executive Summary

Wayne County Airport Authority (WCAA), operator of Detroit Metropolitan Airport (DTW), is committed to environmentally responsible operations and comprehensive customer service. The WCAA Maintenance Department recently identified a need to replace the existing waste and recycling bins in DTW's North Terminal. As a result, the WCAA Department of Environment and Sustainability contracted with Mead & Hunt to conduct the waste composition study described in this report. The goal of this project was to evaluate the existing waste stream generated in passenger/public areas and airline spaces in order to recommend an optimal bin configuration as well as strategies to increase landfill diversion through recycling.

As of spring 2016, the majority of waste generated in the passenger/public and airline spaces was landfilled (except a limited quantity of paper which was recycled and aluminum cans that were collected for fundraising through Michigan's bottle deposit program). A waste sort, a facility walk-through, and informal interviews with stakeholders were conducted to develop a baseline and identify areas of opportunity for increasing recycling participation and compliance in order to better divert waste from the landfill. The baseline information and identified opportunities were the basis for recommendations, including recommended bin configuration, appropriate for the facility's waste stream. Data collected during this project indicates the existing waste stream contains approximately 20.4 percent recyclables and 79.7 percent waste. The waste component is made up of liquids (19.3 percent); compostables including food waste and paper products (20.7 percent); recoverable food, beverages, and toiletries (2.79 percent); and other waste such as trash, toiletries, Styrofoam and glass (which currently has low value in the recycling market) (36.9 percent). Using this data, a number of recommendations were identified to increase recycling in the North Terminal.

Highlights of near-term recommendations include:

- *Liquid collection stations at security checkpoints*
- *Conjoined three-stream containers in passenger areas*
- *Instructional signage on containers and throughout terminal*
- *Trash collection and paper and container recycling in passenger and airline areas*
- *Training and educational opportunities for airline and DANTeC employees*

The following are longer-term recommendations to support overall program continuity and strength:

- *Centralizing recycling collection points*
- *Collecting recoverable items for donation*
- *Collecting cardboard generated by the airlines*
- *Evaluating composting of paper products and food waste*
- *Setting and tracking progress toward recycling, landfill diversion, waste reduction or other goals*
- *Collaborating with DANTeC and the waste collection contractor*
- *Conducting follow-up waste sorts*

This range of recommendations will allow the Airport the flexibility to implement those which are compatible with changing conditions and available resources, while providing the opportunity to position DTW to increase landfill diversion and recycling over time through a phased, comprehensive program.

1. Introduction and Purpose

Detroit Metropolitan Airport (DTW) is a large hub commercial service airport located in the city of Romulus in Southeast Michigan. DTW is operated by the Wayne County Airport Authority (WCAA). The North Terminal supports the operations of American, Spirit, United, Southwest, Frontier, Jet Blue, Lufthansa, and Royal Jordanian, and the Edward H. McNamara Terminal (McNamara Terminal) supports the operations of Delta, Virgin Atlantic, and Air France. There were more than 33 million passengers and 379,000 aircraft operations at DTW in 2015.

The major airlines operating in the North Terminal formed the Detroit Airlines' North Terminal Consortium (DANTEC) to manage terminal operation and maintenance and support for the airlines. DANTEC contracts with ISS Facility Services (ISS) to provide janitorial cleaning services in the North Terminal, including the collection of solid waste (trash) from public and airline spaces.

In February 2016, the WCAA Department of Environment and Sustainability contracted with Mead & Hunt to conduct a waste stream composition study for the North Terminal public/passenger areas and airline activities. The purpose of the study is to provide waste stream composition information and recycling program recommendations. This study included solid waste (trash and recyclables) and excluded hazardous waste and other special wastes. It also excluded waste generated in other areas of the terminal (concessions, parking lots, etc.) and other airport buildings. The results of this study are intended to support decision-making during the procurement of new waste and recycling bins for the North Terminal at DTW. Some of the information and recommendations contained in this report may be applicable to other areas of the North Terminal and to the McNamara Terminal as well.

Activities conducted under this study included visual observations of existing conditions; interviews with WCAA, DANTEC, and ISS staff; and a waste sort. The waste sort included the physical sort and measurement of a sample of the terminal's waste stream to establish a characterization of its composition.

2. Existing Conditions

In the passenger areas of the North Terminal (curbside, circulation, security checkpoints, gate areas, and baggage claim), recycling bins/trash cans are provided at various locations. These containers are labeled “cans & bottles,” “newspaper,” and “trash” and have openings of different shapes in their lids (a slot for newspapers, a small hole for cans and bottles, and a larger hole for trash). In some cases, these containers are co-located. There are also waste bins in the terminal restrooms. Waste placed in these containers is collected by ISS and taken to a trash compactor located in a trash room in the lower level of the terminal. (There are four active trash rooms in the terminal; each utilizing one trash compactor. The fifth trash room is currently empty.) Due to challenges including unauthorized repositioning of the containers and contamination, recyclable materials placed in these containers are also transferred to the one of the trash compactors by ISS.

In the airline areas of the North Terminal (ticket counters, gate stations, ramp spaces, breakrooms, and offices), trash cans are available. Some airline spaces also have recycling cans for paper or aluminum cans. The trash cans are emptied by ISS and the waste collected from these spaces is also taken to the compactors in the trash rooms. Airlines that collect paper utilize a dedicated contractor who shreds and recycles this material. In some cases, aluminum cans are managed by airline employees who collect the deposit as a fundraising effort. Waste generated aboard flights arriving at DTW is managed by contractors for each airline at the North Terminal. This waste is also taken to the trash room compactors.

In the McNamara Terminal, waste is managed by a contractor for Delta Airlines (the majority operator of this terminal). In 2015, Delta and partners purchased and installed specialized, conjoined containers in the terminal concourse for the collection of recyclables and trash. Some of the containers were labeled “bottles & cans,” “paper,” or “litter,” and the remainder were labeled for “litter” or “recycling.” Based on interviews with WCAA staff and the DTW Dockmaster, Delta Airlines and their partners may have removed some of the conjoined containers in favor of the previous bins potentially due to contamination issues (waste materials in the recycling bins).

3. Waste Study

Mead & Hunt staff conducted a facility walk through and waste sort to collect waste stream composition data and establish a basis for recycling program recommendations. The following subsections describe the components of this study.

A. Facility Walk Through

On March 1, 2016, a representative from WCAA Department of Environment and Sustainability provided a guided tour of the North Terminal for a representative from Mead & Hunt. This walk through included the public/passenger and airline spaces within the North Terminal as well as a brief visit to the McNamara Terminal. Access to the airline spaces and trash rooms was facilitated by a representative from DANTeC. Information and photographs collected during the walk-through were used to establish a baseline of the existing waste and recycling program in the North Terminal (described in **Section 2. Existing Conditions**) and to design the waste sort.

B. Sample Size and Distribution

A waste sort sample of considerable size was required to provide statistically significant information. Based on information provided by WCAA, the North Terminal generates approximately 1,550 tons (3,133,000 pounds) of waste per year. Past case studies and waste sorts show that airlines generate approximately 44 percent of the waste generated at an airport (20 percent deplaned and 24 percent other) and public areas contribute about 35 percent. Concessions and administration spaces contribute 18 percent and three percent, respectively; however, these spaces were not included in this study. **Table 1: Estimated Waste Generation at DTW North Terminal by Space Type** shows the estimated amount of material generated by each area type based on the industry average percentages.

Approx. Total North Terminal (pounds)	Airline			Public Areas	Concessions	Administration
	Deplaned	Other Airline	Total			
	20%	24%	44%			
3,133,000	626,600	751,920	1,378,520	1,096,550	563,940	93,990

A statistical analysis indicated that a total sample size of approximately 1,750 pounds would provide statistically significant waste sort results. Assuming an average trash bag weight of seven pounds, a sample of this size would equal 190 average bags. To account for variations in bag weight, 250 bags were requested. See **Appendix A** for more information about sample size calculation.

C. Identification of Material Categories

Once the sample size had been determined, the different categories that the sample material would be sorted into were identified. Based on information provided by DANTeC's waste management contractor, the following items can or cannot be recycled under the current agreement:

RECYCLABLE

- **Paper Stream:**
 - *Computer Paper / Computer Print Out*
 - *White Ledger*
 - *Tab Cards*
 - *Colored Ledger*
 - *Newspaper / Old News Print*
 - *Miscellaneous Paper*
 - *Mixed Waste Paper*
 - *Shredded paper*
- **Metal Stream (scrap metal):**
 - *Non-Ferrous Metals*
 - *Ferrous Metals*
- **Co-Mingled Stream:**
 - *Plastics:*
 - *PET (SPI = 1)*
 - *HDPE (SPI = 2)*
 - *PVC (SPI = 3)*
 - *LDPE (SPI = 4)*
 - *Polypropylene (SPI = 5)*
 - *Polystyrene (SPI = 6)*
 - *Other (SPI = 7)*
 - *Corrugated Cardboard*
 - *Paper bags*
 - *Paper towel/toilet paper cores*
 - *Linerboard/Pressboard/ Paperboard*
 - *Aluminum*
 - *Metals, Excluding Aluminum*
 - *Tin Coated Steel Containers*
 - *Bimetal Containers*
 - *Metal Jar Lids and Bottle Caps*

NOT RECYCLABLE

- **Glass** (clear, green, brown, or mixed)
- **Paper Products**
 - *Facial Tissue ("Kleenex")*
 - *White paper towels or napkins*
 - *Unbleached or natural paper towels or napkins*
- **Other waste**
 - *Paperback books*
 - *Plastic bags*
- **Food Waste**
- **Liquids**
- **Styrofoam**

MANAGED UNDER SEPARATE SPECIFIC PROGRAMS (excluded from this study)

- *Universal waste*
- *Bulk items*
- *Construction and demolition debris*
- *Hazardous waste*
- *Bio-hazardous waste*
- *E-waste*
- *Yard waste*



In addition to the material categories listed above, unopened packaged food, beverages, and toiletries that could potentially be recovered for donation to a charitable organization were measured separately.

D. Sample Collection

Collection of the waste sort samples was coordinated by WCAA and DANTeC and completed by ISS and WCAA staff. The sample collection instructions provided those staff for are included in **Appendix B: Sample Collection Instructions**. Samples were collected from the following areas:

- Public Areas:
 - *Curbside*
 - *Check-In Area/Circulation*
 - *Sterile Circulation*
 - *Ticketing*
 - *Pre-Security Restrooms*
 - *Security Checkpoints*
 - *Sterile Restrooms*
 - *Gate Waiting Areas*
 - *Baggage Claim*
- Airline Areas:
 - *Behind Ticket Counters*
 - *Gate Stations*
 - *Office Areas*
 - *Breakrooms*
 - *Deplaned Waste*
 - *Ramp Space*

Labels for the sample bags were designed by Mead & Hunt and provided to ISS and the airlines by WCAA. Each label provided information about the sample, including area type, space category, sample number, etc. An example of the labels is included in **Appendix C: Sample Bag Label**.

E. Material Sort

Over the course of three days, staff from Mead & Hunt sorted and measured the provided samples. In total, the contents of 217 bags containing 1,727 pounds of solid waste were sorted. During the waste sort, each sample bag was weighed and then opened. The contents of each bag were sorted into the different material categories and then each category was weighed to determine its proportion of the overall weight. **Appendix D: Physical Material Sort Procedure** provides the procedure for the physical material sort and photos of this activity.

After the sort was completed, all of the waste material was disposed of by ISS at the airport in one of the trash room compactors. Liquid waste was collected each day during the sort and disposed of by ISS.

F. Data Analysis

Following the waste sort, the resulting data was analyzed to identify trends and calculate waste stream composition for the specified areas. The data from 205 bags totaling 1,698 pounds of waste was evaluated¹.

¹ Twelve of the sample bags (totaling 28.8 pounds) were excluded from the data analysis because they each had a greater than 20 percent difference between pre-sort weight and a total weight of the components (greater than 20% error).

4. Waste Sort Data Analysis and Results

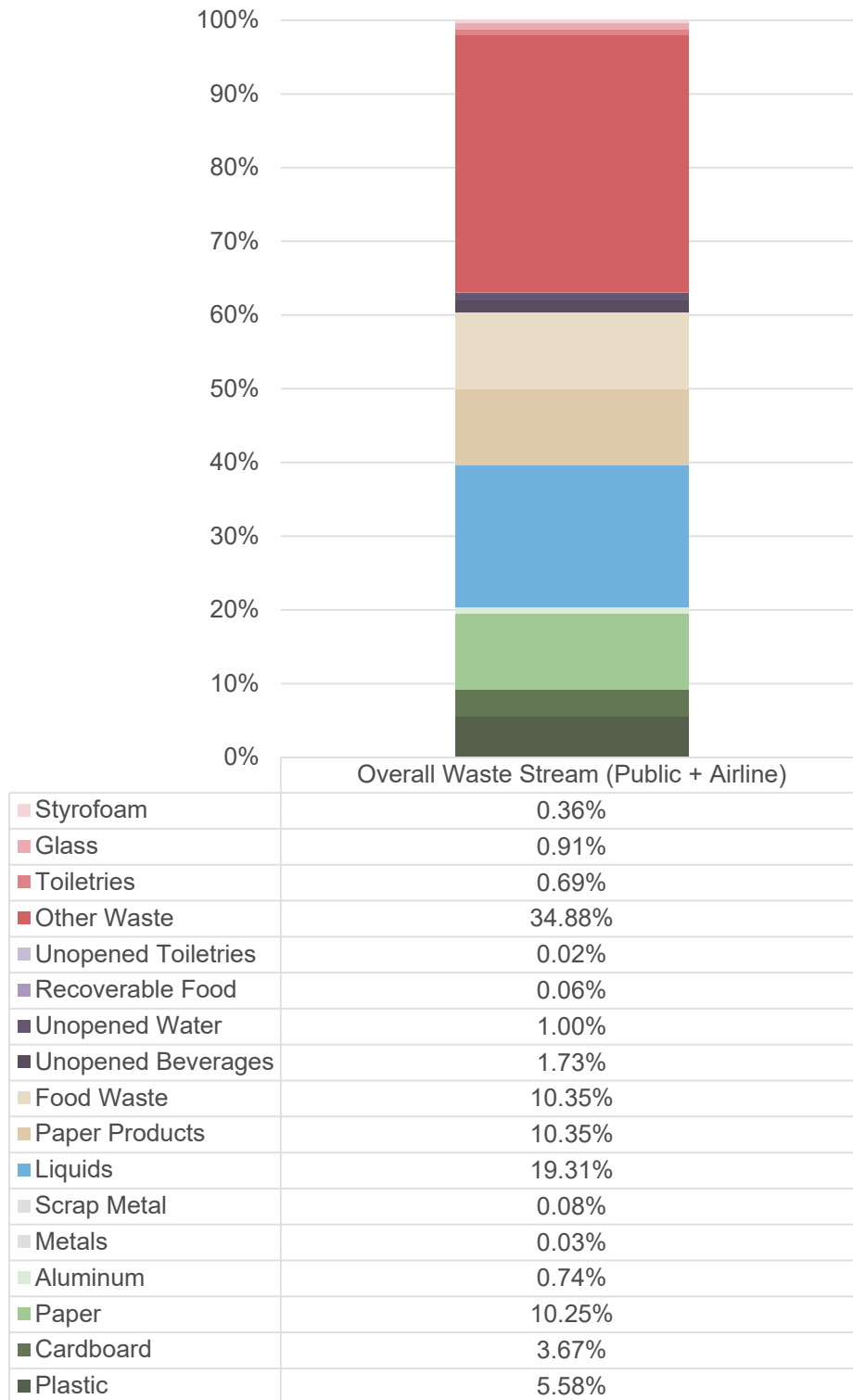
A. DTW North Terminal Waste Characteristics

Of the sample bags sorted, the average bag weight was 8.29 pounds; the smallest bag was 0.15 pounds and the largest was 67.6 pounds. All of the recyclable and non-recyclable materials listed in **Section 3C. Identification of Material Categories** were found in the sample bags. The sample bags also contained some of the materials listed as managed under separate programs (for example, e-waste such as computer and electronic cords and universal waste like batteries).

B. DTW North Terminal Waste Stream Composition

Based on the results of the waste sort, the composition of the overall waste stream generated in airline and public/passenger spaces at the DTW North Terminal is shown in **Figure 1: Waste Stream Composition DTW North Terminal Public / Passenger and Airline Spaces**. The waste stream is made up of approximately 40 percent “other waste” and trash and 60 percent compostable items, liquids and recyclable materials. The most prevalent recyclable material in the overall waste stream is paper. Liquids and compostable items (food waste and paper products like paper towel, paper napkins and tissue) contribute a considerable amount to the overall stream.

Figure 1: Waste Stream Composition
DTW North Terminal Public/Passenger and Airline Spaces



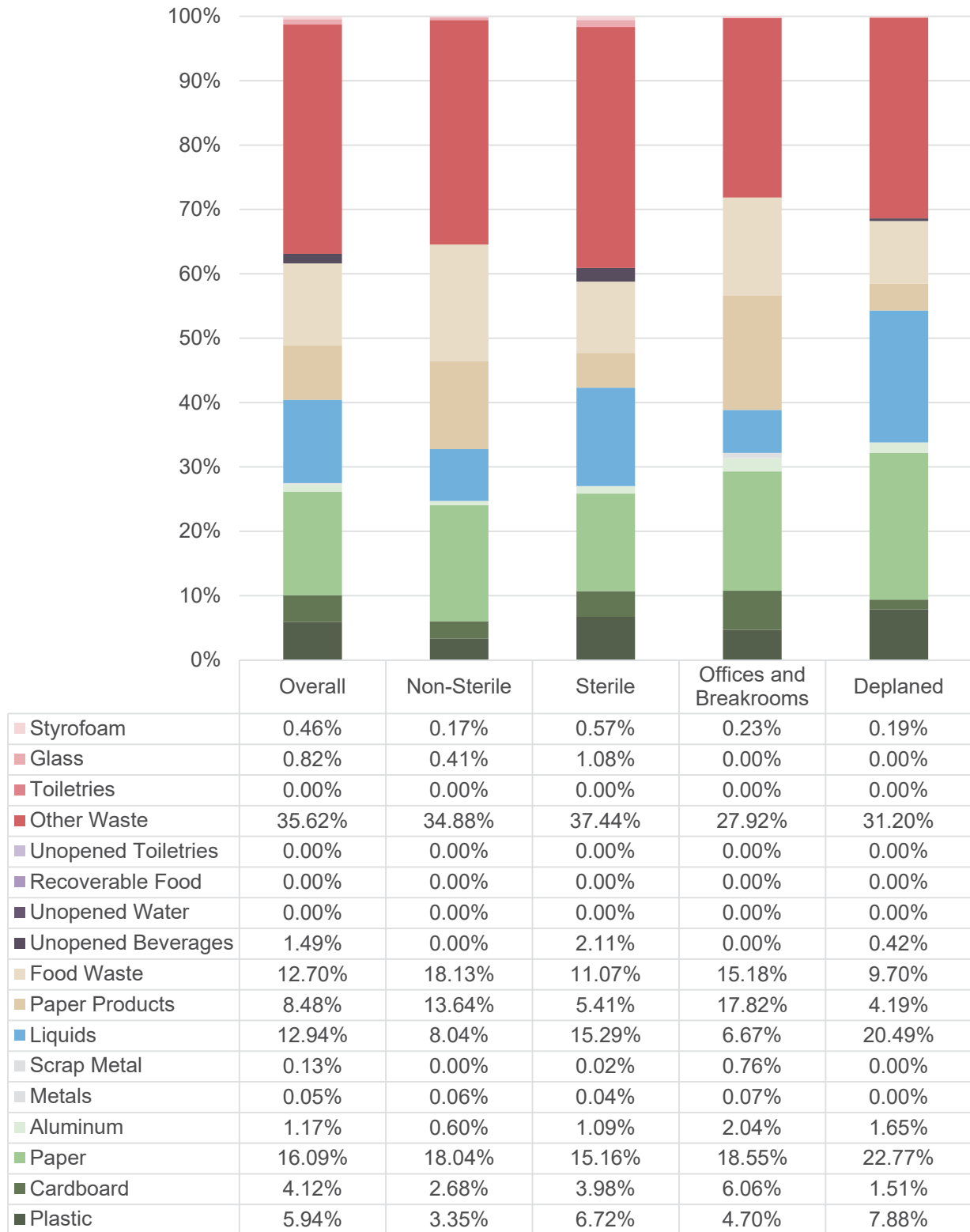
Applying the percentages calculated from the waste sort data to the entire waste stream generated from the airline and public spaces in the North Terminal results in estimated total annual generation by material by weight as shown in **Table 2: Estimated Total Annual Waste Generation by Material DTW North Terminal Passenger / Public Spaces and Airline Areas**. Due to Michigan’s can and bottle deposit program, the amount of aluminum present is lower than would be expected at an airport in another state.

Table 2: Estimated Total Annual Waste Generation by Material DTW North Terminal Passenger / Public Spaces and Airline Areas			
Stream / Material	Pounds	Tons	Percentage (%)
<i>Estimated Total</i>	<i>2,575,400</i>	<i>1,287.70</i>	
Other Waste	898,192	449.10	34.88%
Liquids	497,396	248.70	19.31%
Paper Products	266,564	133.28	10.35%
Food Waste	266,492	133.25	10.35%
Paper	264,025	132.01	10.25%
Plastic	143,765	71.88	5.58%
Cardboard	94,430	47.21	3.67%
Unopened Beverages	44,568	22.28	1.73%
Unopened Water	25,678	12.84	1.00%
Glass	23,442	11.72	0.91%
Aluminum	19,092	9.55	0.74%
Other Toiletries	17,759	8.88	0.69%
Styrofoam	9,215	4.61	0.36%
Scrap Metal	1,934	0.97	0.08%
Recoverable Food	1,424	0.71	0.06%
Metals	878	0.44	0.03%
Unopened Toiletries	546	0.27	0.02%

C. DTW North Terminal Airline Areas Waste Stream

Based on the waste sort data, the waste generated in airline areas at the North Terminal is comprised of materials in the amounts as shown in **Figure 2: Waste Stream Composition DTW North Airline Spaces**. This figure includes data from sterile spaces (gate stations, ramp space, and deplaned waste) and non-sterile spaces (behind ticket counters) as well as airline spaces that could be either of these (breakrooms and offices areas). The predominant recyclable and compostable materials generated from airline spaces and activities are paper and food waste. Paper products also contribute considerably to the airline waste stream. As may be expected, the breakrooms and offices generate notable amounts of food waste and paper products while deplaned waste had the largest liquid component compared to the other airline spaces. The amount of food waste and paper products from the non-sterile airline spaces is larger than would be expected based on the airline activities occurring in these areas (primarily ticketing) and the expectation that airline employee dining occurs in the breakrooms.

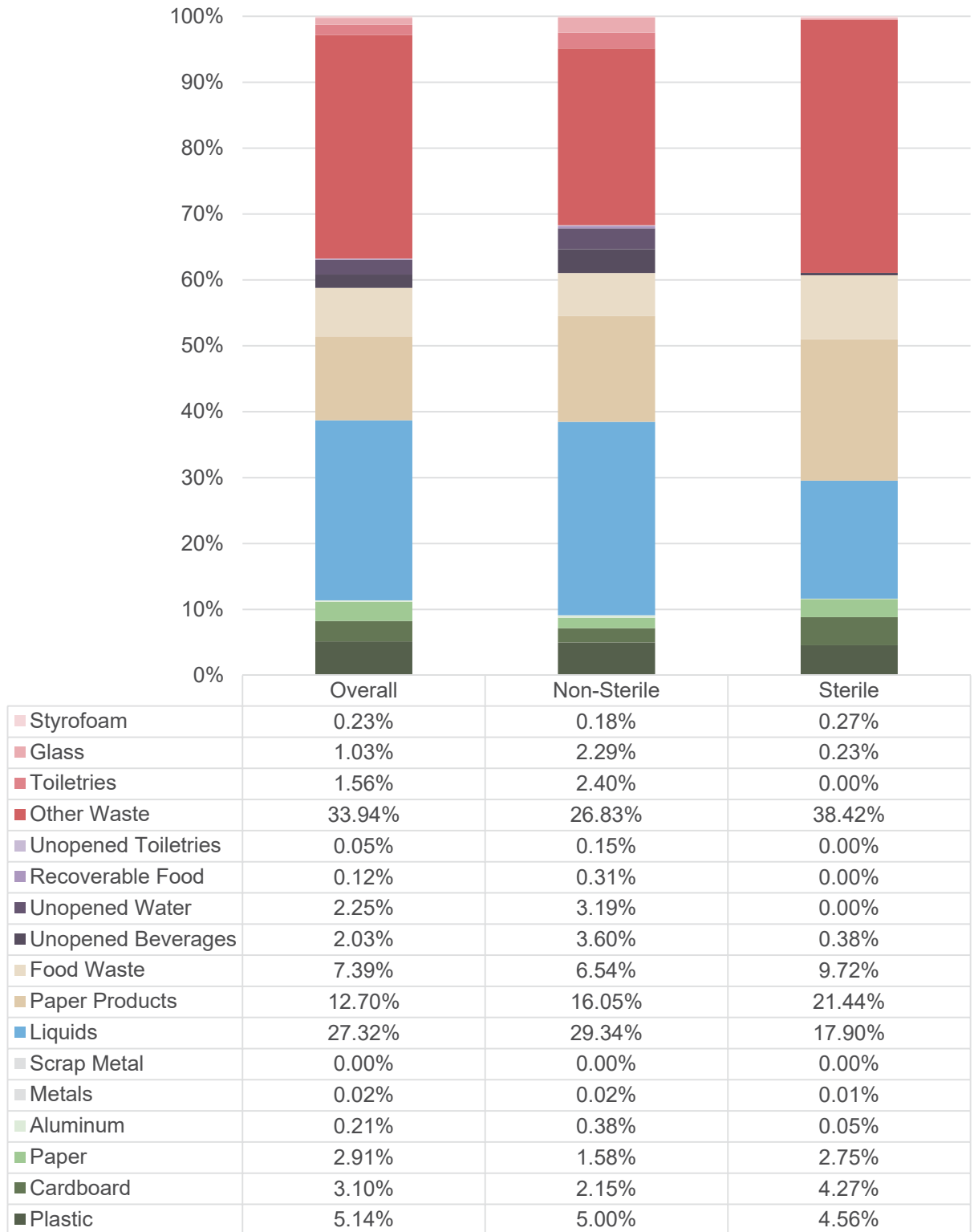
Figure 2: Waste Stream Composition DTW North Terminal Airline Spaces



D. DTW North Terminal Public/Passenger Areas Waste Stream

Analysis of the data collected from the sample bags showed that waste generated in the passenger/public areas of the North Terminal is comprised of materials in the amounts shown in **Figure 3: Waste Stream Composition DTW North Terminal Public / Passenger Spaces**. This figure includes information from sterile spaces (gate areas and sterile restroom) and non-sterile spaces (curbside, ticketing circulation, checkpoint, restroom, baggage claim). One notable difference between the non-sterile and sterile passenger areas is the greater percentage of liquids, unopened beverages, water and toiletries, and recoverable food in the non-sterile waste stream.

Figure 3: Waste Stream Composition DTW North Terminal Public/Passenger Spaces



5. Recommendations

Based on the results of the DTW North Terminal passenger and airline areas waste study, near-term and long-term recommendations were developed to assist the Airport in increasing landfill diversion and reducing the facility's environmental impact resulting from waste generation.

A. Recommendations for North Terminal Waste and Recycling Bins

1) Install liquid collection stations outside the security checkpoints

It is recommended that DTW install one liquid collection station at each of the North Terminal security checkpoints for the disposal of liquids prior to security screening in the near-term.

Recyclable containers containing liquids contaminate other materials, are more difficult to recycle, and may be rejected by a recycler, which will result in them being landfilled. Also, liquids in a waste stream add weight to the waste stream.

The deployment of liquid collection stations would reduce the weight of the waste stream generated in this area and protect recyclable materials. The waste sort data shows a very strong correlation between weight of liquids and the weight of plastics in the waste stream.² This observation suggests that the collection and recycling of other materials in the waste stream can be enhanced with availability of a designated place to empty water bottles and other beverage containers prior to them being deposited in the recycling bins. These stations also encourage passengers to empty their reusable and disposable water bottles and refill them in the sterile area after clearing screening.

Liquid collection stations are available from various manufacturers and can also be fabricated in-house. These stations require maintenance and servicing, specifically emptying into a designated drain.

² The data has a correlation coefficient or "r value" of 0.79 between liquids and plastics. This coefficient ranges from negative one to positive one (-1.0 to 1.0) and the closer the data's coefficient is to either end of this spectrum, the more closely related the variables may be.

Liquid collection stations also provide a benefit to custodial staff. Diverting liquids to a collection station from the waste or recycling stream can reduce the overall weight of waste and recycling bags, which can reduce the frequency at which bags need to be emptied in order not to exceed comfortable or safe handling weights. Diverting the liquids will also reduce the need to reinforce the bags (double bag) due to leaks.

2) Install conjoined three-bin containers in the passenger areas

It is recommended that a network of conjoined three bin containers be installed in the passenger/public areas of the North Terminal.

The use of conjoined containers will help reduce contamination, maintain proper placement, and provide a consistent bin configuration throughout the building. This can be accomplished with a single unit with multiple interior bins or separate bins that can be connected together (i.e. with vendor supplied magnets or connector kits). It is desirable that there be enough bins deployed in the North Terminal to provide convenient access to all passenger areas.

Based on the data from the waste sort, it is further recommended that one compartment be three to four times larger than the two others (1.5 to 2 times larger than the two others together). Ideally, the larger bin should be sized to accommodate landfill bound trash, which makes up on average 60 percent of the current waste stream (36 percent other waste plus 3 percent unopened food, beverages and toiletries plus 21 percent food waste and paper products). Sizing this waste bin to accommodate some of the materials that could be recycled but may not be disposed of in the recycling containers is also desirable. This would leave one of the two smaller bins for paper (including magazines, newspaper, and printer paper) and the second bin for plastic bottles or aluminum cans or both (see item four below).

The recycling program can benefit from bin lids with specific openings for different streams as these have been shown to reduce contamination. The larger waste bin should have a large opening for waste and the small recycling bins should have a small hole for bottles/cans and a slot for paper.

Color coding should also be incorporated into the bin and/or lid design. Blue should be used for the bins for bottles/cans and paper and grey or black for trash (reserving green for future organics/composting). If the containers are all ordered in the same color and the lids are designed with different colors, they will have a consistent look and the program can be changed by changing the lids versus replacing all the cans.

The ideal container set up would have a 20 percent paper, 20 percent bottles (and cans) and 60 percent waste sizing scheme. However, commercially available standard sizes may provide a ratio closer to 25 percent, 25 percent and 50 percent. This ratio would work in the DTW North Terminal as long as the waste bin is larger than the other two. This ratio can also be achieved by designing stations with two recycling bins (one for paper, one for bottles/cans) and two trash units if they are all the same size (four bins in total for three streams). This configuration would also allow WCAA to convert one of the trash bins into an organics/composting collection bin in the future. The mock-ups below (**Figure 4: Potential Waste and Recycling Bin Configuration Options**) show a few potential configurations that could work for the waste and recycling bins.



Figure 4: Potential Waste and Recycling Bin Configuration Options

3) Install instructional signage on containers and throughout terminal

In order to increase and improve participation in the recycling program, it is recommended that DTW design and install clear, concise, color-coded signage on the conjoined three-bin containers as well as throughout the terminal.

Signage provides recycling instructions and additional information, which can help reduce contamination and encourage participation. Signage that acknowledges the extra effort recycling requires or describes a facility's progress toward recycling goals has been shown to further improve participation.

An acknowledgment of the extra effort required by recycling and descriptions of DTW's recycling rate as well as the WCAA sustainability logo could be incorporated into the bin labels, posters, and other signs. Vinyl clings or large stickers on the faces of the containers will allow for consistent application in the container arrangements throughout the terminal and can be changed as the program develops.

4) Collect trash and recycle paper, and beverage containers from passenger areas

For the passenger areas, it is recommended that DTW collect trash, and recycle paper (primarily magazines and newspapers) and beverage containers.

Paper was not as prevalent as beverage containers (by weight) in the waste stream, but it is a material that may be considered more valuable than other recycled materials. Coordination with ISS and the waste hauling contractor is needed to plan the logistics of collecting paper as a separate stream from other materials (specifically trash and beverage containers that can contaminate these materials).

Further coordination with the waste hauling contractor is needed to determine whether a stream containing only plastic bottles is desirable given current market conditions and whether such a stream would be kept segregated (versus being mixed with other comingled materials). If the stream is acceptable to the contractor and can be kept segregated, one of the bins in the conjoined container should be labeled for "Plastic Bottles."

If a plastics-only stream is undesirable or would be mixed with other comingled materials during sorting at the contractor's facility, the collection at DTW could also include the small number of aluminum cans that are not removed by employees or that do not have a deposit under the State of Michigan's program (for example, fruit juice or water in an aluminum can). Under this scenario, one of the smaller bins in the conjoined container should be labeled for "Plastic Bottles and Aluminum Cans."

Even if the paper and beverage container streams are going to be co-mingled on-site (for example, in a compactor or dumpster in a trash room) or by the contractor, separate bins are still recommended because they have been shown to reduce contamination overall.

5) Collect trash, paper and beverage containers from airline areas

Similar to the passenger area recommendation, it is recommended that DTW collect trash, paper and beverage containers from the airline areas. Further coordination with DANTeC and the airlines will be required to determine how to configure these elements while continuing existing paper and aluminum can collection.

6) Provide training and educational opportunities for airline staff and DANTeC employees

In order to introduce new strategies and answer questions about the recycling program, it is recommended that WCAA implement a training program for airline staff and DANTeC employees.

A training program will promote program participation and compliance, resulting in increased recycling and reduced contamination. Content of the training sessions should be standardized to provide a consistent message. Information from the waste collection contractor should be incorporated into the training program. In addition, different stakeholders in the recycling program should be asked to provide content or to present. This program would work best if offered at times that are convenient for attendees' schedules and, if possible, combined with other trainings to use employee time efficiently.

B. Additional Near-Term Recommendations

1) Centralize recycling collection

The remote location of Trash Room Five may discourage proper disposal of recyclables collected from within the terminal. It is recommended that DTW evaluate reconfiguring the existing trash rooms so that recycling is centrally located (i.e. set up in Trash Room Three) and the waste compactors are arranged in the other trash rooms to the north and south (Trash Rooms One, Two, Four, and Five). This reconfiguration would reduce the travel distance to the trash room designated for recycling and increase compliance with the recycling program by all users.

2) Collect unopened water, other beverages, food and toiletries for donation outside security checkpoints

It is recommended that WCAA investigate the feasibility of collecting unopened bottles of water, other beverages, food and toiletries that are restricted from carry-on luggage and donating them to a local charity or other organization. In compliance with TSA requirements, these items may need to be collected prior to the security checkpoint queuing area. In order to implement this recommendation, coordination between WCAA, a representative from TSA, and the designated receiving organization would be needed.

3) Encourage aluminum can returns

It is recommended that WCAA allow separation and collection of redeemable containers to continue because these containers are recycled after they are redeemed, which is the ultimate goal of a recycling program. It may be possible to collect the non-redeemable containers with plastic bottles, pending the waste hauling contractor's program (see above).

In 1976, the State of Michigan enacted the Michigan Beverage Container Act to reduce roadside litter, clean up the environment and conserve energy and natural resources. This act covers beer, soft drinks, carbonated and mineral water, wine coolers, and canned cocktails in any airtight metal, glass, paper, or plastic container under one gallon in size. A deposit of 10 cents is added to the purchase price of these beverages and returned when the containers are redeemed.

Based on the data from the waste sort, it appears that aluminum cans are efficiently being scavenged from the waste stream. The aluminum cans that were found included those that had contained beverages not covered under Michigan's Container Act (fruit juices and water, for example). These containers are recyclable; they are not redeemable for the deposit.

4) Encourage use of sinks to empty containers before recycling or throwing away

As discussed above, liquids in the waste stream add extra weight to the trash bags and contaminate recyclable materials. For the airline spaces, WCAA should post simple signage asking employees to empty their beverage containers (for example, in a breakroom sink) before recycling it and to throw away any container they do not empty (so as not to contaminate the recycling stream). The signage for this campaign should explain that dry waste and recycling is easier to manage and process while helping employees understand why this extra step is important to the program.

5) Collect cardboard from airlines for recycling

It is recommended that WCAA consider providing a centralized location for the collection of cardboard and offering this service to the airlines to encourage consistent recycling of this material. The airlines generate a respectable amount of cardboard, which has had a fairly steady value in the recyclables market. Coordination with the waste collection contractor would be needed to determine the specifics of this element.

6) Landfill glass, open toiletries, Styrofoam and other waste

It is recommended that WCAA continue to landfill glass, open toiletries, Styrofoam, and other waste generated at the North Terminal.

While glass is recyclable, at this time the cost to manage and handle this fragile, heavy material, coupled with its low value in the market make it undesirable in many recycling programs. In addition, broken glass contaminates other recyclable materials and can cause issues in a sorting facility. If the market and infrastructure for glass improve, WCAA should work with their waste collection contractor to evaluate including this material in the recycling program.

C. Long Term Recommendations – Specific Materials

1) Collect cardboard from concessionaires and retail tenants

Although these areas were excluded from the sort, the cardboard program described above should be expanded to the terminal tenants as a second phase. This would increase the quantity of cardboard collected. Other airport waste studies have shown that cardboard is one of the most prevalent materials in the waste stream generated by concessionaires (restaurants) and retail stores.

2) Evaluate composting or other processing of paper products and food waste

Once the recycling program at the North Terminal is established, it is recommended that WCAA evaluate adding a composting or processing element. Paper products, such as napkins, paper towel and facial tissue, and food waste (including food scraps from food preparation activities) can be composted in a commercial facility. In some airports, these materials are collected in the terminal and processed off-site by a composting facility. Other processing technology, for example, digesters and treatment systems, are becoming more available and being used at aviation facilities, such as flight meal prep kitchens. Further investigation into the availability of a commercial composting facility or other processing technology and collection services for these materials would be needed when WCAA was ready to consider this additional element.

3) Evaluate glass program when markets improve and systems become available

As noted above, glass is currently undesirable in many recycling programs. It is recommended that WCAA and DANTeC coordinate with their waste collection contractor to receive notification if the market improves. At that time, WCAA could evaluate how to add glass collection to the recycling program.

4) Evaluate Styrofoam options

Use of Styrofoam has been banned from use in some airports, specifically by concessionaires and restaurants. At this time, Styrofoam makes up a small portion of the overall waste stream (by weight). This may indicate that few of the terminal tenants are using Styrofoam. WCAA could be approached to substitute another more environmentally friendly material, however, this is a low priority recommendation.

D. Long-Term Recommendations – Overall Program

1) Set recycling, diversion, waste reduction or other waste objectives

It is recommended that WCAA set recycling, landfill diversion, waste reduction or other waste objectives to guide recycling program efforts. These objectives could be established during the development of a facility-wide sustainability plan. The waste sort completed under this study provides baseline information for the airline and passenger areas and should be replicated for the tenant spaces. At some airports, the city that owns the facility has an overall city-wide recycling or diversion goal; in other cases, the airport has proactively set their own independent metrics. WCAA has not been mandated to meet a particular recycling level, but can draw inspiration from the State of Michigan’s 30-percent recycling goal or another appropriate benchmark. Progress toward such goals does require tracking, but can also provide information on progress and improvements, which can be a valuable marketing and education tool.

2) Maintain training and education program and expand to other tenants

Once a training and education program is implemented, it is recommended that WCAA actively maintain such a program to facilitate its continued success. The content of trainings should be updated as the program changes and grows. Additional tenants can be included in the training program as new strategies that impact their activities are implemented. Providing users of the recycling program with clear, actionable information facilitates their participation and compliance and provides a mechanism to receive feedback and ideas for improvement.

3) Collaborate with DANTeC and waste hauler to optimize program

It is recommended that WCAA consider formalizing their collaboration with DANTeC and the waste collection contractor to optimize and monitor the recycling program. A more formal collaboration is likely to lead to improvements and expansion of the program and therefore result in reduced costs and/or improved environmental stewardship.

4) Conduct follow-up waste sort to evaluate progress

Once selected strategies are implemented, it is recommended that WCAA conduct a follow-up waste sort during the next three to five years to evaluate progress and identify additional opportunities for improvement.

6. Conclusion

Results from the material sort, facility walk-through, and informal interviews helped identify areas of waste management where WCAA should focus effort and resources. These recommendations, when implemented, are designed to help the WCAA to increase landfill diversion and recycling, providing social, economic, and environmental benefits to DTW and its community. In order to realize the benefits of the recommendations described in this report, implementation of these strategies will need to be phased and appropriately timed based on existing conditions and available resources. Collaboration with DANTeC's waste and recycling management contractor will be important to the success of these strategies.

It is important to note that additional strategies might make sense to implement over a long-term basis, as waste management at a complex facility like DTW is dynamic and recommendations that may not be prudent now could become feasible in the future. Therefore, it is recommended that in addition to the strategies listed above, that WCAA periodically evaluate its program to determine if the program elements are working as expected. If the program is not performing as expected, a waste sort can help identify further areas for correction or improvement. By checking results and adjusting course as needed, WCAA can create a truly dynamic and sustainable waste management program.

7. Resources

A. Airport Case Studies

Atkin, Peter. *How Airlines and Airports Can Clean Up Their Recycling Programs*. Rep. Natural Resources Defense Council, Dec. 2006. Web.

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B. Recycling Signage Research

Katzev, R. & Mishima, H.R. (1992). *The use of posted feedback to promote recycling*. Psychological Reports, 71(1), 259-264.

Werner, C.M., Stoll, R., Birch, P., & White, P.H. (2002). *Clinical validation and cognitive elaboration: signs that encourage sustained recycling*. Basic and Applied Social Psychology, 24, 185-203.



Results and Recommendations Report

[FINAL]

March 2017

Detroit Metropolitan Airport McNamara Terminal Waste Composition Study



DETROIT METRO • WILLOW RUN
WAYNE COUNTY AIRPORT AUTHORITY

Report
Prepared by

**Mead
& Hunt**

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Executive Summary

Wayne County Airport Authority (WCAA), operator of Detroit Metropolitan Airport (DTW or Airport), is in the process of completing an Airport Master Plan project for the facility. Planning for issues related to recycling and waste management is required under such a project per the FAA Modernization and Reform Act (FMRA) of 2012. As a result, Leigh Fisher, the master planning consultant for DTW, subcontracted with Mead & Hunt to conduct the waste composition study described in this report as well as to develop a comprehensive Airport Recycling, Reuse, and Waste Reduction Plan in order to meet the FMRA requirements (available under separate cover). The goal of the waste composition study was to evaluate the existing waste stream generated in the McNamara Terminal and supplement information collected during a previous study in the North Terminal. The goal of the overall plan was to document the existing practices at the Airport and recommend strategies to increase landfill diversion through recycling and other approaches.

To evaluate the composition of the waste stream generated at the McNamara Terminal (and to inform the overall Airport recycling plan), a waste sort, a facility walk-through, and informal interviews with stakeholders were conducted to develop a baseline and identify areas of opportunity for increasing recycling participation and compliance in order to better divert waste from the landfill. The baseline information and identified opportunities were the basis for recommendations appropriate for the terminal's waste stream. Data collected during this project indicates the existing McNamara Terminal waste stream contains approximately 19 percent recyclables and 81 percent waste. The waste component is made up of liquids (16 percent); compostables including food waste and paper products (24 percent); and other waste (42 percent) such as trash and Styrofoam. Using this data, a number of recommendations were identified to increase recycling in the North Terminal.

Highlights of near-term recommendations include:

- Increase stakeholder involvement
- Provide training and education
- Evaluate compactor convenience
- Address airline administration, deplaned, and airline area recyclables
- Plan for liquids
- Continue and improve food donation program

The following are longer-term recommendations to support overall program continuity and strength:

- Pilot then expand composting program
- Expand recycling program

This range of recommendations will allow the Airport and stakeholders the flexibility to implement those which are compatible with changing conditions and available resources, while providing the opportunity to position DTW's McNamara Terminal to increase landfill diversion and recycling over time through a phased, comprehensive program.

1. Introduction and Purpose

Detroit Metropolitan Airport (DTW or Airport) is a large hub commercial service airport located in the city of Romulus in Southeast Michigan. DTW is operated by the Wayne County Airport Authority (WCAA). The Edward H. McNamara Terminal (McNamara Terminal) supports the operations of Delta, Virgin Atlantic, and Air France and the North Terminal supports the operations of American, Spirit, United, Southwest, Frontier, Jet Blue, Lufthansa, and Royal Jordanian. There were more than 33 million passengers and 379,000 aircraft operations at DTW in 2015.

Delta manages terminal operation and maintenance and support for the airlines in the McNamara Terminal. Delta contracts with ABM for building maintenance and ABM subcontracts Diverse Facility Solutions (DFS) to provide janitorial cleaning services in the McNamara Terminal, including the collection of solid waste (trash) from public and airline spaces. Delta also contracts with Prospect Airport Services (Prospect) to provide aircraft cabin cleaning services.

In October 2016, airport consultant Leigh Fisher contracted with Mead & Hunt to conduct a waste stream composition study for the McNamara Terminal, including waste generated in airline administration areas, other airline areas, and aboard inbound domestic flights (deplaned waste); public passenger areas, restrooms, restaurants, and retail areas. The purpose of the study is to provide waste stream composition information and recycling program recommendations. This study included solid waste (trash and recyclables) and excluded hazardous waste and other special wastes. It also excluded waste generated in other areas of the terminal (parking lots, etc.) and other airport buildings. The results of this study are intended to inform the development of a terminal-wide recycling plan and supplement information collected during a waste sort conducted at the North Terminal for inclusion in an overall Airport Recycling, Reuse, and Waste Reduction Plan. Some of the information and recommendations contained in this report may be applicable to the North Terminal and other areas of the Airport as well.

Activities conducted under this study included visual observations of existing conditions; interviews with WCAA and Delta staff; and a waste sort. The waste sort included the physical sort and measurement of a sample of the terminal's waste stream to establish a characterization of its composition.

2. Existing Conditions

Delta Air Lines (Delta) operates and maintains the McNamara Terminal under an agreement with WCAA. Delta contracts with ABM for facility maintenance and Prospect for aircraft cabin cleaning services. ABM contracts with DFS for janitorial /facility cleaning services.

In the passenger areas of the McNamara Terminal (curbside, circulation, security checkpoints, gate areas, and baggage claim), recycling bins/trash cans are provided at various locations. The recycling bins are conjoined into three stream stations, with a bin each for beverage containers or “bottles & cans,” “paper,” and garbage or “litter.” These stations have openings of different shapes in their lids (a round hole for beverage containers, a rectangular slot for paper, and a square opening for garbage. Based on interviews with WCAA staff, the DTW Dockmaster, Delta and their partners may have removed some conjoined recycling containers due to contamination issues (waste materials in the recycling bins). The garbage bins in these areas are tall, round, and grey or silver cans with a round opening in the lid; these containers are not labeled. There are also waste bins in the terminal restrooms.

Waste placed in the containers in the public areas is collected by DFS and taken to a trash compactor, typically located in a trash room in the lower level of the terminal, or a dumpster outside the terminal. There are more than 20 dumpsters and compactors located at the McNamara Terminal. Recyclable materials placed in the recycling stations are also collected by ABM and transferred to one of four trash rooms designated and equipped with a compactor for recyclable materials.

In the airline areas of the McNamara Terminal (administration offices, ticket counters, gate stations, breakrooms, and other offices), trash cans and paper recycling bins are available. These containers are emptied by DFS and the material collected from these spaces is taken to the appropriate trash rooms and compactors. Delta also utilizes a dedicated contractor who shreds and recycles paper material. In some cases, aluminum cans are managed by airline employees who collect the deposit as a fundraising effort.

Waste and recyclable materials generated aboard flights arriving at the McNamara Terminal are managed by Prospect. This waste is also taken to the appropriate trash room compactors.

In 2016, WCAA was awarded a grant by the Michigan Department of Environmental Quality to address food waste at DTW. The resulting food recovery program is operated by staff from WCAA Environment and Sustainability Department and diverts unwanted food from the landfill to a local food pantry. To date, the program has captured and donated nearly 10,800 pounds of food from three concessionaires and Delta's SkyClub lounge. Using a conversion rate of 1.2 pounds per meal, this represents approximately 9,000 meals.

3. Waste Study

Mead & Hunt staff conducted a facility walk through and waste sort to collect waste stream composition data and establish a basis for recycling program recommendations. The following subsections describe the components of this study.

A. Facility Walk Through

On October 13, 2016, a representative of Delta provided a guided tour of the McNamara Terminal for representatives from Mead & Hunt and WCAA Department of Environment and Sustainability. This walk through included the public/passenger areas, airline spaces, and trash rooms within the McNamara Terminal. Information and photographs collected during the walk-through were used to establish a baseline of the existing waste and recycling program in the McNamara Terminal (described in Section 2. Existing Conditions) and to design the waste sort.

B. Sample Size and Distribution

A waste sort sample of considerable size was desired to provide statistically significant information. Based on information provided by Delta, the McNamara Terminal generates approximately 7,540 of waste per year. Past case studies and waste sorts show that airlines generate approximately 44 percent of the waste generated at an airport (20 percent deplaned and 24 percent other); public areas contribute about 35 percent; concessions and administration spaces contribute 18 percent and three percent, respectively. **Table 1: Estimated Waste Generation at DTW McNamara Terminal by Space Type** shows the estimated amount of material generated by each area type based on the industry average percentages.

Table 1: Estimated Waste Generation at DTW McNamara Terminal by Space Type						
Approx. Total McNamara Terminal (tons)	Airline			Public Areas	Concessions	Administration
	Deplaned	Other Airline	Total			
	20%	24%	44%	35%	18%	3%
7,540	1,508	1,810	3,318	2,639	1,357	226

A statistical analysis indicated that a total sample size of approximately 1,280 pounds would provide statistically significant waste sort results. Assuming an average trash bag weight of eight pounds, a sample of this size would equal 160 average bags. To account for variations in bag weight, 225 bags were requested. See **Appendix A: Sample Size Calculation** for more information.

C. Identification of Material Categories

Once the sample size had been determined, the different categories that the sample material would be sorted into were identified based on the categories used for the waste composition study at the North Terminal. These categories are as follows:

RECYCLABLE

- **Paper:**
 - *Computer Paper / Computer Print Out*
 - *White Ledger*
 - *Tab Cards*
 - *Colored Ledger*
 - *Newspaper / Old News Print*
 - *Miscellaneous Paper*
 - *Mixed Waste Paper*
 - *Shredded paper*
- **Plastic:**
 - *PET (SPI = 1)*
 - *HDPE (SPI = 2)*
 - *PVC (SPI = 3)*
 - *LDPE (SPI = 4)*
 - *Polypropylene (SPI = 5)*
 - *Polystyrene (SPI = 6)*
 - *Other (SPI = 7)*
- **Cardboard**
 - *Paper bags*
 - *Paper towel/toilet paper cores*
 - *Linerboard/Pressboard/Paperboard*
- **Aluminum**
- **Metal, Excluding Aluminum**
 - *Tin Coated Steel Containers*
 - *Bimetal Containers*
 - *Metal Jar Lids*

NOT RECYCLABLE

- **Glass** (clear, green, brown, or mixed)
- **Paper Products**
 - *Facial Tissue ("Kleenex")*
 - *White paper towels or napkins*
 - *Unbleached or natural paper towels or napkins*
- **Other waste**
 - *Paperback books*
 - *Plastic bags*
- **Food Waste**
- **Liquids**
- **Styrofoam**

MANAGED UNDER SEPARATE SPECIFIC PROGRAMS (excluded from this study)

- **Universal waste**
- **Bulk items**
- **Construction and demolition debris**
- **Hazardous waste**
- **Bio-hazardous waste**
- **E-waste**
- **Yard waste**

In addition to the material categories listed above, food waste and paper products that could potentially be recovered for composting were measured separately. Unlike the North Terminal Study, this study did not measure unopened packaged food, beverages, and toiletries that could potentially be recovered for donation due to the low number of samples from the pre-security spaces and food suitable for donation in the restaurant sample bags.

D. Sample Collection

Collection of the waste sort samples was coordinated by Delta and completed by DFS and Prospect staff. The sample collection instructions provided for those staff are included in **Appendix B: Sample Collection Instructions**. Samples were collected from the following areas:

- Delta Administration Offices
- Other Airline Spaces:
 - o Ticket counters
 - o Breakrooms
 - o Non-administration offices
 - o Gate stations
- Deplaned Waste
(inbound domestic flights)
- Terminal Restaurants
 - o Including grab and go, quick serve, and sit down restaurants
- Retail Areas
- Public Areas:
 - o Curbside
 - o Ticketing check in
 - o Baggage claim
 - o Gate areas/holdrooms
 - o Express Tram Stations
 - o Restrooms

Labels for the sample bags were designed by Mead & Hunt and provided to Delta by WCAA. Each label provided information about the sample, including area type, space category, sample number, etc. An example of the labels is included in **Appendix C: Sample Bag Label**.

E. Material Sort

Over the course of three days, staff from Mead & Hunt sorted and measured the provided samples. In total, the contents of 225 bags containing 886 pounds of solid waste were sorted. Due to low average bag weights, the sample size was smaller than designed; a discussion of the adjusted level of significance is included in **Appendix A**.

During the waste sort, each sample bag was weighed and then opened. The contents of each bag were sorted into the different material categories and then each category was weighed to determine its proportion of the overall weight. **Appendix D: Physical Material Sort Procedure** provides the procedure for the physical material sort and photos of this activity.

After the sort was completed, all of the waste and recyclable materials were disposed of by DFS at the Airport in compactors appropriate for the material. Liquid waste was collected each day during the sort and disposed of by the sort team in a stormwater drain identified by Delta.

F. Data Analysis

Following the waste sort, the resulting data was analyzed to identify trends and calculate waste stream composition for the specified areas.

4. Waste Sort Data Analysis and Results

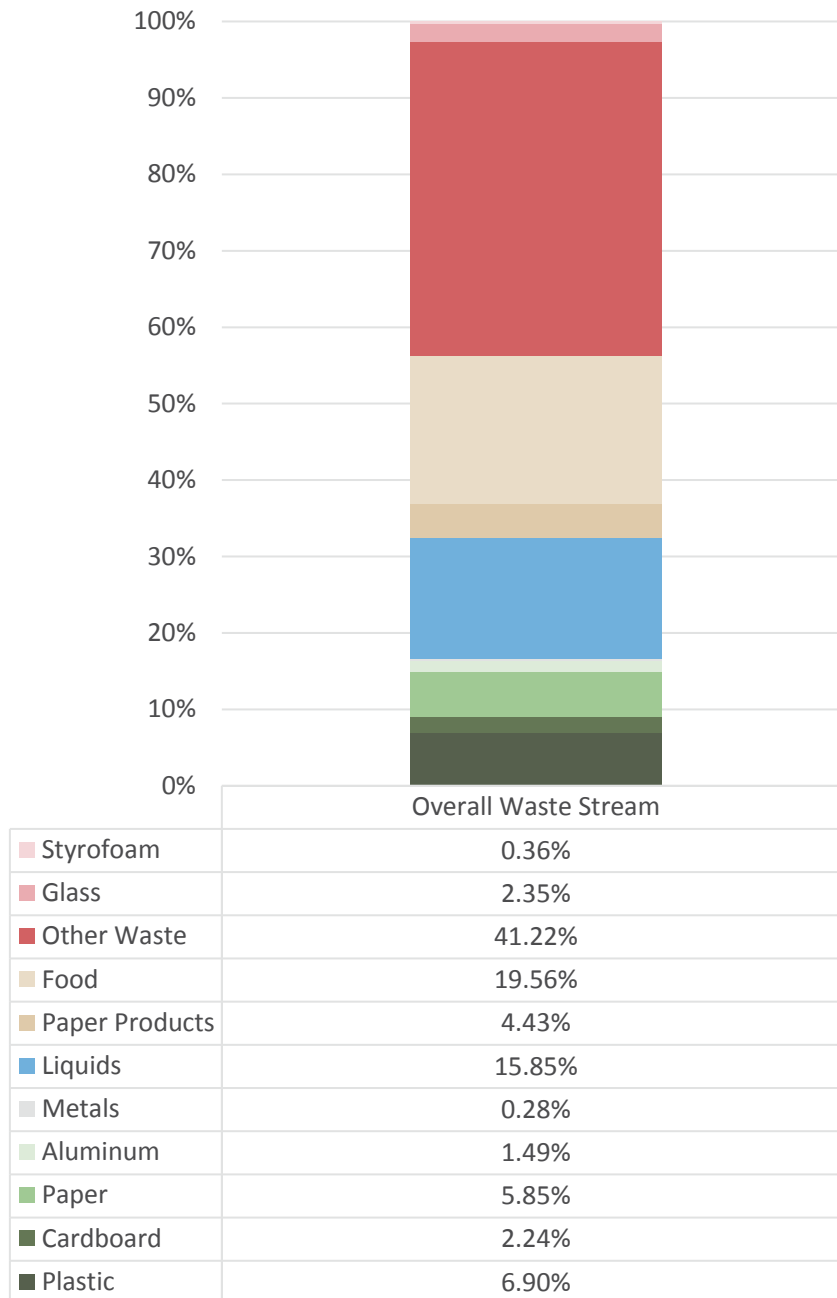
A. DTW McNamara Terminal Waste Sample Characteristics

Of the sample bags sorted, the average bag weight was 3.94 pounds; the smallest bag was 0.10 pounds and the largest was 25 pounds. All of the recyclable and non-recyclable materials listed in **Section 3C: Identification of Material Categories** were found in the sample bags. The sample bags also contained some of the materials listed as managed under separate programs (for example, e-waste such as computer and electronic cords and universal waste like batteries).

B. DTW McNamara Terminal Waste Stream Composition

Based on the results of the waste sort, the composition of the overall waste stream generated by airline administration, airline, deplaned, public/passenger, restroom, restaurant, and retail activities at the DTW McNamara Terminal is shown in **Figure 1: Waste Stream Composition DTW McNamara Terminal- Overall**. The waste stream is made up of approximately 42 percent “other waste” and trash and 58 percent compostable items, liquids, and recyclable materials. The most prevalent recyclable material in the overall waste stream is plastic. Liquids and compostable items (food waste and paper products like paper towel, paper napkins and tissue) contribute a considerable amount to the overall stream.

Figure 1: Waste Stream Composition
 DTW McNamara Terminal - Overall



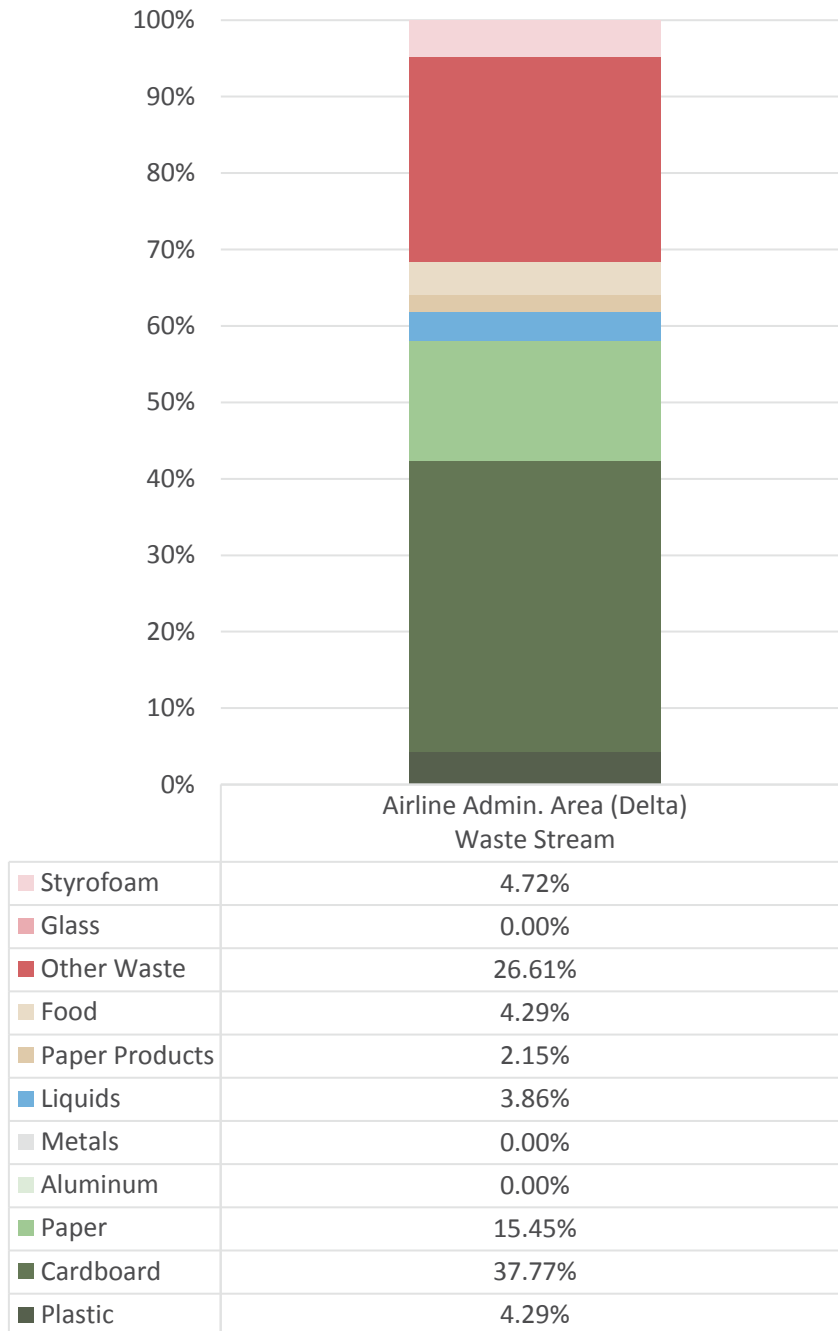
Applying the percentages calculated from the waste sort data to the entire waste stream generated from the McNamara Terminal results in estimated total annual generation by material by weight as shown in **Table 2: Estimated Total Annual Waste Generation by Material DTW McNamara Terminal**. Due to Michigan’s can and bottle deposit program, the amount of aluminum present is lower than would be expected at an airport in another state.

Table 2: Estimated Total Annual Waste Generation by Material DTW McNamara Terminal		
Material	Estimated Percentage (%)	Estimated Quantity (Tons)
Other Waste	41.22%	3,108
Food	19.56%	1,475
Liquids	15.85%	1,195
Plastic	6.90%	520
Paper	5.85%	441
Paper Products	4.43%	334
Glass	2.35%	177
Cardboard	2.24%	169
Aluminum	1.49%	112
Styrofoam	0.36%	27
Metals	0.28%	21
Total	100%	7,540

C. DTW McNamara Terminal Airline Administration Areas Waste Stream

Based on the waste sort data, the waste stream generated in airline administration areas at the McNamara Terminal is comprised of materials in the proportions shown in **Figure 2: Waste Stream Composition – DTW McNamara Terminal Airline Administration Area (Delta)**. The predominant recyclable materials generated in this area are cardboard and paper. Liquids and compostables do not contribute significantly to the airline administration waste stream.

Figure 2: Waste Stream Composition
 DTW McNamara Terminal Airline Administration Area (Delta)

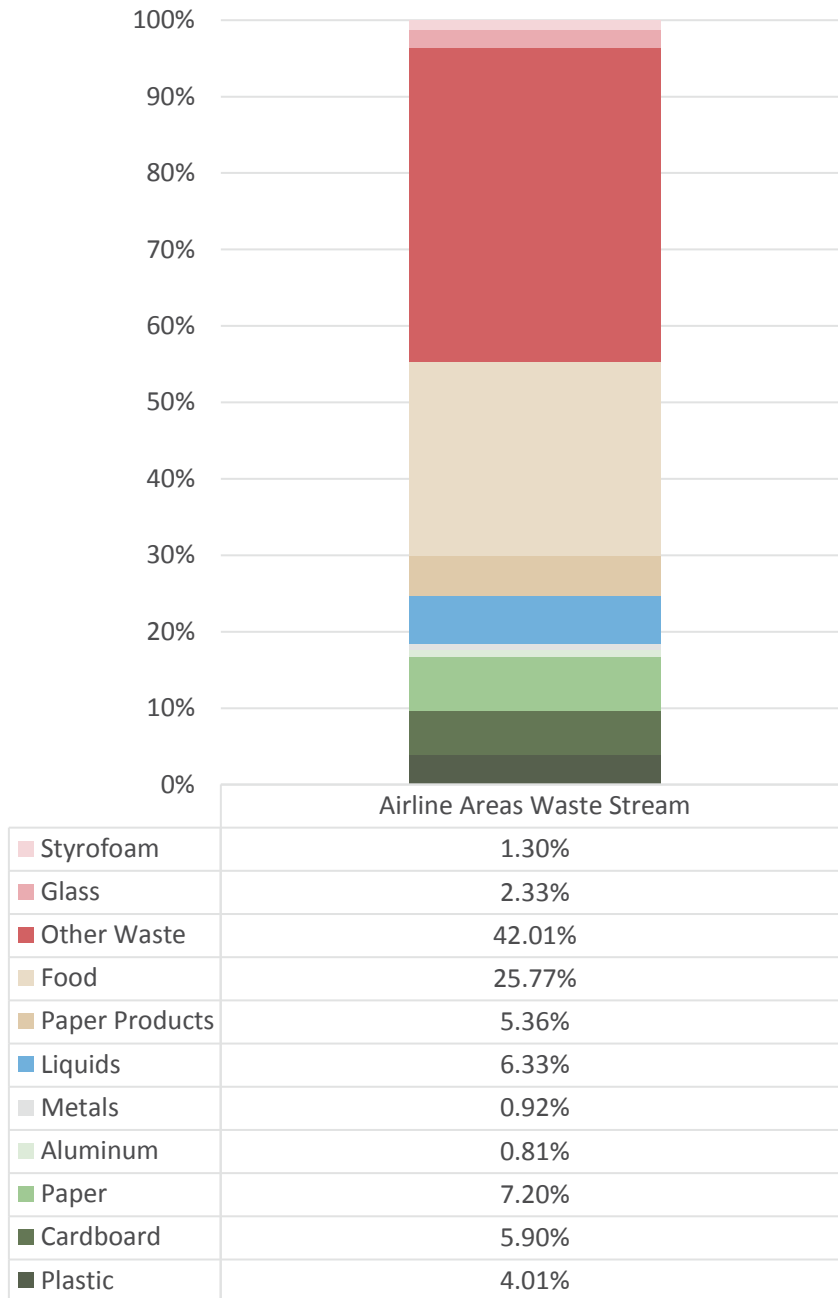


D. DTW McNamara Terminal Airline Areas Waste Stream

Based on the waste sort data, the waste stream generated in other airline areas at the McNamara Terminal is comprised of materials in the proportions shown in **Figure 3: Waste Stream Composition – DTW McNamara Terminal Airline Areas**. This figure includes data from sterile spaces (gate stations), non-sterile spaces (behind ticket counters) as well as airline spaces that could be either of these (breakrooms and non-administration office areas such as Inflight and Flight Services).

The predominant compostable material generated from these spaces is food waste. Recyclable materials, such as cardboard and paper, and liquids also contribute to this stream.

Figure 3: Waste Stream Composition
 DTW McNamara Terminal Airline Areas



E. DTW McNamara Terminal Deplaned Waste Stream

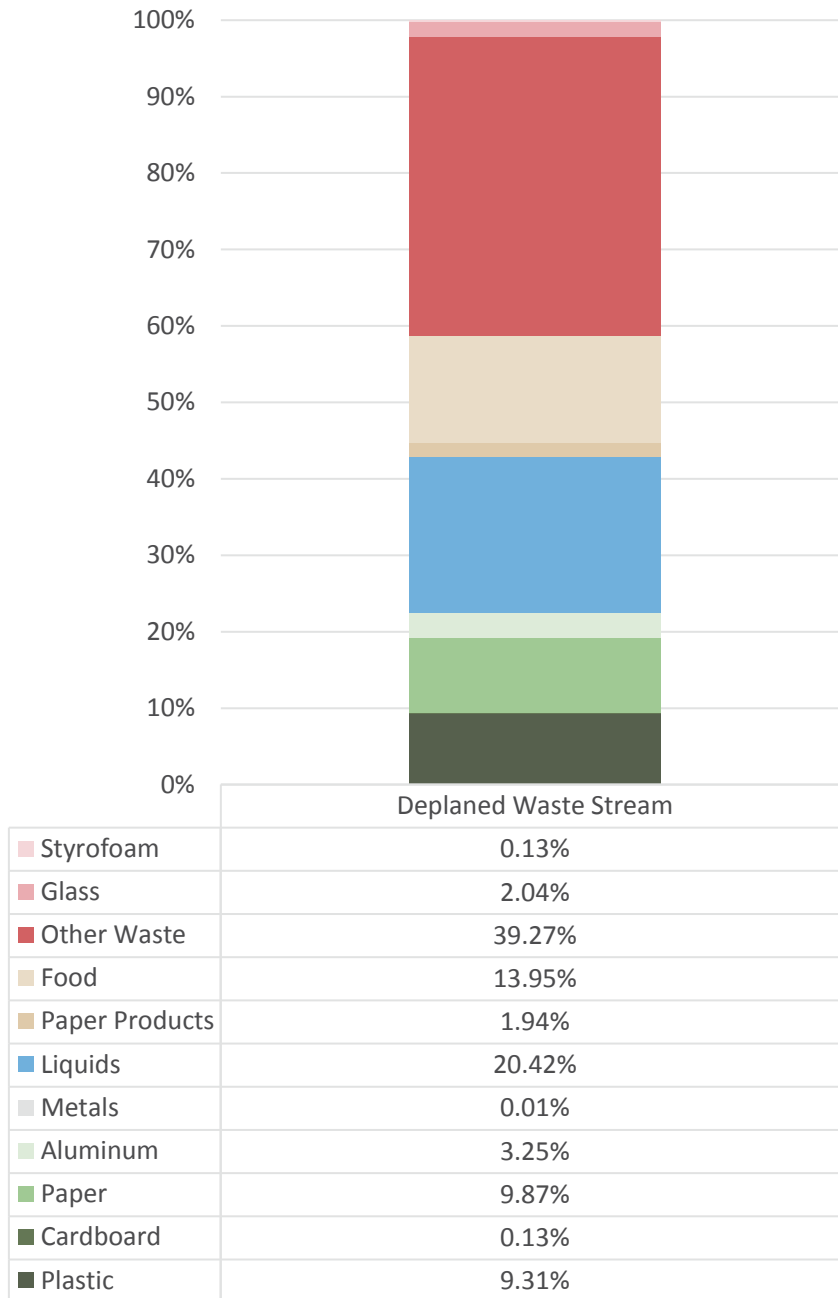
Based on the waste sort data, the waste stream generated aboard arriving domestic flights is comprised of materials in the proportions shown in **Figure 4: Waste Stream Composition – DTW McNamara Terminal Deplaned Waste (Domestic)**. Liquids contribute significantly to this waste stream; food waste, plastic, and paper are also present in notable amounts.

The materials found in the deplaned waste stream are as can be expected based on the food and beverage services offered on board: cans, large water bottles, airline snacks, coffee filter packs (coffee grounds and filter in one packet), and plastic cups. Other prevalent materials included hand towels and blankets, which may be suitable for donation.

Of specific note, the waste sort discovered several small, clear bags intended for cabin recycling (labeled “Recycling” and featuring the Delta logo) full of recyclable materials in the landfill-bound waste stream. This indicates that cabin crews are separating recyclable materials during some flights; however, during the cabin cleaning process, some of these separated materials are combined with garbage and disposed of as waste. Coordination with the cabin cleaning contractor may be needed to divert these materials to the proper recycling compactors.

One other in flight practice that was noted during the waste sort was the collection of liquids in one or two large water bottles from the cabin crew’s beverage carts. This means cabin crews are consolidating liquids to fewer, sealable containers which helps to keep the rest of the waste and recycling dry. Coordination with Delta and their cabin crews may be helpful in encouraging this practice as it reduces free liquids in the cabin waste stream and protects recyclable materials like newspapers and magazines, other paper, beverage containers like cans and bottles, and plastic cups from contamination.

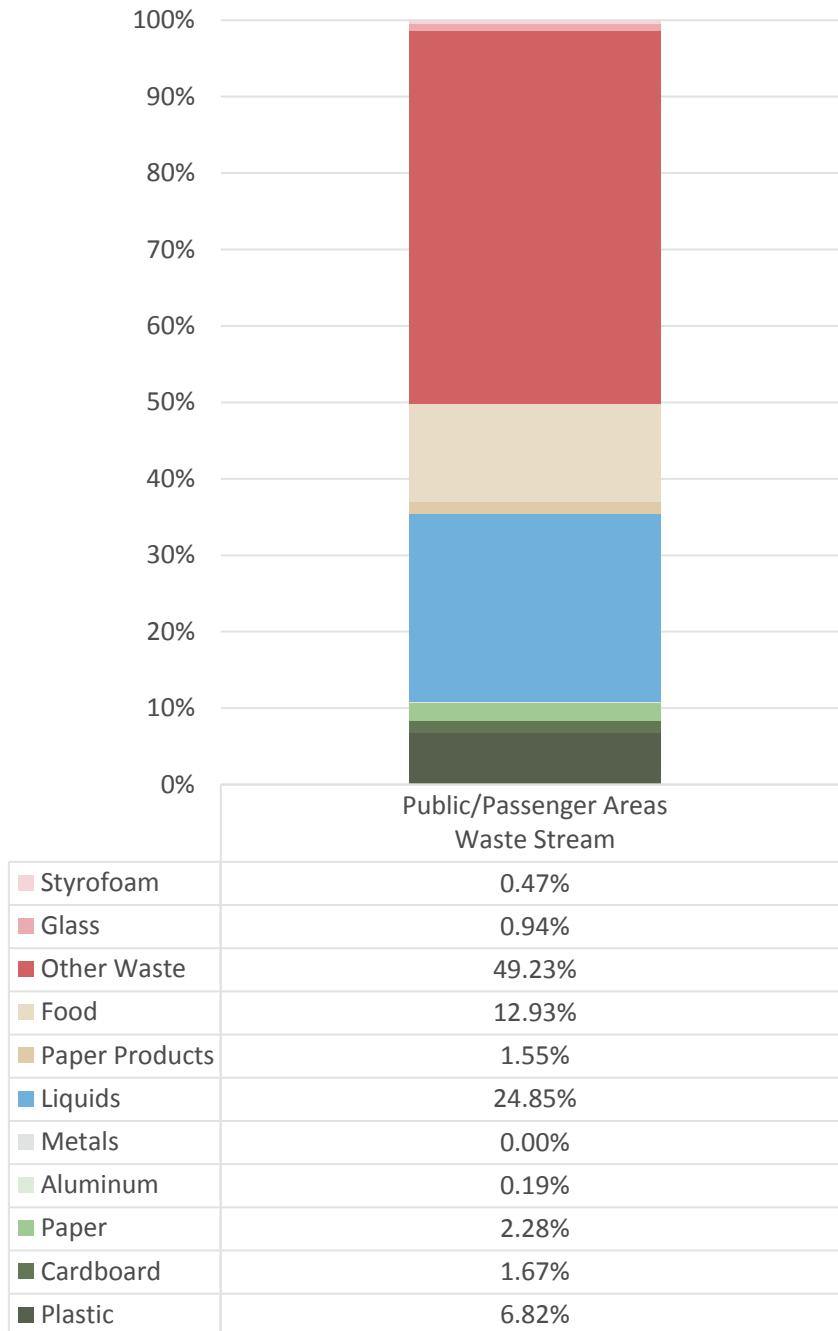
Figure 4: Waste Stream Composition
 DTW McNamara Terminal Deplaned Waste (Domestic)



F. DTW McNamara Terminal Public/Passenger Areas Area Waste Stream

Analysis of the data collected from the sample bags showed that waste generated in the public passenger areas of the McNamara Terminal is comprised of materials in the amounts shown in **Figure 5: Waste Stream Composition DTW McNamara Terminal Public / Passenger Areas**. This figure includes information from sterile spaces (gate areas/hold rooms and Express Tram Stations) and non-sterile spaces (curbside, ticketing check in, and baggage claim). Liquids contribute significantly to this waste stream and food waste is also present in a notable quantity. Of the recyclable materials, plastic is the most prevalent in this stream.

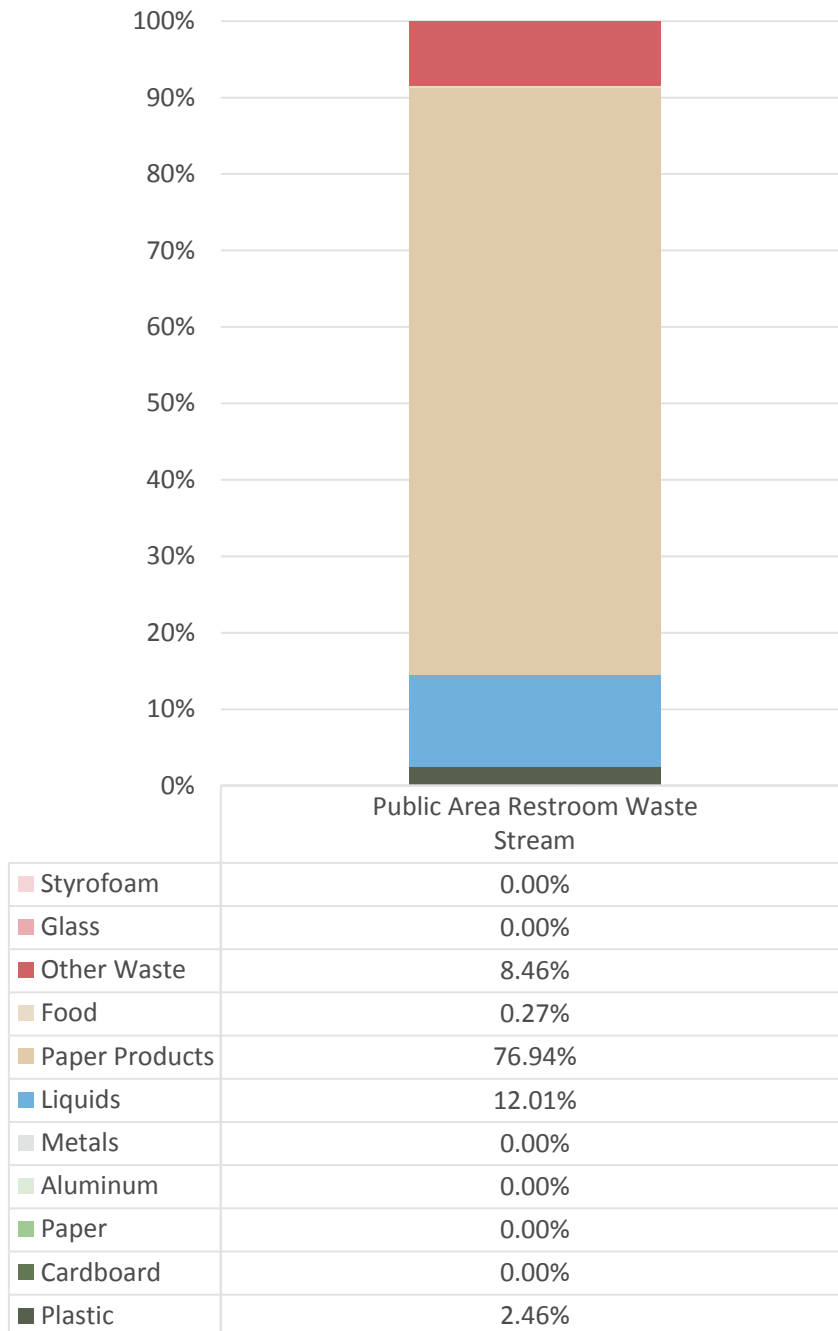
Figure 5: Waste Stream Composition
 DTW McNamara Terminal Public/Passenger Areas



G. DTW McNamara Terminal Restroom Waste Stream

Waste sort data from samples collected in the restrooms at the McNamara Terminal is displayed in **Figure 6: Waste Stream Composition – DTW McNamara Terminal Restrooms**. This stream is almost completely comprised of paper products (paper towels) and liquids contribute a large part of the remainder.

Figure 6: Waste Stream Composition
 DTW McNamara Terminal Restrooms

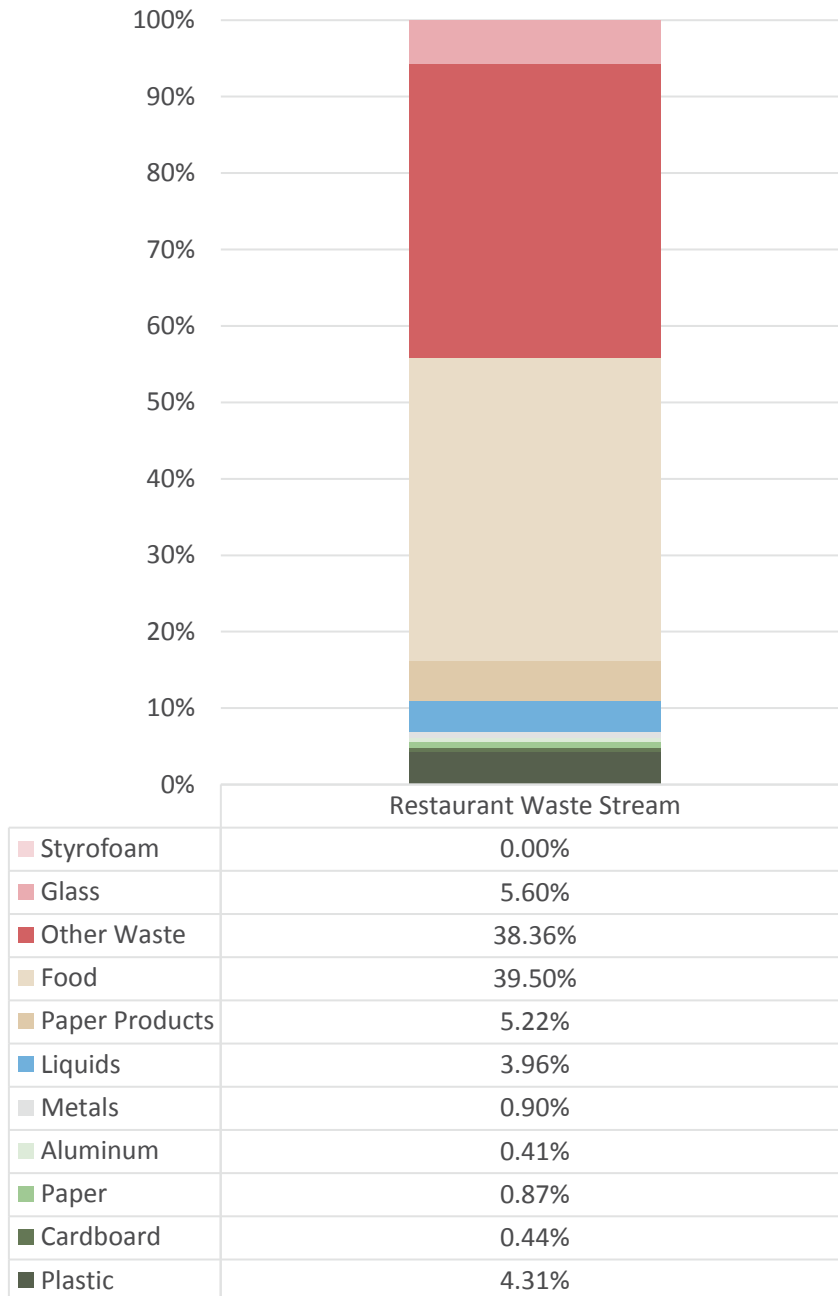


H. DTW McNamara Terminal Restaurant Waste Stream

Analysis of the data from the waste sort found that the waste stream from the restaurants in the McNamara Terminal is comprised of materials as shown in **Figure 7: Waste Stream Composition – DTW McNamara Terminal Restaurants**. As is to be expected, this stream contains a large portion of food waste and food packaging, such as plastic film. Of the recyclable materials, glass was the most prominent followed by plastic.

Under Michigan’s bottle bill, single-serve glass bottle for beer and other carbonated beverages are eligible for a refund upon return. At the McNamara Terminal, these are likely collected by the beverage suppliers. Glass bottles for non-carbonated beverages (such as liquors) are not included in the return refund; this glass is currently disposed of as waste.

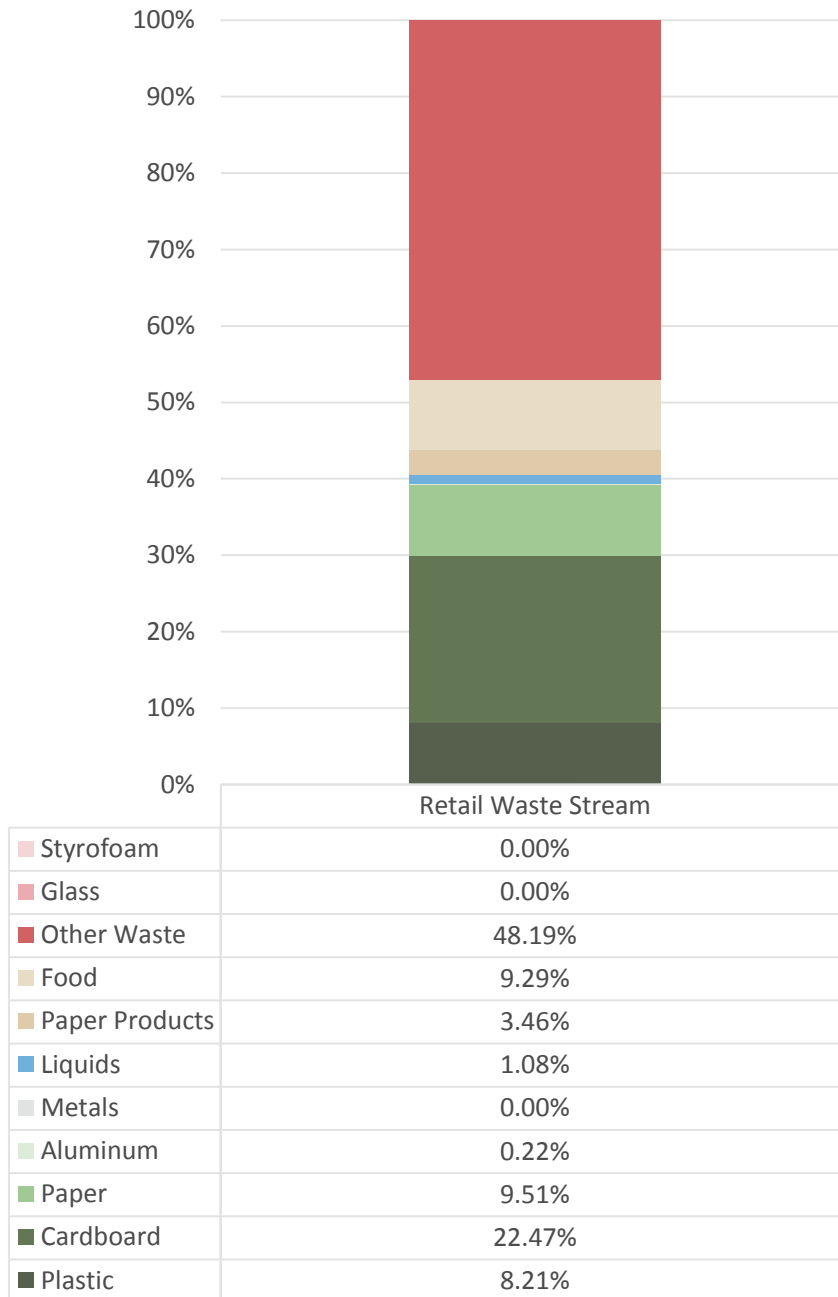
Figure 7: Waste Stream Composition
DTW McNamara Terminal Restaurants



I. DTW McNamara Terminal Retail Waste Stream

Based on the waste sort data, the waste stream generated in retail areas at the McNamara Terminal is comprised of materials in the proportions shown in **Figure 8: Waste Stream Composition – DTW McNamara Terminal Retail Areas**. Of the recyclable materials, cardboard contribute the most to this stream, followed by paper and plastic. Food waste was also present in a notable amount. The retail spaces showed some use of disposable cleaning products such as dusting and cleaning cloths and pads.

Figure 8: Waste Stream Composition
 DTW McNamara Terminal Retail Areas



5. Recommendations

Based on the results of the DTW McNamara Terminal waste study, near-term and long-term recommendations were developed to assist the Airport in increasing landfill diversion and reducing the facility's environmental impact resulting from waste generation.

A. Near-Term Recommendations

1) Increase Stakeholder Involvement, Set Objectives and Targets, and Plan for Continuous Improvement

Per corporate policy, Delta is “committed to minimizing waste streams through diversion and re-use, waste recycling programs, and [waste reduction].” Due to Delta’s role in operating the McNamara Terminal, it is recommended that WCAA collaborate with the airline, their maintenance and cabin cleaning contractors, and their waste hauler to optimize recycling practices in this facility. The first step toward this collaboration could be review and discussion of this waste study report and the findings it contains with these stakeholders.

Delta and WCAA are both tracking elements of the recycling performance of the McNamara Terminal. It is recommended that these data sets be combined in a regular report and serve as the basis for recycling, diversion, waste reduction or other waste objectives. The DTW Airport Recycling, Reuse, and Waste Reduction Plan (available under separate cover) provides more detail on metrics that may be appropriate for each terminal at DTW as well as WCAA areas.

2) Provide Training and Education

The success of a recycling program at McNamara Terminal depends on the cooperation and compliance of Delta employees as well as those of the involved contractors. It is recommended that WCAA team with Delta to provide training and educational opportunities for these groups. It is recommended that outreach include information about the drivers behind a recycling program at the McNamara Terminal, acceptable materials, and a point person for employees and contractors to reach out to with questions or suggestions. A training program can be as simple as an email message or signs posted in key employee and contractor areas (breakrooms, etc.). Once an education program is established for Delta employees and contractors, it is recommended that similar information be disseminated to

terminal restaurant and retail tenants in order to encourage their participation in the program.

3) Evaluate Compactor Convenience

During the facility walk-through, it was noted that there are many more waste compactors than there are recycling compactors. Based on this ratio, it is possible that waste compactors are typically more convenient for employees, contractors, and tenants than recycling compactors. This may be contributing to recyclables being disposed of as waste. It is recommended that WCAA work with Delta and its contractors as well as the restaurants and retail tenants to determine if the number and placement of this infrastructure can be adjusted to improve access and reduce travel distances for recyclable materials.

4) Address Airline Administration and Other Airline Area Paper, Cardboard, and Plastic Recycling

As noted in the discussion about waste generation quantities, airline activities and deplaned waste together represent 44 percent of the overall waste stream generated at an airport. Based on the contribution of airline activities (20 percent), it is recommended that WCAA work with Delta to facilitate and improve recycling of paper, cardboard, and plastic recycling from airline areas. Since employees who work for Delta are at the facility on a regular basis, shaping their behaviors could lead to improved capture rates for these materials. Similarly, through collaboration, WCAA and Delta may find it beneficial to address paper and cardboard recycling from the airline's administration area. One key element of protecting the value of recyclable materials will be to encourage employees to use sinks where available to empty beverage containers before recycling or throwing away.

5) Optimize Recycling of Deplaned Materials

As noted in the discussion about waste generation quantities, airline activities and deplaned waste together represent 44 percent of the overall waste stream generated at an airport. To address the 24 percent from deplaned waste, it is recommended that WCAA coordinate with Delta to support plastic, paper, and aluminum recycling from deplaned waste. Delta counts Detroit as one of the 33 domestic locations included in its in-flight recycling program; improving Prospect's exchange of recyclables from inbound aircraft to the appropriate recycling compactor is recommended and will be key to maximizing the potential of this program.

Liquid content represents a challenge in recycling deplaned recyclables. As noted previously, some of the cabin crews are consolidating these into large water bottles during the flight. WCAA is encouraged to work with Delta to determine if this, or an alternative strategy, is appropriate to deploy on more flights.

In addition, donation may provide an alternative to landfilling the blankets and pillows discarded by passengers aboard incoming flights.

6) Plan for Public Passenger Area Liquids

While the McNamara Terminal waste samples were primarily focused on sterile areas of the terminal (“past security”), the passenger/public area data follows the same trends as the waste stream from these areas in the North Terminal – most notably high liquid content. As noted in the North Terminal study, liquid collection stations may be appropriate at the security checkpoints to handle liquids subject to TSA volume restrictions. It is also recommended that WCAA evaluate installing liquid collection stations at other key areas to reduce weight and contamination of the waste and recycling streams.

7) Continue and Improve Food Donation

As described above, WCAA is operating a food recovery program and has donated 7,000 meals to date to a local food pantry. It is recommended that WCAA 1) publically recognize Delta’s participation in this program and 2) collaborate with Delta and the DTW Dockmaster to improve the logistics of collection from Delta’s Sky Club Lounge. It may be simpler to donate the rescued food to the Airport’s Freedom Centers (USO lounges for military travelers); in which case it is recommended that the donation occur in a timely manner so as not to transfer the generation of food waste from one area to another (i.e. so that the food can be used well in advance of expiration.)

8) Address Restaurant and Retail Waste Generation

The restaurants and retail tenants in the McNamara Terminal have unique elements within their waste streams (food and cardboard respectively); however, both streams had a high fraction of “other waste” or waste which must be landfilled. It is recommended that WCAA coordinate with restaurant and retail management to evaluate options to reduce volume of waste generated that cannot be recycled or reused.

9) Improve Retail Cardboard Recycling

Because cardboard is such a bulky material, it is likely that additional cardboard is generated in the retail areas of the terminal (beyond what appeared in the sample bags). It is recommended that WCAA work with the retail tenants to establish a recycling program for cardboard. A few key elements of such a program include convenience, retail employee access, and a requirement for cardboard boxes to be “broken down” or unfolded prior to placement on a pallet or in a designated dumpster.

10) Support Aluminum Can Recycling

It is recommended that WCAA encourage aluminum can returns for containers included under the state’s program and recycling of the other non-refundable containers. The current informal practice is contributing to a low level of aluminum in the overall waste stream which likely represents a high rate of return for the refundable containers; this is a benefit to WCAA and the environment because these containers are removed from the waste stream and have a very high rate of being recycled into new cans and other products.

11) Pilot Composting

Composting represents an alternative strategy for managing inedible food waste (materials generated during back of house food prep, such as fruit peels, coffee grounds etc.). WCAA has expressed an interest in launching a coffee ground composting program in the near future as a first step toward a larger composting program. It is recommended that WCAA coordinate with the restaurants and coffee shops in the McNamara Terminal to identify and address hesitations of these stakeholders when designing such a program. Another option is to start by collecting paper towel from the restrooms for composting (single stream, already fairly well separated) depending on the requirements of identified composting facilities/end users.

12) Landfill Other Materials

Currently, there are no local options for recycling glass or Styrofoam; therefore, it is recommended that WCAA, Delta, and others continue to landfill these materials and “other waste.”

13) Track Performance

It is recommended that WCAA conduct regular spot checks of the existing recycling program as well as any additional strategies that are implemented. These audits will serve to inform performance tracking.

B. Long-Term Recommendations

1) Expand Composting

Based on the performance of the coffee ground composting program described above, it may be possible for WCAA to move into coordination with restaurant management and evaluate options for composting food and paper products from restaurants in the McNamara Terminal.

Once a back of house restaurant composting program is established, future expansions of a composting program could include food and airline areas, deplaned waste, and public passenger areas.

2) Track Performance and Expand Program

Once new recycling and waste management strategies have been implemented to a point that the program is vastly different from the existing practices, it is recommended that WCAA conduct another waste composition study to analyze 1) the performance of the new program and 2) additional opportunities for improvement/expansion.

6. Conclusion

Results from the material sort, facility walk-through, and informal interviews helped identify areas of waste management where WCAA may wish to focus effort and resources. These recommendations, when implemented, are designed to help WCAA to increase landfill diversion and recycling, providing social, economic, and environmental benefits to DTW and its community. In order to realize the benefits of the recommendations described in this report, implementation of these strategies will need to be phased and appropriately timed based on existing conditions and available resources. Collaboration with Delta, their contractors, and the waste and recycling management contractors will be important to the success of these strategies.

It is important to note that additional strategies might make sense to implement over a long-term basis, as waste management at a complex facility like the McNamara Terminal is dynamic and recommendations that may not be prudent now could become feasible in the future. Therefore, it is recommended that in addition to the strategies listed above, that WCAA periodically evaluate its program to determine if the program elements are working as expected. If the program is not performing as expected, a waste sort can help identify further areas for correction or improvement. By checking results and adjusting course as needed, WCAA can create a truly dynamic and sustainable waste management program.