

FINAL REPORT



Landfill Waste Stream Analysis

November 4, 2020





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1. INTRODUCTION

1.1 BACKGROUND

Ada County, home to the City of Boise and five other cities, has a collective population of approximately 182,500 households plus a thriving business sector. The County's Solid Waste Management division operates the Ada County Landfill, and works directly with private collection contractors in the daily receipt, placement and cover of the waste into the landfill. The Division is responsible for the community outreach and educational initiatives that encourage recycling among its residential customers. On average, the Ada County Landfill accepts over a million cubic yards of ordinary waste every year.

Trash collection services for the residents of Ada County are provided by several haulers. Republic services the communities of Boise, Meridian, Garden City, Eagle, and Star; and J&M Sanitation collects from Kuna. Hardin Sanitation provides services for the unincorporated parts of the county.

In 2014, Ada County completed its first composition study of municipal solid waste (MSW) disposed at the Ada County Landfill. This inaugural study provided a snapshot of the composition of wastes delivered to the Landfill in various classes of delivery vehicle, and encompassed single and multi-family residential waste, mixed commercial waste, construction and demolition (C&D) materials, and non-compacted MSW (self-haul waste).

Ada County retained the project team of MSW Consultants and Great West Engineering to update its waste composition study in 2019-2020. This report (2020 Study) summarizes the results of the comprehensive sampling and sorting protocol that began in the winter of 2019, and concluded in September 2020.

1.2 OBJECTIVES

The County identified the following objectives in performing this update:

- ◆ Provide reliable, representative estimates of waste composition at the Landfill by generator type and source, including the transfer stations that feed into the Landfill,
- ◆ Provide a comparison against the 2014 Study to identify notable changes in disposed waste composition,
- ◆ Evaluate the effectiveness of existing waste prevention and recycling programs, and
- ◆ Prioritize future waste prevention and recycling initiatives to maximize effectiveness of any new programs.

1.3 COMPARISON TO PREVIOUS STUDIES

Generally, the 2020 Study was designed based on the same generator and scale data and targeted roughly comparable samples as compared to the 2014 Study. The sections below highlight both the similarities and differences between the two studies.

1.3.1 SIMILARITIES

- ◆ **Similar Generator Types:** Both studies examined landfilled wastes separately for the following generator types:
 - ◆ Single family residential;
 - ◆ Multi-family residential;

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- ◆ Industrial, commercial and institutional (ICI),¹
- ◆ Self-haul municipal solid waste,² and
- ◆ Construction and demolition (C&D) debris.
- ◆ **Seasonality:** Both studies were conducted over the course of four seasons.
- ◆ **Host Facilities:** Both studies characterized loads of waste that deliver to both the Ada County Landfill and to the Meridian Transfer Station.
- ◆ **Sampling Targets for Manual Sorting:** Both studies targeted a comparable number of manually sorted samples.
- ◆ **Same Material Groups for Manual Sorts:** Both studies used the same eight major material groups (e.g., Paper, Plastic, Metal, Glass, Organics, C&D, Special Wastes, Other Wastes).
- ◆ **Level of Confidence:** Both studies estimated waste composition to a 90 percent level of confidence, which is a common standard in the waste composition field.³

1.3.2 DIFFERENCES

- ◆ **Expanded Sampling at Meridian Transfer Station:** The 2020 Study deployed the sampling and sorting team to spend at least one full day per season collecting and sorting samples at the Meridian Transfer Station. The 2014 Study arranged for roughly three loads per season (one each of single-family, mixed commercial, and commercial compactor) to be diverted to the landfill from the Meridian Transfer Station.
- ◆ **Enhanced Visual Characterization of C&D Debris and Self-Haul Wastes:** The 2014 Study attempted to sample and manually sort inbound loads of C&D and bulky self-haul wastes. Based on evolving and improving protocols for visual, volumetric characterization of these waste types, the 2020 Study used a tablet-based app to visually survey these loads and convert the volumetric composition estimates into weight-based estimates based on a real-time calculator. The 2020 Study therefore captured 160 samples of C&D debris and self-haul loads, approximately one-quarter of which were collected and characterized directly at the Meridian Transfer Station.
- ◆ **Edible Food Waste Not Evaluated:** The 2014 Study incorporated a supplemental analysis to estimate the percentage of Food Waste that could be considered edible and therefore had been wasted when disposed. The 2020 Study did not attempt to duplicate this supplemental analysis.
- ◆ **Expanded Gate Survey:** The 2014 Study incorporated a survey of self-haul customers to better understand the contribution of wastes from this sector. The 2020 Study incorporated a full week of gate surveying of all direct-haul loads (i.e., collection vehicles and self-haulers, but excluding transfer trailers originating from a transfer station), with four days at the Landfill and one day at the Meridian Transfer Station.
- ◆ **Material Category Differences for MSW:** The 2020 Study incorporated some new material categories and eliminated others from the 2014 Study to most effectively align with current waste characterization standards in identifying recyclable, compostable, and otherwise divertible materials.
- ◆ **Consolidated Material Categories for C&D and Self-haul Wastes:** In concert with the visual estimation protocols for visual surveys of C&D and self-haul wastes, the 2020 Study applied a

¹ The 2014 Study separately characterized “Mixed Commercial” and “Commercial Roll-offs.” These were combined in the 2020 Study.

² The 2014 Study referred to this sector as “Non-compacted MSW.”

³ The 2014 Study reported lower and upper confidence intervals; while the 2020 Study reports a single margin of error as a +/- relative to the mean.

consolidated set of material categories that reflect the most prevalent constituents in these waste streams.

1.4 REPORT ORGANIZATION

The remainder of this report presents the methodology and results of the 2020 Study. The report is divided into the following sections:

- ◆ **Methodology:** This section provides an overview of Ada County's waste generation and disposal as received at the landfill. This section also summarizes the sampling plan, field data collection methods and analytical methods applied in the study.
- ◆ **Results:** Detailed results about the composition of disposed residential and commercial refuse are presented in this section, along with the results of the visual survey of self-haul waste and C&D debris. Results are presented in both tabular and graphical format to highlight findings of interest and include a comparison of results to the 2014 Study.
- ◆ **Conclusions and Recommendations:** This section provides some general observations and recommendations about this study and the opportunities available to Ada County.
- ◆ **Appendices:** Material category definitions are contained in the appendices.

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2. METHODOLOGY

2.1 MATERIAL STREAMS AND GENERATOR SECTORS

Consistent with the 2014 Study, this update characterized disposed wastes according to their generator sector. The following waste types were defined and separately characterized:

- ◆ **Municipal Solid Waste (MSW):** MSW includes materials originating from the routine generation of trash and typically includes a wide mix of waste materials, usually including food and other putrescible organic constituents.
- ◆ **Construction and Demolition (C&D) Debris:** This category includes debris generated from construction, demolition, and renovation activities, as well as bulky items. These materials are typically delivered in open top containers and may contain yard wastes and land clearing debris, but no putrescible organics.

These waste streams were further subdivided into specific generator types:

- ◆ The **Single-Family Residential** sector, which includes residential housing units with up to three dwelling units, was captured from waste collected primarily from private (contracted) haulers, in which at least 80% or more of the waste was derived from single-family residential sources. Vehicles chosen for sample collection in the Single-Family Residential waste sector included side-loading and rear-loading packer trucks, which the driver verbally indicated that collected waste had come primarily from residential routes. This sector was also analyzed in the 2014 Study.
- ◆ The **Multi-Family Residential** sector, which includes buildings with four or more dwelling units, was captured from waste brought to the Meridian Transfer Station by dedicated loads organized by Republic Services. A total of four dedicated multi-family routes were arranged in advance by all parties to ensure that the truck would be properly identified and that multiple samples could be collected from the load. This sector was also analyzed in the 2014 Study.
- ◆ The **Institutional, Commercial, Industrial (ICI)** sector, which includes all non-residential establishments (such as businesses, institutions, and small industrial operations), was captured from waste brought to the transfer station or landfill by commercially operated vehicles, in which 80% or more of the waste was from institutional, commercial, or industrial sources. Vehicles chosen for sample collection in the ICI sector included roll-off compactor boxes and packer trucks, which the driver verbally indicated that collected waste had come primarily from routes serving ICI customers. This sector was analyzed in the 2014 Study under two subcategories: Mixed Commercial and Commercial Roll-offs.
- ◆ The **C&D** sector includes wastes generated primarily from the construction, demolition, and renovation of structures, and was treated as a separate generator sector entirely from the municipal solid waste originating from residential and ICI sources. C&D was identified during the study as loads that contained 80% or more of material generated from construction, demolition and renovation activities. C&D Debris also included “dry waste loads” which were primarily bulky waste loads managed as C&D loads.¹ C&D and bulky waste loads originated from commercial (private hauler) and self-haul sources. This sector was also analyzed in the 2014 Study.
- ◆ **Bulky/Dry Wastes** that were delivered primarily by self-haulers in open top truck beds, box trucks, (as well as some roll-off containers) were also characterized separately. These loads contained

¹ Note that the host disposal facilities also receive source-separated loads of clean C&D materials (e.g., “Wood”) which is not destined for disposal. Both the 2020 and 2014 Studies only characterized mixed C&D and bulky wastes destined for disposal.

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materials that were bulky in nature but were not generated as a result of construction, demolition or renovation activity. This sector was also analyzed in the 2014 Study but was termed “Non-compacted MSW.”

It should be noted that loads that contained less than 80% of the targeted generator sector were not included in sample collection because it was not possible to verify the specific generator sector from which the materials originated. In particular, transfer trailers were not targeted for sampling in this study because they contain wastes mixed together from more than one generator sector. Rather, the 2020 Study (as well as the 2014 Study) made arrangements to perform sampling at the Meridian Transfer Station to capture wastes prior to loading onto transfer trailers.

2.2 WASTE GENERATION

2.2.1 OVERVIEW

Ada County tracks the flow of all wastes delivered to the county landfill. Table 2-1 provides a summary of material quantities reported at Ada County Landfill for the 2020 fiscal year (October 1, 2019 through September 30, 2020). As shown, the Landfill received almost 480,000 tons of mixed materials which were disposed.

Table 2-1 FY2020 Material Quantities (scale data)

Material Stream	Tons
Compacted MSW	105,049
Non-Compacted MSW	33,555
Mixed Load Waste	3,616
Boise Transfer Station	87,608
Meridian Transfer Station	156,512
Construction & Demolition (C&D) Debris	89,991
Total	476,332

Note: Material Streams do not sum to Total due to rounding.

This table reflects the specific material types recorded through the Landfill scale system. As shown, the Landfill does not track inbound wastes by different residential and commercial generator sectors. Additional information was therefore needed to fully characterize inbound wastes by generator sector.

2.2.2 GATE SURVEY

During the week of November 18, 2020, Great West Engineering staff completed a survey of inbound direct-haul vehicles arriving at the Landfill (four days) and the Meridian Transfer Station (one day) to establish a basis for the allocation of tons disposed among generator sectors (single family residential, multi-family residential, etc.) so that the percent composition of each waste stream (determined by hand sorting) could be applied to total estimated tons by generator.

A total of 273 trucks were surveyed, with total payload of 1,053 tons. Surveys were completed on all trucks coming across the scale during the course of the survey and included single-family, multi-family and commercial MSW loads, loads containing bulky waste and C&D debris. Results of the gate survey are provided in Table 2-2.

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Table 2-2 Allocation of Inbound Tonnage by Generator Sector Based on Gate Survey

Facility	MSW				C&D	Bulky/ Dry Waste	Grand Total
	Single Family	Multi-family	ICI	Sub-total			
Landfill	58.3%	7.1%	18.8%	84.2%	10.7%	5.1%	100.0%
Meridian Transfer Station	24.7%	0.7%	33.4%	58.8%	21.6%	19.6%	100.0%
Combined	52.2%	5.9%	21.4%	79.6%	12.7%	7.7%	100.0%

2.2.3 WASTE GENERATION SUMMARY

By applying the gate survey results in Table 2-2 to the MSW tonnage in Table 2-1, a more detailed representation of annual tonnage by waste type and generator sector arises, as shown in Table 2-3. The quantities in this table are used as a basis for applying the results of the composition analysis throughout the Results section of the report. *It is therefore important to note that when results are presented later in the report for the composition of MSW, the quantity of MSW is based on Table 2-3 and not on the MSW total as contained in the County's landfill scale system.*

Table 2-3 FY2020 Waste Disposal by Waste Stream and Generator Sector Based on Applying Survey Results

Facility	MSW				C&D & Bulky Waste			Grand Total
	Single Family	Multi-family	ICI	Sub-total	C&D	Bulky/Dry Waste	Sub-total	
Landfill	93,419	11,345	30,193	134,957	89,991	7,263	97,255	232,212
Meridian Transfer Station	38,694	1,158	52,253	92,105	33,733	30,674	64,407	156,512
Boise Transfer Station ^[1]	45,760	5,201	18,790	69,751	11,101	6,757	17,858	87,608
Total	177,873	17,704	101,236	296,812	134,825	44,694	179,520	476,332

[1] No gate surveying was performed at the Boise Transfer Station. Tonnage from this facility was allocated among generator sectors based on the combined allocation from the Landfill and the Meridian Transfer Station.

For reference, Table 2-4 compares the material tonnages that were characterized in the 2020 and 2014 Studies. As shown, the tonnage distribution percentage was fairly similar between the studies, although the gate survey in the 2020 Study suggests a somewhat higher percentage of C&D debris and a somewhat lower percentage of ICI wastes. Additionally, the 2014 Study omitted the Boise Transfer Station tonnage.

Table 2-4 Comparison of Characterized Tonnages, 2020 and 2014 Studies

Material Stream	FY2020		2014 Study	
	Tons	Percent	Tons	Percent
Single-Family Refuse	177,873	37.3%	142,780	38.6%
Multi-Family Refuse	17,704	3.7%	14,750	4.0%
ICI Refuse	101,236	21.3%	129,310	35.0%
C&D Debris	134,825	28.3%	59,970	16.2%
Bulky/Dry Waste	44,694	9.4%	22,825	6.2%
Total	476,332	100.0%	369,635	100.0%

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2.3 HOST FACILITIES AND SCHEDULE

Table 2-5 summarizes the field data collection schedule for the 2020 Study. As shown, data were collected over four seasons. For comparison, the 2014 Study data collection was compiled during November 2013, and in March, May and July 2014.

Table 2-5 Host Facilities and Field Data Collection Schedule

Host Facility	Work Performed	Field Data Collection Events			
		Season 1	Season 2	Season 3	Season 4
Ada County Landfill	Manual sorting of refuse samples; Visual surveys	December 16-18, 2019	March 3-5, 2020	June 17-19, 2020	August 19-21, 2020
Meridian Transfer Station	Manual sorting of refuse samples; Visual surveys	December 19, 2019	March 2, 2020	June 16, 2020	August 18, 2020

2.4 SAMPLING TARGETS

The sampling plan developed for this waste characterization study sought to obtain a representative distribution of samples from the targeted waste streams and generator sectors. Generally, samples were distributed in proportion to the amount of wastes estimated to have originated from each generator sector. Table 2-5 summarizes the number of samples planned for the study and also shows the actual number of samples obtained.

Table 2-6 Sample Collection Targets by Material Stream and Generator Sector

Material Stream	Generator Sector	Sample Type	Planned Samples	Actual Samples Obtained	Variance
Refuse	Residential	Manual	96	102	+6
	Multi-Family	Manual	8	8	0
	ICI	Manual	56	50	-6
	<i>Subtotal</i>		160	160	0
C&D / Bulky		Visual	160	159	-1
Grand Total			320	319	-1

As shown in the table above, all targeted manual samples were obtained during the study. One targeted visual sample was not obtained due to a data transmission error. In the professional opinion of MSW Consultants, a sufficient number of manual and visual samples were obtained to discern differences in material composition from the various generator sectors.

2.5 MATERIAL CATEGORIES

For the 2020 Study, sorting operations utilized a predetermined list of material categories for refuse and C&D debris. The categories are in general conformance with those categories used in the 2014 study, with some additions and consolidation.

2.5.1 MSW MATERIAL CATEGORIES

Each sample of refuse was sorted into 48 material categories. Table 2-6 shows the breakdown of the material categories within their respective material groups. Detailed definitions for each of these categories is shown in Appendix B.

This table also identifies a number of the individual constituents in the disposed waste stream that could be recovered in the event that a formal curbside recycling program is established in Ada County. The Results section of this report contains an analysis of the percentage of recyclable materials that are being disposed. This table also identifies organic materials that that could be diverted for mulching (yard wastes) or composting (food waste) operations rather than disposed.

Table 2-7 MSW Material Categories

Material Category	Material Category
Paper	Glass
Newspaper	Clear Glass Bottles
Corrugated Cardboard/Kraft (Uncoated)	Brown Glass Bottles
Mixed Recyclable Paper	Green Glass Bottles
Compostable Paper	Remainder/Composite Glass
Other Non-Recyclable Paper	Construction & Demolition Debris
Plastic	Wood – Treated/Painted/Stained
PET (#1) Bottles	Wood – Untreated/Clean
PET (#1) Non-bottle Containers	Remainder/Composite C&D Debris
HDPE (#2) Natural Bottles	Hazardous Wastes
HDPE (#2) Colored Bottles	Actual Hazardous Wastes
HDPE (#2) Non-Bottle Containers	Automotive Products Hazardous Wastes
Rigid Containers #3, #4, #6 and #7	Garden Products Hazardous Wastes
#5 Rigid Plastic Containers*	Paints & Solvents
Expanded Polystyrene "Styrofoam"	Other
Bags & Film	Other Special Wastes
Durable/Bulky Rigid Plastics	E-Waste
Remainder/Composite Plastic	Other Electronics
Metal	Textiles
Steel Cans & Lids	Rubber
Other Ferrous Metals	Diapers
Aluminum Cans and Foils*	Carpet & Carpet Padding
Other Non-Ferrous Metals	Tires
Other Mixed Metals	Furniture
Organics	Remainder/Composite Organics
Food Waste	Ash/Dust
Yard Debris	Residuals
	Miscellaneous Inorganics
	Other Materials Not Elsewhere Classified

2.5.2 MSW RECOVERABILITY DESIGNATION

Finally, one of the objectives of this study was to identify constituents that could be diverted from landfill through locally available means. It is recognized that recycling programs in Ada County, as in the rest of Idaho, are optional services provided at the discretion of local governments or private recycling companies. As such, the following recyclability classes have been assigned, based on generally accepted practices throughout the nation. For the purposes of this study, each material category was assigned a “recoverability class” which included:

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- ◆ **Targeted Fiber:** All recyclable cardboard and mixed recyclable paper.
- ◆ **Targeted Containers:** Metal cans and plastic bottles and other packaging.
- ◆ **Compostable:** Food waste and compostable paper that could potentially be diverted via commercial composting or other organics management programs.
- ◆ **Green Waste:** Yard wastes (leaves, grass, and small branches) that could potentially be diverted via a grinding, mulching, or composting program.
- ◆ **Not Currently Recoverable:** Materials for which there are no readily available outlets for recycling, composting, or other diversion from landfill.

2.5.3 C&D AND BULKY/DRY WASTE MATERIAL CATEGORIES

Table 2-7 presents a list of the C&D and Bulky/Dry Waste material categories within their respective material groups. The same recoverability designations that were used for the MSW material categories have been used for the C&D and Bulky/Dry Waste composition analysis.

Table 2-8 C&D Material Categories

Material Category	Material Category
Paper	Wood
Uncoated OCC - Recyclable	Pallets and Crates
Other Paper	Untreated/Unpainted Wood
Plastics	Treated/Painted/Stained Wood
HDPE Buckets	Engineered Wood
Tyvek Building wrap	Wood Furniture
Film Plastic (ICI Film)	Other Wood
Plastic Furniture	C&D Materials
Durable Plastic Items	Rock/Gravel
Composite/Other Plastic	Concrete, Brick, Block
Metal	Asphalt
Ferrous Scrap	Gypsum Wallboard - Clean
Non-Ferrous Scrap	Gypsum Wallboard - Painted
Glass	Roofing Shingles
All Glass Materials	Carpet
Organics	Carpet Padding
Yard Waste	Ceramics/Porcelain Fixture
Dirt/Sand	HVAC Ducting
Other Materials	Tires
E-Waste	Appliances
Bulky Items (inc. mattresses)	Remainder/Composite C&D
Mixed MSW	

2.5.4 C&D RECOVERABILITY DEFINITIONS

The C&D recoverability classes as presented in the table above are defined as follows.

- ◆ **Broadly Recyclable:** C&D material constituents which can be recovered through commercial processing of mixed C&D loads throughout most markets. These materials primarily are comprised of ferrous and non-ferrous metal scrap, yard waste, rock/gravel, concrete, brick, block, and asphalt.

- ◆ **Recyclable in Select Markets:** C&D material constituents which can be recovered through commercial processing of mixed C&D loads in some areas. Such material may consist of clean gypsum wallboard, roofing shingles, carpeting and carpet padding, and appliances.
- ◆ **Boiler Fuel Feedstock:** C&D material (wood pallets and crates, dimensional lumber, engineered wood, other wood products) that can be used directly as a fuel, or converted to another form of fuel or energy product.
- ◆ **Non-Recoverable:** Material (from a C&D processing perspective) for which there is no current infrastructure or market to divert from disposal. Includes paper and plastic products, glass, dirt/sand, painted wallboard, ceramic fixtures, HVAC ducting, tires, combined/composite C&D materials, tires, E-Waste, bulky materials, and mixed MSW.

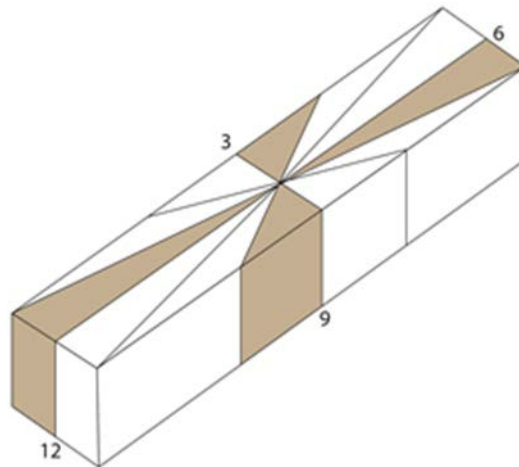
2.6 FIELD DATA COLLECTION METHODS

2.6.1 OBTAINING SAMPLES FOR SORTING

Inbound loads of refuse were randomly selected within the stratified sampling plan. MSW Consultants interviewed the drivers of selected loads to confirm the geographic origin and type of waste, as well as any other pertinent data. This information was noted on a handheld tablet computer, along with a unique identifying number associated with that vehicle on that day.

Selected loads of waste designated for sorting were tipped in the designated area at the landfill. From each selected load, one sample of material was selected based on systematic “grabs” from the perimeter of the load. For example, if the tipped pile is viewed from the top as a clock face with 12:00 being the part of the load closest to the front of the truck, the first samples was taken from 3 o’clock, 6 o’clock, 9 o’clock, 12 o’clock, and then from 1, 4, 7, and 10 o’clock, and so-on. This is illustrated in Figure 2-1, and a photo of a load awaiting sampling is shown in Figure 2-2.

Figure 2-1 Systematic Sampling Procedure for Incoming Loads



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Figure 2-2 Photo of Tipped Load



Once the area of the tipped load was selected, MSW Consultants' Field Supervisor coordinated with a loader operator to take a "grab" sample of wastes from that point in the tipped load. The loader operator removed a sample of waste that exceeded the targeted sample weight and placed the grab sample in a secure area to await sorting.

Samples were deposited in barrels to contain the sample and to enable the sampling team to pre-weigh the sample according to sample mass targets. Each sample was labeled by its identifying number using a white board. The white board for sample identification stayed with the sample until sorting and weigh out was completed.

2.6.2 MANUAL SORTING PROCEDURE

At the outset of each season, the Field Supervisor and/or Crew Chief conducted a detailed training session in the morning of the first day of the sort. The training covered all aspects of site safety and health guidelines, as well as the procedure of sorting and weighing samples. Guidance was provided throughout the manual sorting process to improve productivity. Training included:

- ◆ General facility overview;
- ◆ Learning and reviewing the material categories and definitions;
- ◆ Facility-specific health and safety requirements;
- ◆ Personal protective equipment (PPE) requirements;
- ◆ Waste handling techniques; and
- ◆ Productivity strategies and daily sorting quotas.

Figure 2-3 presents the typical layout of the sorting table and bins into which each material group was sorted. During this phase of field work, a well-organized sort area was crucial to efficient and accurate

sorting. Generally, maintaining a consistent sort area improves safety by establishing boundaries for all workers to follow consistently.

Figure 2-3 Typical Manual Sorting Layout



Once the sample was acquired and placed on the sorting table, the material was sorted by hand into the predetermined material groups. Plastic 20-gallon bins with sealed bottoms were used to contain each material group. The sorting crew members typically specialize in categories of materials, such as papers, metal, or plastics.

During the sort, the Crew Chief monitored the homogeneity of material sorted into the component bins, identifying and re-sorting materials that may have been improperly classified. Open bins allow the Crew Chief to see the material at all times and verify the purity of each component as it is weighed, before recording the weight. The materials were sorted to particle sizes of 2 inches or less by hand, until no more than a small amount of homogeneous fine material (“mixed residue”) remained. The layer of material ranging from 2-inch down to ½ inch was allocated to the appropriate categories based on the best judgment of the Crew Chief — most often a combination of Other Paper, Other Organics, or Food Waste.

2.6.3 DATA RECORDING

The weigh-out and data recording process is a critical aspect of the data gathering and recording procedure. The Crew Chief oversaw all weighing and data recording of each sample. Once each sample was sorted, and mixed fines allocated into an appropriate category, the weigh-out was performed. Each bin containing sorted materials from each sample was carried over to the scale. Sorting laborers assisted with carrying and weighing the bins of sorted material, and the Crew Chief recorded all data.

The Crew Chief used a tablet computer to record the composition weights. The tablet allowed for samples to be tallied in real time so that field data collection can immediately identify and rectify errors associated with light sample weights. Each sample was cross-referenced against the Field Supervisor’s sample sheet to assure accurate tracking of the samples each day. The real-time data entry system offers several important advantages:

- ◆ The system contains built-in logic and error checking to prevent erroneous entries.

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- ◆ The system sums sample weights in real time so the Crew Chief can confirm achievement of weight targets for each and every sample.
- ◆ At the end of the workday, the tablet is synchronized with the cloud via Wi-Fi signal, providing data security.

2.6.4 SITE MAINTENANCE & CLEANUP

The Project Team were guests at each of the host facilities, and it was therefore critical to leave the work area clean and safe for subsequent operations. The sorting crew was responsible for keeping litter to a minimum. The Project Team also concluded each day of sorting operations with sufficient time to perform site clean-up. Clean-up included the following types of activities:

- ◆ Organized stacking and stowing of sorting supplies in a designated location;
- ◆ Removal of sorted wastes for proper disposal or processing (the host facility equipment operator helped with this);
- ◆ Sweeping and cleaning the sort area to prevent windblown litter and other situations that could attract vectors;
- ◆ Removal and disposal of day-use personal protective equipment;
- ◆ Covering any unsorted samples with a secure tarp, to leave for sorting the next day;
- ◆ Securing the work area and checking out with the Facility Manager each day; and
- ◆ Decontaminating procedures for sort personnel.

2.6.5 COVID-19 PRECAUTIONS

During Seasons 3 and 4, the coronavirus became a national concern, prompting the implementation of additional health and safety guidelines during the collection of field data. These changes included the following considerations and procedures:

1. Review of OSHA Guidelines for the handling of Municipal Solid Waste for Workers and Employers. Generally, management of waste that is suspected or known to contain or be contaminated with COVID-19 does not require special precautions beyond those already used to protect workers from the hazards they encounter during their routine job tasks in solid waste and wastewater management.
2. With the above OSHA Guidelines in mind, field crews used typical engineering and administrative controls, safe work practices, and PPE that would normally be used during the handling of MSW. PPE included puncture-resistant gloves and face and eye protection, to prevent worker exposure to the waste streams (or types of wastes), including any contaminants in the materials, they manage. Such measures can help protect workers from sharps and other items that can cause injuries or exposures to infectious materials.
3. Centers for Disease Control's (CDC) "Recommended Guidelines for Protecting Yourself and Others" were implemented. This guidance set forth the following procedures and precautions, which were followed during the field data collection phase:
 - ◆ Maintain six feet of distance between yourself and others.
 - ◆ When six feet of distance is not possible, wear a face covering over your mouth and nose; Cover coughs and sneezes;
 - ◆ Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow;
 - ◆ Throw used tissues in the trash;

- ♦ Immediately wash your hands with soap and water for at least 20 seconds. If soap and water are not readily available, clean your hands with a hand sanitizer that contains at least 60% alcohol.
- 4. Disinfecting surfaces. Workers were required to disinfect all work gloves and PPE prior to taking these items off during breaks and at the end of the workday. Disinfecting wash consisted of a 4:1 solution of water and chlorine bleach.

2.6.6 VEHICLE SELECTION, VISUAL SAMPLE CHARACTERIZATION

MSW Consultants performed the visual characterization of non-compacted, bulky (self-haul) waste loads and C&D loads at the Meridian Transfer Station and Ada County Landfill. Similar to the refuse sample collection strategy, the n^{th} vehicle method was used, based on the estimated daily arrivals of C&D debris loads to the facility.

MSW Consultants deployed one professional staff person to coordinate with the scale house, tip area spotter, and inbound deliveries to select loads for surveying. A front-end loader operator provided assistance in spreading the loads from time to time so that the entirety of the loads could be observed. On most occasions, the driver of the targeted vehicle was instructed to spread the load out during the tipping process. Figure 2-4 shows two photographs of C&D loads selected for visual characterization.

Figure 2-4 Sample C&D Loads



2.6.7 VISUAL CHARACTERIZATION OF C&D DEBRIS AND BULKY/DRY WASTE

Visual surveying involves detailed volumetric measurements of the truck and load dimensions, followed by the systematic observation of the major material components in the tipped load. Results of the visual, volumetric estimates are then calibrated against the actual scale weight of the load.

MSW Consultants has developed an advanced tool for visual estimation of C&D and other bulky waste loads that has been refined and calibrated over multiple similar characterization studies. This process relies on a tablet computer to perform real-time density-to-weight calculations so that estimated composition and weight closely correlated to the actual weight of the load.

The visual estimation protocol used the following methodology:

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- ◆ The dimensions of the incoming load were measured and recorded prior to tipping and (if possible) the percent fullness of the vehicle/container was estimated.
- ◆ The load was tipped. If it was a large load of non-homogeneous materials, the loader operator was asked to spread out the material so that it is possible to discern dense materials such as block, brick, and dirt that tend to sink to the bottom of the pile.
- ◆ A first pass was made around the load marking the major material groups that were present in the load—wood waste, organics, paper, etc. The percentage of the load made up of these major groups was estimated.
- ◆ A second pass was made around the load, noting the secondary material categories contained within each group – for example, within the Wood material group, secondary categories include wooden pallets, sawn lumber, OCC, etc. The percentage of the secondary material category within the primary material groups was then estimated.
- ◆ The app alerted the enumerator if there were any problems with the estimations, for example if the percentages did not sum to 100 percent.
- ◆ Finally, the app compared the volumetrically calculated weight of the load to the actual scale weight of the load. Possible sources of discrepancy could then be identified, and adjustments to volumetric estimates and/or density factors could be made to reduce the degree of difference. This last step is critical to the accuracy of the data.

2.7 DATA ANALYSIS

2.7.1 QA/QC PROCEDURES

The collection process followed a well-established set of quality assurance/quality control (QA/QC) strategies to ensure data accuracy and integrity. The QA/QC process involved the following procedures:

- ◆ Assigning a unique combination sample number, facility of origin, date and time to each sample, and transferring that information to tablet computer that was used to record material weights for the sample.
- ◆ Encoding the type of waste load into the sample number. For example, on a particular date, samples of ICI waste could be numbered ICI-1, ICI-2, etc.
- ◆ Using a vehicle selection form to track the numbers of each type of load obtained and sampled.
- ◆ Designing the data entry databases to prevent out-of-range values for vehicle and sample characteristics such as vehicle type, net weight, etc.

2.7.2 STATISTICAL ANALYSIS

A statistical analysis was performed to calculate the mean composition for each of the material categories and for each material stream in this study. Samples were first normalized by converting the sample data from weight to percentage. Then, the sample mean was determined by averaging the percent composition of each material across all samples.

Confidence intervals are provided for each material category as well as for major material groups (e.g., "paper", "plastic", etc.). Confidence intervals have been calculated at a 90 percent level of confidence, meaning that we can be 90 percent sure that the upper and lower bounds of a confidence interval successfully capture its respective population mean. (The converse is also true: that there is a 10 percent chance that a confidence interval will fail to capture its population mean.) In general, as the number of samples increases, the width of the confidence intervals decreases, although the more variable the underlying waste stream composition, the less noticeable the improvement for adding incremental samples.

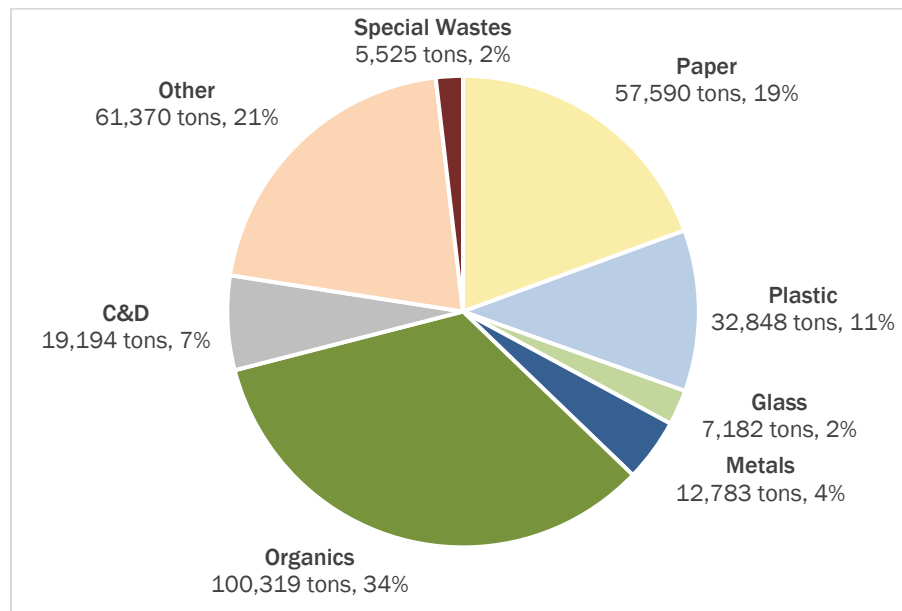
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3.1 DISPOSED MSW COMPOSITION

This section provides detailed results of the composition of municipal solid wastes destined for disposal.

In 2020, 296,812 tons of MSW¹ were disposed at the Ada County Landfill. Figure 3-1 provides a summary of the aggregate² MSW composition by major material group. As shown, organics comprise the largest fraction of the disposed MSW stream, followed other wastes (textiles, fines/residuals, sanitary products), and paper.

Figure 3-1 Aggregate MSW Waste Composition by Material Group and Estimated Tons



The 2014 Study characterized and estimated 286,840 tons in 2014. Figure 3-2 and Figure 3-2 compare the aggregate disposed waste composition by major material group in 2014 and 2020, by percentage and by estimated tonnage, respectively.

¹ It is important to note that the tonnages cited in this section are based on Table 2-3 in the previous section, which integrates the findings of a gate survey to better estimate MSW and C&D quantities.

² “Aggregate” refers to the combination of single family residential, multi-family residential, commercial and institutional municipal solid wastes taken as a whole.

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Figure 3-2 Comparison of Aggregate MSW Composition in 2020 and 2014 (Percent)

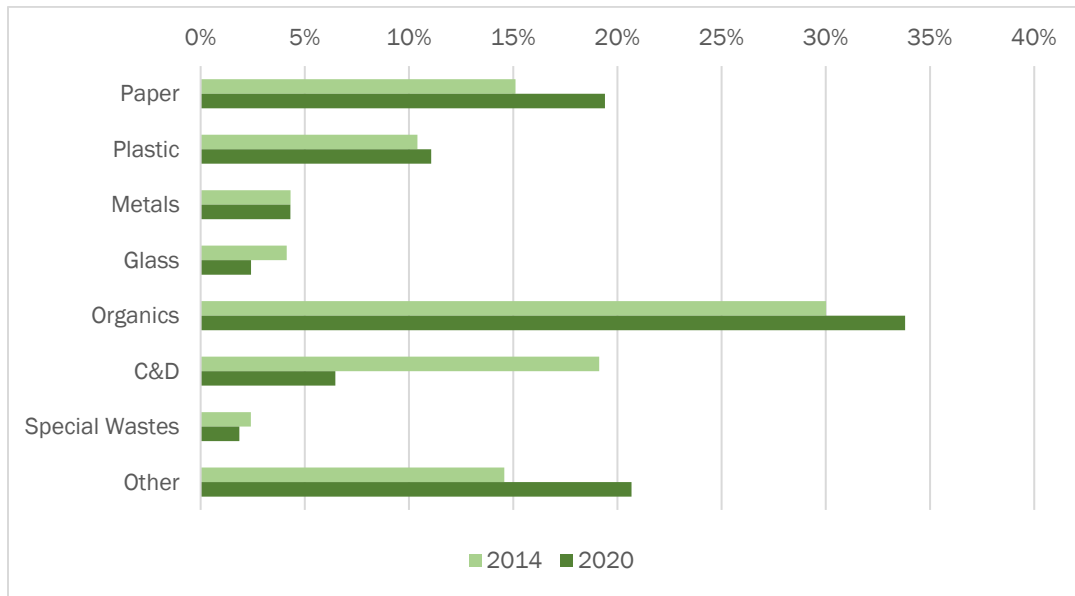


Figure 3-3 Comparison of Aggregate MSW Composition in 2020 and 2014 (Estimated Tonnage)

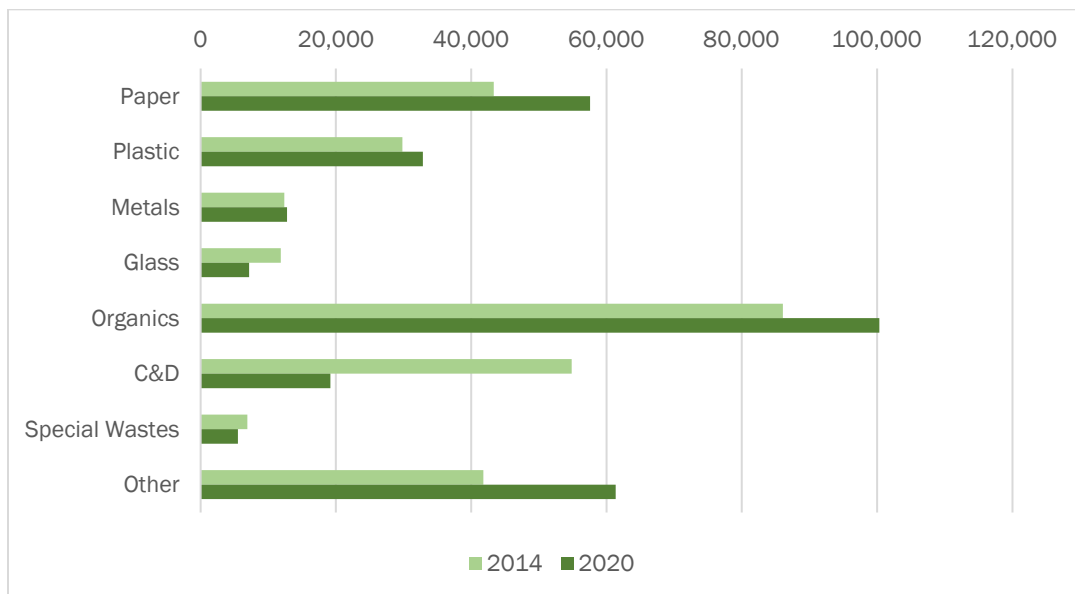
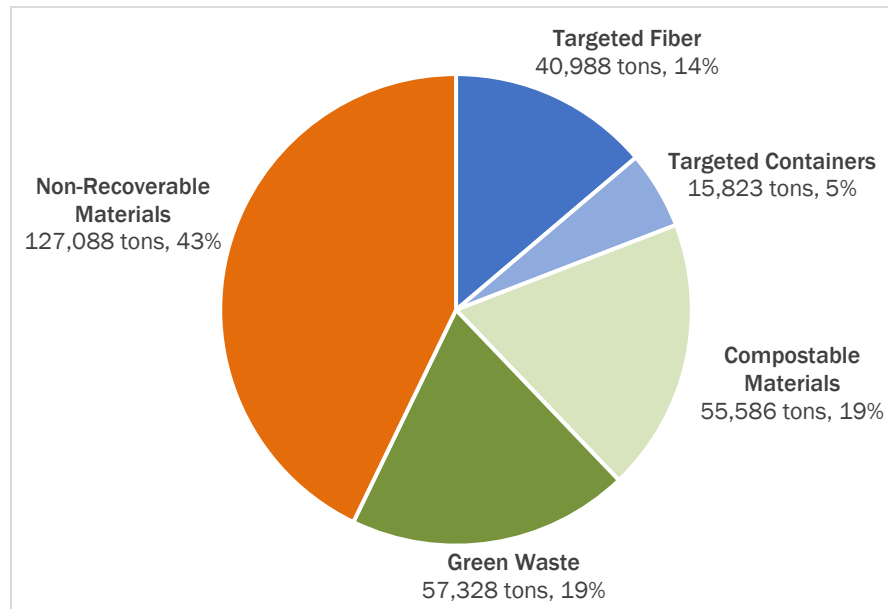


Figure 3-4 illustrates the recyclability of the 2020 aggregate disposed MSW stream. This graphic shows that the majority of the materials being disposed could be diverted through a combination of recycling and composting (or other organics recovery) programs. It should be noted that this graphic omits the impact of contamination, and as a practical matter it is not possible for all of the divertible materials to actually be diverted. Nonetheless, this chart suggests that there is a significant fraction of materials that could be diverted from disposal.

Figure 3-4 Recyclability of Aggregate Disposed Wastes



Please refer to detailed composition tables in Appendix A of this report for a complete statistical summary of material composition.

3.1.1 SINGLE AND MULTI-FAMILY RESIDENTIAL WASTE COMPOSITION

The residential portion of the MSW stream is comprised of single and multi-family generators. According to our gate survey data, approximately 90% of the residential waste stream within Ada County is from single-family households; the remaining 10% is from multi-family households.

There was an estimated 195,576 tons of residential refuse disposed in 2020, with 177,873 tons attributed as single-family waste and 17,704 tons as multi-family waste. Figure 3-5 summarizes the composition of the residential refuse stream by major material group. Similar to the Aggregate MSW composition, organics comprise the largest fraction of the disposed residential waste sector, followed other wastes, and paper. It should be noted that Figure 3-5 presents the waste composition by material group only and is not intended to identify recyclable materials. The recoverability of materials in this waste stream is provided elsewhere in this section, and the complete composition data for individual material categories is presented in Appendix A.

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Figure 3-5 Residential MSW Composition by Material Group

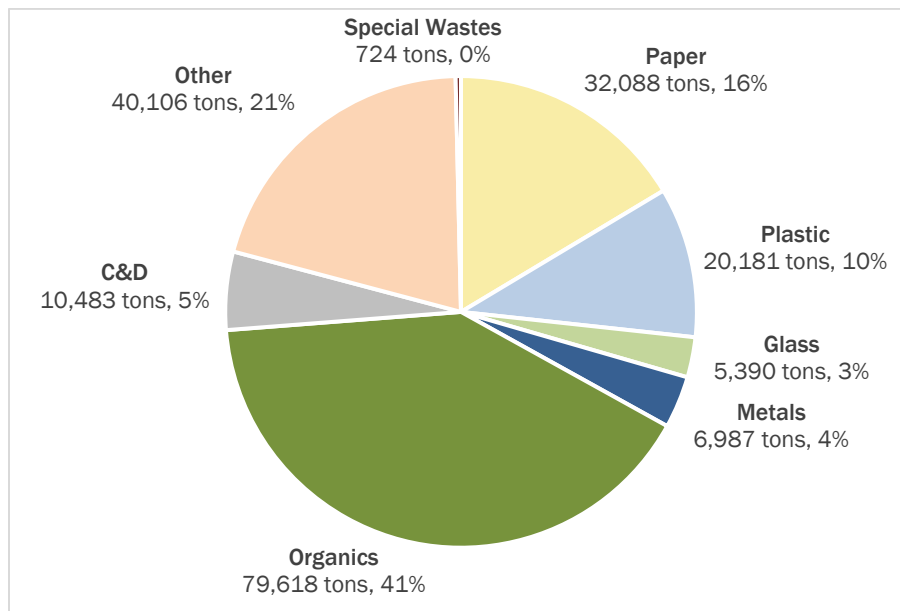


Figure 3-6 compares the single and multi-family residential disposed waste streams based on percentage composition. Generally, single family wastes contained higher percentages of organics (as yard waste), while multi-family wastes contained higher percentages of cardboard boxes and furniture due to more frequent move-in and move-out activity.

Figure 3-6 Comparison of Single and Multi-Family Residential MSW Composition (Percent)

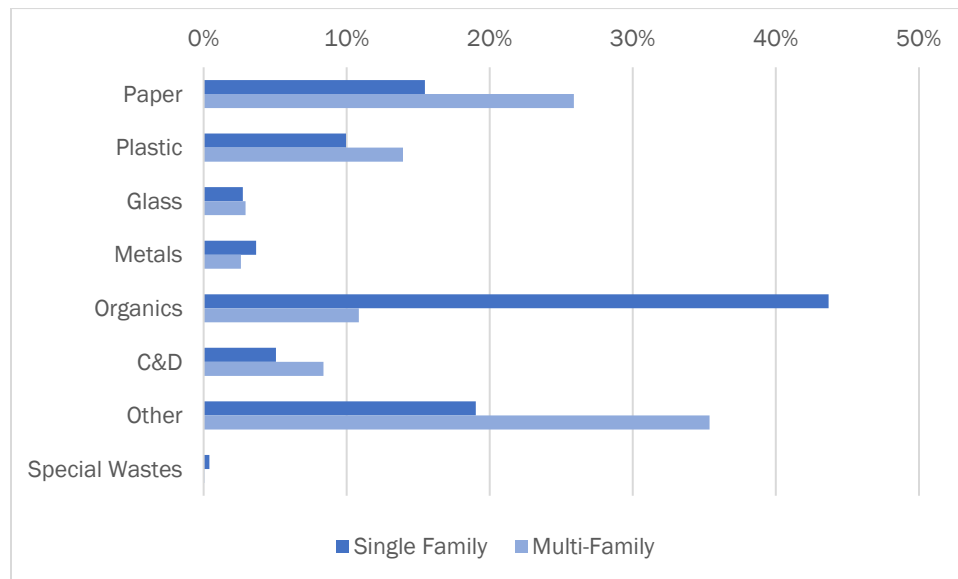
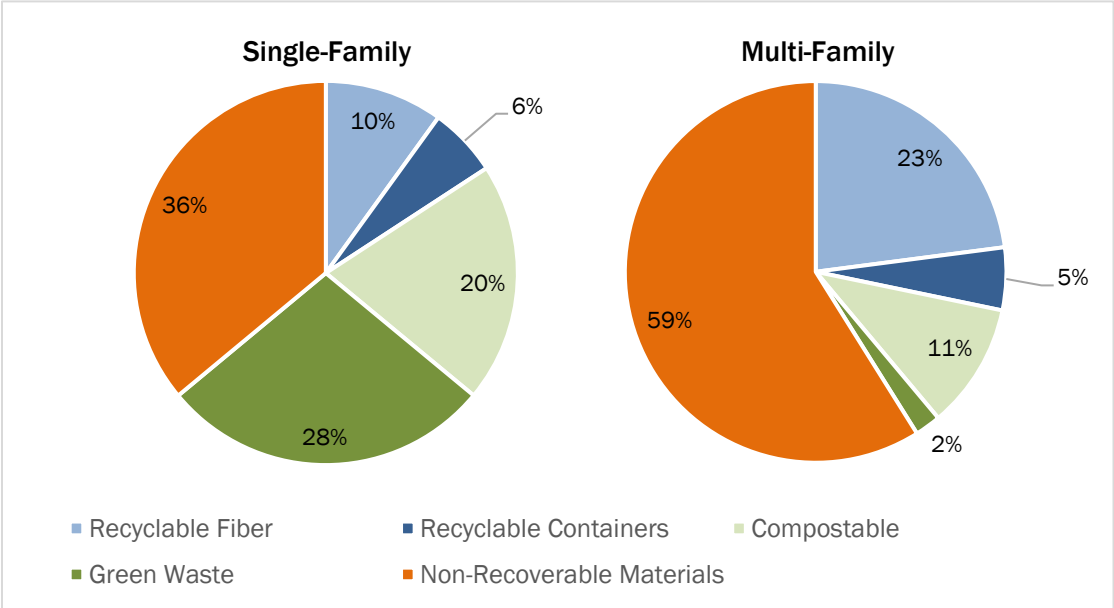


Figure 3-7 compares the recoverability of the single and multi-family residential disposed waste streams. The significant difference between the residential sectors is driven by the high proportion of yard waste in the single-family stream which was largely absent in the multi-family stream.

Figure 3-7 Recoverability of Single and Multi-Family Wastes



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Figure 3-8 and Figure 3-9 compare single-family and multi-family wastes, respectively, in 2014 and 2020.

Figure 3-8 Single-Family MSW Comparison, 2014 vs 2020

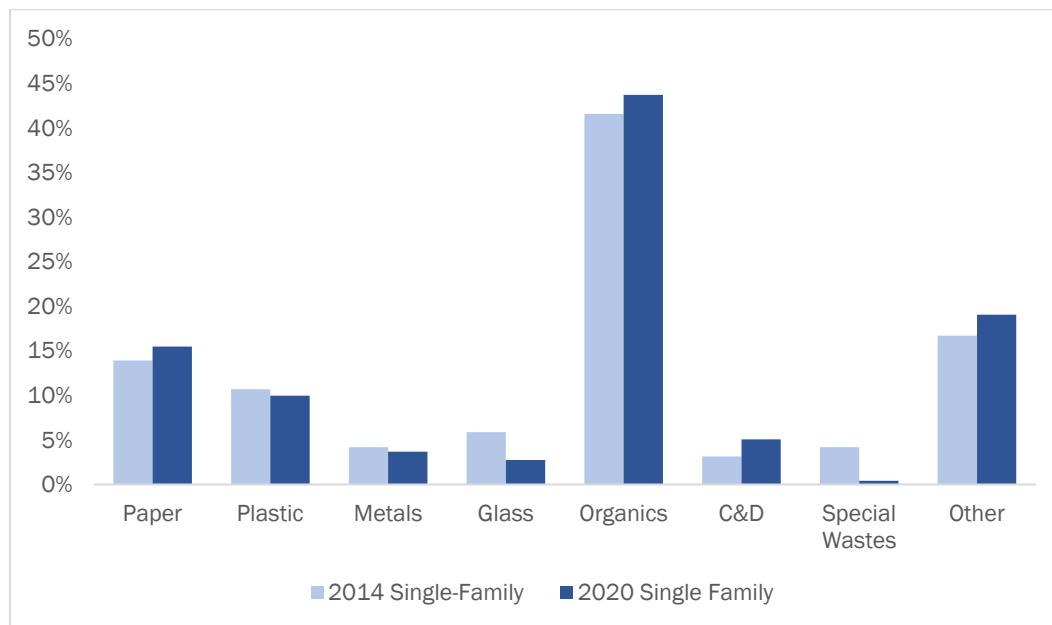
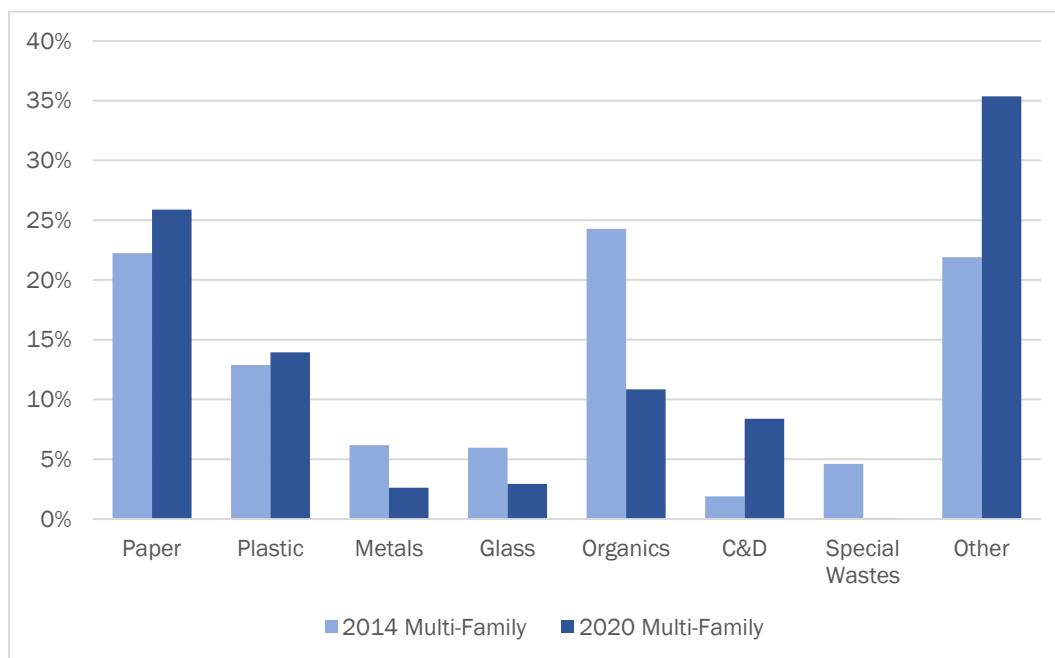


Figure 3-9 Multi-Family Waste Comparison, 2014 vs 2020



3.1.2 ICI WASTE COMPOSITION

There were an estimated 101,236 tons of ICI refuse disposed at Ada County Landfill in 2020. Figure 3-10 shows the breakdown by major material group in the ICI waste stream. Paper makes up the largest fraction, followed by Other Waste, and Organics. It should be noted that Figure 3-10 presents the waste

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composition by material group only and is not intended to identify recyclable materials. The recoverability of materials in this waste stream is provided in Figure 3-11, and the complete composition data for individual material categories is presented in Appendix A.

Figure 3-10 ICI Waste Composition by Material Group and Estimated Tons

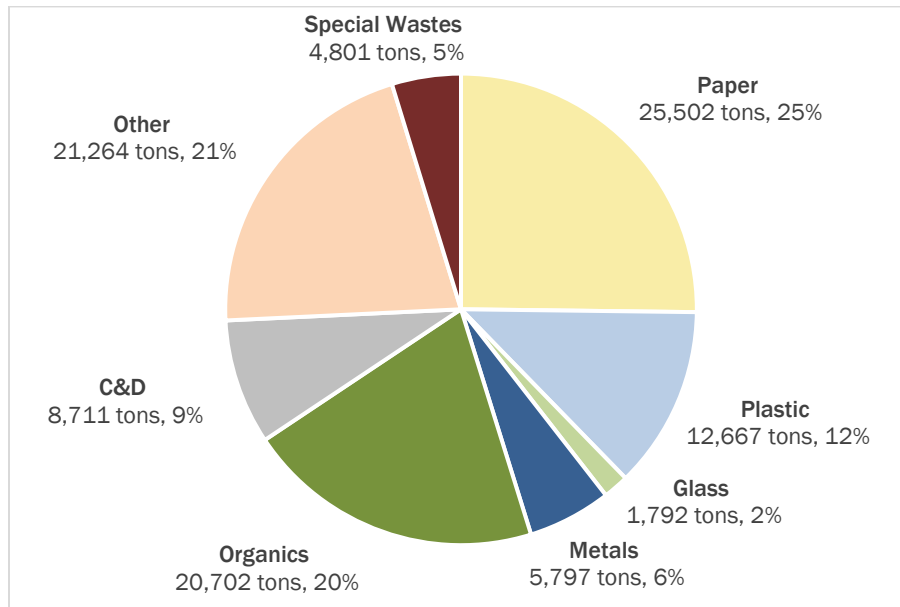
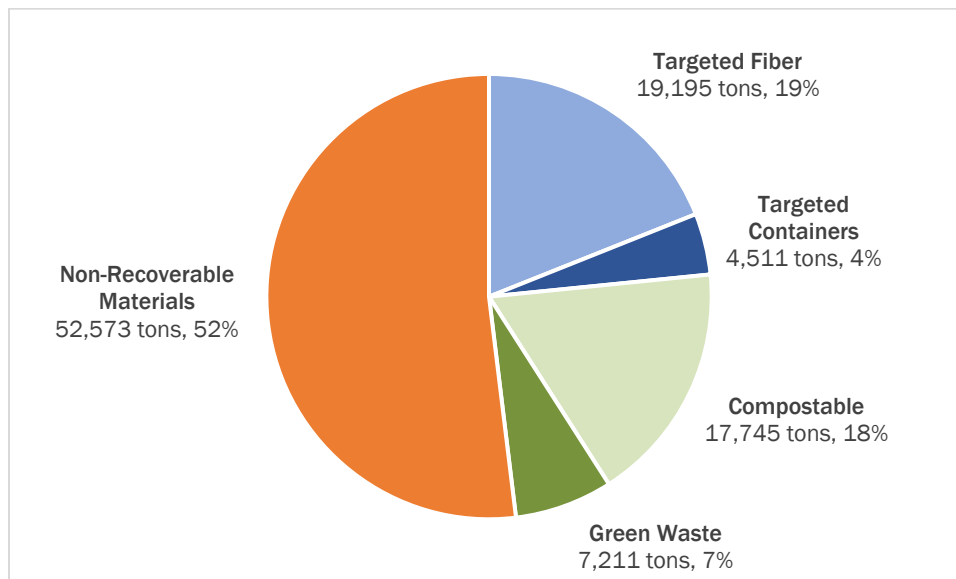
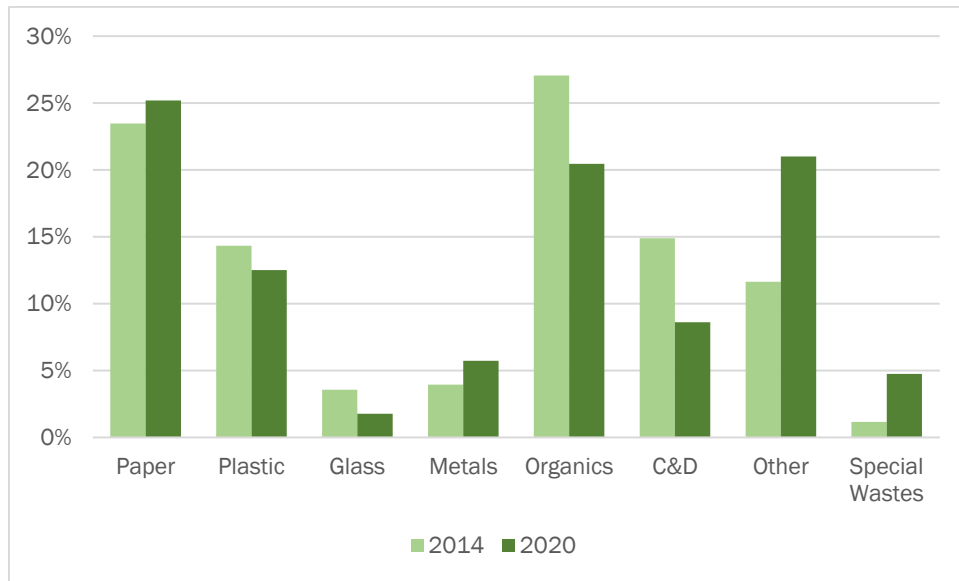


Figure 3-11 ICI Waste Recoverability



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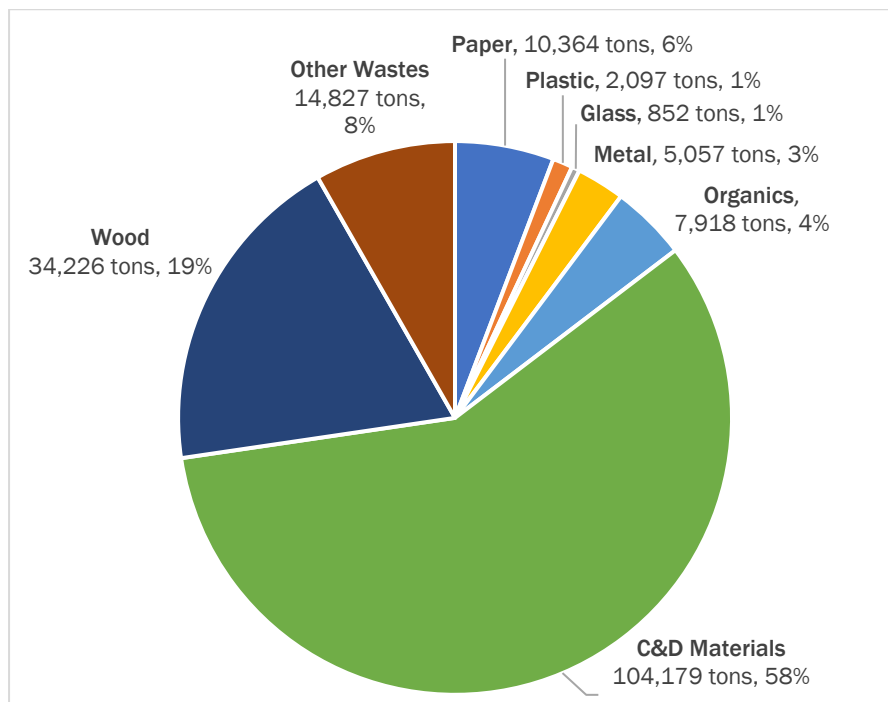
Figure 3-12 ICI Waste Comparison, 2014 vs 2020



3.2 C&D AND BULKY/DRY WASTE COMPOSITION

There were 134,825 tons of C&D debris and 44,694 tons of Bulky/Dry Waste disposed at Ada County Landfill in 2020. Figure 3-13 presents the breakdown of this material in aggregate, using similar material groups as used for MSW. Not surprisingly, much of the composition is expected to be found in C&D waste, (concrete, roofing, gypsum board), followed by wood and paper materials, etc. Tables providing the complete composition data for individual material categories is presented in Appendix A.

Figure 3-13 Composition of C&D and Bulky/Dry Wastes and Estimated Tons



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Table 3-1 compares the recoverability of C&D and Bulky/Dry wastes separately, and in aggregate.

Table 3-1 Recoverability of C&D Materials and Bulky/Dry Wastes

Recoverability	Bulky/Dry Waste	C&D Materials	Aggregate
Broadly Recyclable	31.0%	29.4%	29.8%
Recyclable in Select Markets	2.8%	26.8%	20.8%
Boiler Fuel Feedstock	9.9%	21.6%	18.7%
Non-Recoverable Materials	56.4%	22.3%	30.8%
Total	100.0%	100.0%	100.0%

Table 3-2 lists the top five recoverable materials from the aggregated C&D and Bulky/Dry Wastes as surveyed during this study. It should be noted that this list does not include segregated loads containing wood, as this material is separately tracked by Ada County Landfill. It is not surprising that the denser materials tend to dominate the weight of C&D debris and dry/bulky wastes.

Table 3-2 Top 5 Recoverable Materials in Aggregated C&D and Bulky/Dry Waste Streams

Material	Percent	FY2020 Tons
Concrete, Brick, Block	15.7%	28,089
Roofing Shingles	13.3%	23,887
Rock/Gravel	8.9%	15,898
Gypsum Wallboard - Clean	6.7%	12,052
Engineered Wood	6.5%	11,717
Total	51.1%	91,642

Figure 3-14 compares the percent composition of material groups in C&D and Bulky/Dry loads as characterized during the visual surveys. Figure 3-15 depicts the same comparison with the composition percentage applied to the estimated tonnages of each waste stream.

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Figure 3-14 Comparison of C&D and Bulky/Dry Waste Loads by Percentage

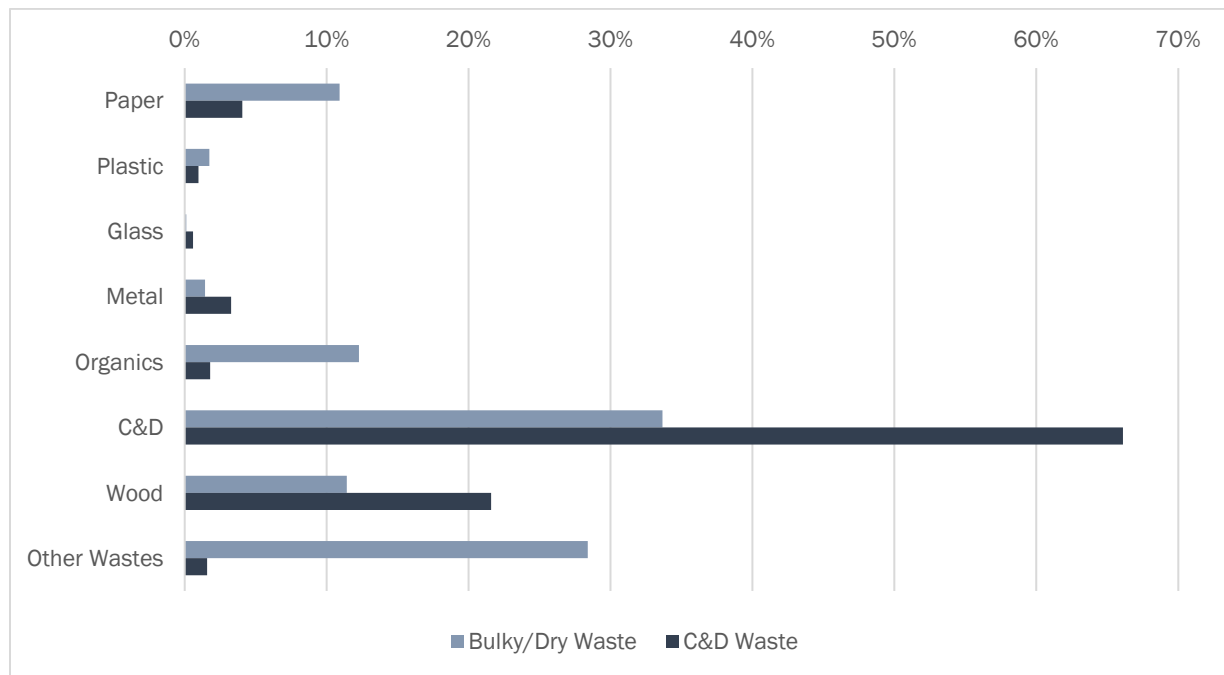
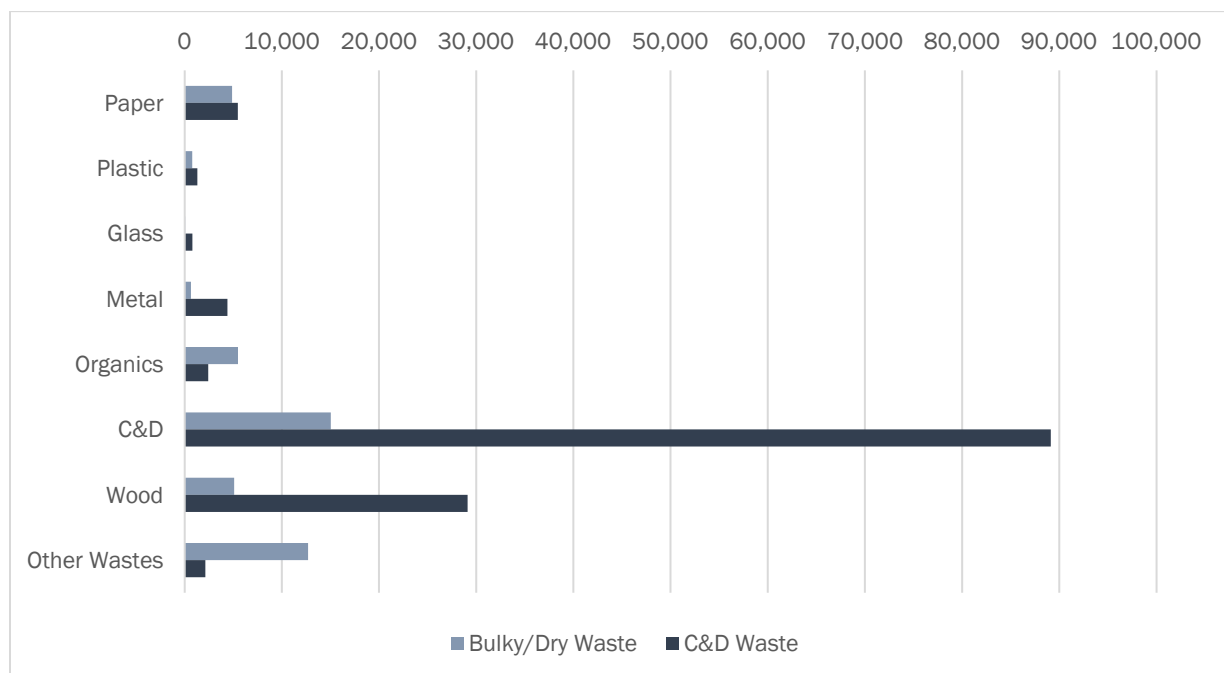


Figure 3-15 Comparison of C&D and Bulky/Dry Waste Loads by FY2020 Tons



Finally, Figure 3-16 compares the composition of C&D loads from 2014 and 2020, while Figure 3-17 compares Dry/Bulky Waste loads between 2014 and 2020. It should be noted that the 2014 and 2020 Studies used significantly different methodologies for estimating the composition of these streams. The 2014 Study attempted to sample and manually sort materials from C&D and non-compacted (dry/bulky)

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waste. Conversely, the 2020 Study applied a more holistic approach to surveying entire loads of these material and correlating the estimated weight to the actual scale ticket weight. In the opinion of MSW Consultants, the 2020 composition estimates are more representative of inbound loads of these materials.

Figure 3-16 Comparison of C&D Materials Composition 2020 and 2014

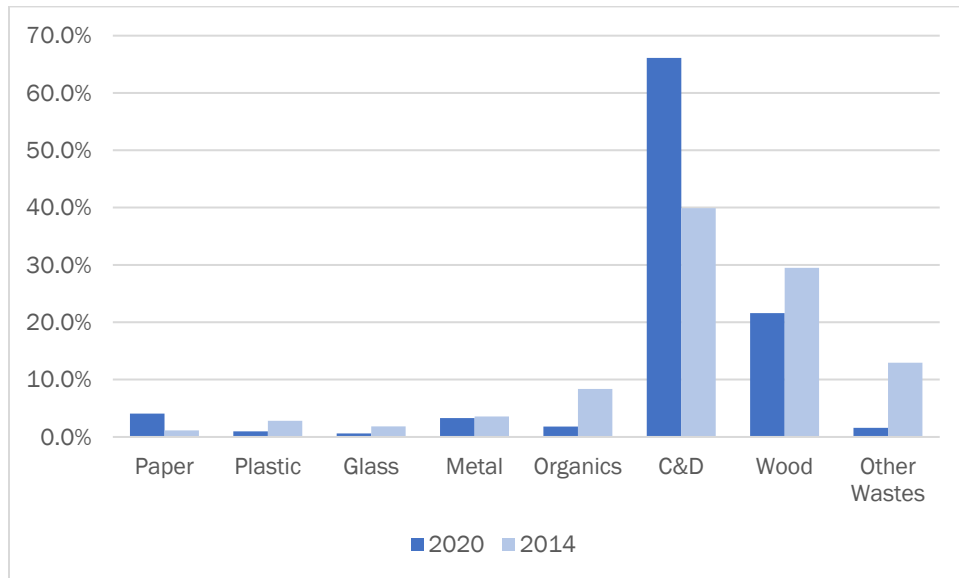
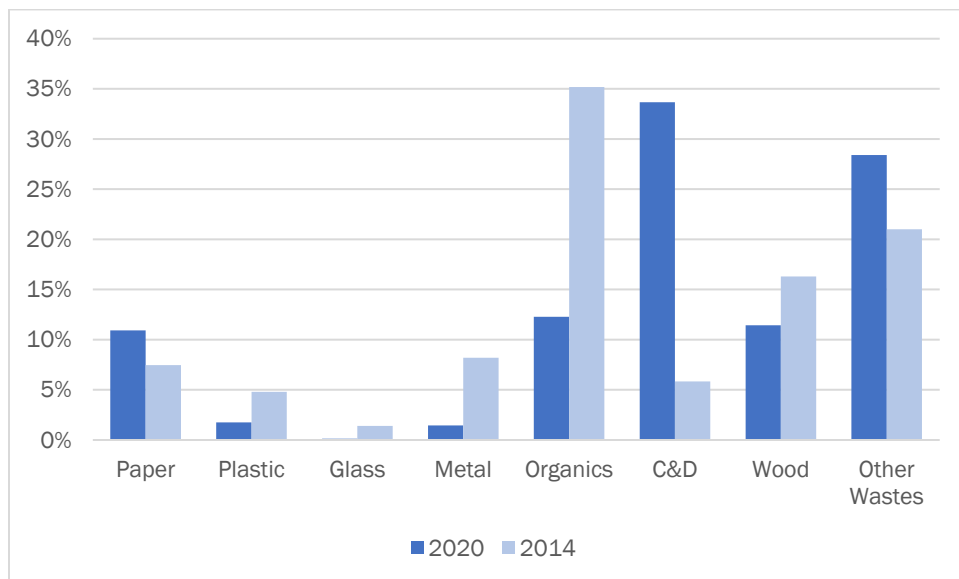


Figure 3-17 Comparison of Bulky/Dry Waste Composition 2020 and 2014



3. RESULTS

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4. CONCLUSIONS & RECOMMENDATIONS

4.1 CONCLUSIONS

- ◆ **Impact of COVID-19:** It was not predicable at the outset of this project that a global pandemic would strike after the first season of data collection. It is also not possible to state with certainty the impact on disposed waste composition that may have resulted. The generation of MSW shifted from the ICI stream to the residential stream as employees converted from office to teleworking. Anecdotally, home delivery of products also increased due to the change in behaviors, which theoretically would have increased the amount of corrugated cardboard and other packaging waste generated in the residential sector (although this trend had been well underway even before COVID). It is possible that the composition of wastes calculated as a result of this study may have differed had the entire data collection effort occurred before the onset of COVID. However, MSW Consultants believes that the findings are nonetheless informative of Ada County's waste generating and disposal behaviors.
- ◆ **Profusion of Yard Debris to Landfill:** Given that the sampling and sorting for this project was performed over four seasons, a noteworthy conclusion to be drawn is that yard debris disposal in the landfill is noticeably high. The incidence of yard debris contained in the MSW stream, primarily from the single-family and ICI generator sectors, suggests a meaningful opportunity to increase diversion of this material, albeit at some expense to implement or enhance residential collection programs. Yard debris is highly divertible and can be mulched or composted (or contribute to a digestion feedstock).
- ◆ **Opportunity for Increasing Diversion:** This study only focused on disposed wastes, and did not attempt to characterize the residential and commercial recyclables being diverted from the County. Consequently, it is harder to evaluate the effectiveness of current recycling programs. Even in communities known for the most aggressive and widespread recycling programs, some targeted recyclables still get disposed, either through carelessness, apathy, or because the targeted recyclable item was too contaminated to place in the recycling stream (e.g., newspaper used as animal bedding for a small pet). In the professional opinion of MSW Consultants, there may be some opportunity to improve the capture of recyclable cardboard and mixed residential paper in the residential stream, and it appears that commercial cardboard recycling could also improve (although this finding may be attributable to temporary COVID-related factors).
- ◆ **Textile Recycling Potential:** The findings of this study are consistent with other studies across the US that have found that a significant percentage of disposed waste are made up of textiles (both clothing and non-clothing). Some regions have attracted more aggressive textile recycling businesses, and there may be an opportunity in Ada County for this service.
- ◆ **Increasing Multi-family Recycling:** Although sampling from the multi-family sector was relatively limited, results suggest that there is a higher percentage of corrugated cardboard being disposed in multi-family apartments. This makes intuitive sense given the turnover among residents in these housing units, and the accompanying use of boxes for move-in and move-out activities. There may be an opportunity to increase diversion from the multi-family sector in the County.
- ◆ **Comparability to 2014 Study:** MSW Consultants offers the following opinion on the methodology of the 2014 and 2020 Studies:
 - ◆ **MSW Composition:** The manual sampling and sorting methodology performed on the MSW stream was comparable in both studies, and the results are also relatively comparable. The data suggest that the County's MSW composition has remained fairly stable over the past six years.
 - ◆ **C&D and Bulky/Dry Waste Composition:** Conversely, the 2020 Study applied a more holistic, volumetric survey-based approach to characterizing the C&D and bulk waste streams. Rather than sorting approximately 12 tons of manually sampled materials from these streams as was done

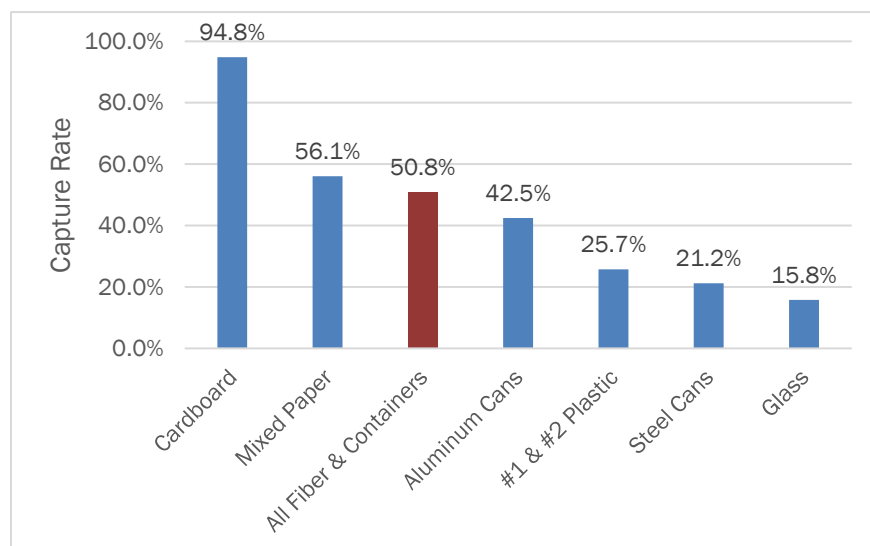
4. CONCLUSIONS AND RECOMMENDATIONS

in 2014, the 2020 Study visually characterized 364 tons of material contained in 159 inbound loads, and incorporated a process to correlate the estimated weight with the actual scale ticket weight to ensure accuracy.

4.2 RECOMMENDATIONS

- ◆ **Focus on Optimizing and Expanding Yard Waste Collection:** Despite curbside yard waste collection being provided to many residential households in the County, there is still a significant percentage of yard debris being disposed. It was beyond the scope of this study to determine why yard waste was as high as it is in the residential sector, and even in Boise which has a curbside compost program. Shifting yard waste from landfill to other outlets would conserve landfill space and return these nutrients to the local economy.
- ◆ **Maintain Public Education and Minimize Contamination of Recyclables:** Although a more in-depth evaluation of the effectiveness of recycling programs in the County was not part of the scope of this project, it appears that some targeted recyclables are still finding their way to the disposal stream. It will therefore continue to be important to maintain routine and clear outreach, and potentially to monitor, educate, and potentially enforce set-out requirements to minimize contamination in the recycling stream.
- ◆ **Consider Expanding to a Full Recycling Capture Rate Study:** The recycling industry has recently identified a metric known as a “capture rate” which is simply the percentage of a targeted recyclable material that is actually captured in a recycling program. Capture rates are a highly informative metric that supplement the recycling rate. Capture rates are calculated for individual recyclable commodities, and indicate which materials are recycled from most to least effectively. For example, if half of the households used the curbside program in Boise and recycled 100 percent of their aluminum cans, this would equate to a 50 percent capture rate. Because most recyclable are collected in single stream, it is also necessary to perform a composition analysis on single stream recyclables, so that disposed and recycled quantities of each targeted recyclable are known values. Figure 4-1 shows a graphical example of the results of a capture rate study.

Figure 4-1 Example of Recycling Capture Rates for Curbside Recyclables



- ◆ **Continue to Perform and/or Update Waste Studies:** Understanding the composition of disposed wastes is critical to the development of long-term solid waste planning efforts associated with disposal

4. CONCLUSIONS AND RECOMMENDATIONS

facility planning, recycling and diversion goal-setting, and general sustainability performance of the waste management system. The County should continue to update this study at reasonable intervals.

4. CONCLUSIONS AND RECOMMENDATIONS

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APPENDIX A

DETAILED RESULTS TABLES

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2019 - 2020 Ada County Waste Composition Study

Summary Comparison Table - Single-Family Residential, Multi-Family Residential, ICI and Adjusted Aggregate

Material Category	SF RES Percent	MF RES Percent	ICI Percent	Adjusted Agg. Percent	City of Boise Percent
Paper	15.5%	25.9%	25.2%	19.4%	17.3%
Newspaper	0.8%	1.4%	0.7%	0.8%	0.9%
Corrugated Cardboard/Kraft Paper (Uncoated)	5.8%	17.9%	15.2%	9.7%	7.1%
Mixed Recyclable Paper	3.4%	3.7%	3.1%	3.3%	3.4%
Compostable Paper	4.5%	2.0%	4.2%	4.2%	4.6%
Other Non-Recyclable Paper	1.0%	1.0%	2.0%	1.4%	1.3%
Plastic	10.0%	13.9%	12.5%	11.1%	11.0%
PET (#1) Bottles	0.8%	0.7%	0.7%	0.8%	0.9%
PET (#1) Non-bottle Containers	0.2%	0.1%	0.1%	0.2%	0.2%
HDPE (#2) Natural Bottles	0.2%	0.2%	0.3%	0.2%	0.2%
HDPE (#2) Colored Bottles	0.2%	0.3%	0.2%	0.2%	0.3%
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	0.0%	0.0%	0.0%
Rigid Containers #3, #4, #6 and #7	0.1%	0.1%	0.2%	0.1%	0.1%
#5 Rigid Plastic Containers	0.3%	0.3%	0.3%	0.3%	0.4%
Expanded Polystyrene "Styrofoam"	0.5%	1.8%	0.4%	0.6%	0.5%
Bags & Film	4.0%	2.3%	5.7%	4.5%	4.7%
Durable/Bulky Rigid Plastics	2.1%	5.9%	1.8%	2.2%	1.9%
Remainder/Composite Plastic	1.5%	2.3%	2.7%	1.9%	1.7%
Metals	3.7%	2.6%	5.7%	4.3%	3.7%
Steel Cans & Lids	0.7%	0.2%	1.0%	0.8%	0.6%
Other Ferrous Metals (Magnetic)	1.3%	0.1%	1.7%	1.3%	1.6%
Aluminum Cans and Foils	0.8%	0.7%	0.5%	0.7%	1.0%
Other Non-Ferrous Metals (Not Magnetic)	0.2%	0.2%	0.2%	0.2%	0.1%
Other Mixed Metals	0.7%	1.4%	2.3%	1.3%	0.4%
Glass	2.7%	2.9%	1.8%	2.4%	3.7%
Clear Glass Bottles	1.2%	2.0%	0.7%	1.1%	1.7%
Brown Glass Bottles	0.6%	0.5%	0.3%	0.5%	0.7%
Green Glass Bottles	0.8%	0.3%	0.2%	0.5%	1.2%
Remainder/Composite Glass	0.2%	0.2%	0.5%	0.3%	0.1%
Organics	43.7%	10.8%	20.4%	33.8%	35.7%
Food Waste	15.7%	8.6%	13.3%	14.5%	21.6%
Yard Debris	28.0%	2.2%	7.1%	19.3%	14.1%
C&D	5.1%	8.4%	8.6%	6.5%	7.7%
Wood - Treated/Painted/Stained	1.9%	3.1%	1.8%	1.9%	3.0%
Wood - Untreated/Clean	1.3%	3.9%	4.3%	2.5%	1.7%
Remainder/Composite Construction & Demolition	1.8%	1.4%	2.5%	2.0%	3.0%
Special Wastes	0.4%	0.1%	4.7%	1.9%	0.4%
Actual Hazardous Wastes	0.0%	0.0%	0.0%	0.0%	0.0%
Automotive Products Hazardous Wastes	0.1%	0.0%	0.1%	0.1%	0.0%
Garden Products Hazardous Wastes	0.0%	0.0%	0.0%	0.0%	0.0%
Paints & Solvents	0.0%	0.0%	0.0%	0.0%	0.0%
Other Special Wastes	0.3%	0.0%	4.6%	1.7%	0.4%
Other	19.0%	35.4%	21.0%	20.7%	20.5%
E-Waste	0.6%	0.6%	0.3%	0.5%	1.1%
Other Electronics	0.7%	0.2%	0.1%	0.5%	1.4%
Textiles	3.9%	6.0%	4.6%	4.3%	2.7%
Rubber	0.2%	0.2%	0.6%	0.3%	0.3%
Diapers/Sanitary Products	2.5%	2.1%	0.9%	2.0%	2.4%
Carpet & Carpet Padding	1.3%	2.7%	1.6%	1.5%	1.9%
Tires	0.1%	2.0%	0.4%	0.3%	0.1%
Furniture	1.9%	17.3%	4.2%	3.6%	3.2%
Remainder/Composite Organics	3.4%	1.4%	5.8%	4.1%	2.3%
Ash/Dust	0.0%	0.0%	0.0%	0.0%	0.0%
Miscellaneous Inorganics	1.1%	1.4%	1.1%	1.1%	1.4%
Other Materials Not Elsewhere Classified	0.3%	0.1%	0.1%	0.2%	0.2%
Fines/Residuals	2.9%	1.4%	1.3%	2.3%	3.4%
Actual Sample Totals	102	8	50	160	29
Targeted Sample Totals	96	8	56	160	N/A

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - All Ada County Manual Sort Samples - Seasons 1-4 - Adjusted

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	19.4%	1.7%	57,590	Organics	33.8%	3.0%	100,319
Newspaper	0.8%	0.2%	2,337	Food Waste	14.5%	1.6%	42,991
Corrugated Cardboard/Kraft Paper (Uncoated)	9.7%	1.5%	28,799	Yard Debris	19.3%	2.9%	57,328
Mixed Recyclable Paper	3.3%	0.5%	9,852	C&D	6.5%	1.4%	19,194
Compostable Paper	4.2%	0.4%	12,595	Wood - Treated/Painted/Stained	1.9%	0.6%	5,714
Other Non-Recyclable Paper	1.4%	0.5%	4,008	Wood - Untreated/Clean	2.5%	0.8%	7,396
Plastic	11.1%	1.1%	32,848	Remainder/Composite Construction & Demolition	2.0%	0.9%	6,084
PET (#1) Bottles	0.8%	0.1%	2,292	Special Wastes	1.9%	1.5%	5,525
PET (#1) Non-bottle Containers	0.2%	0.0%	513	Actual Hazardous Wastes	0.0%	0.0%	45
HDPE (#2) Natural Bottles	0.2%	0.1%	680	Automotive Products Hazardous Wastes	0.1%	0.1%	328
HDPE (#2) Colored Bottles	0.2%	0.0%	675	Garden Products Hazardous Wastes	0.0%	0.0%	14
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	40	Paints & Solvents	0.0%	0.0%	33
Rigid Containers #3, #4, #6 and #7	0.1%	0.0%	445	Other Special Wastes	1.7%	1.5%	5,104
#5 Rigid Plastic Containers	0.3%	0.0%	928	Other	20.7%	2.3%	61,370
Expanded Polystyrene "Styrofoam"	0.6%	0.2%	1,653	E-Waste	0.5%	0.3%	1,508
Bags & Film	4.5%	0.6%	13,257	Other Electronics	0.5%	0.3%	1,383
Durable/Bulky Rigid Plastics	2.2%	0.7%	6,592	Textiles	4.3%	0.9%	12,726
Remainder/Composite Plastic	1.9%	0.5%	5,773	Rubber	0.3%	0.1%	1,016
Metals	4.3%	1.0%	12,783	Diapers/Sanitary Products	2.0%	0.4%	5,813
Steel Cans & Lids	0.8%	0.3%	2,288	Carpet & Carpet Padding	1.5%	0.8%	4,512
Other Ferrous Metals (Magnetic)	1.3%	0.6%	3,939	Tires	0.3%	0.2%	826
Aluminum Cans and Foils	0.7%	0.1%	2,088	Furniture	3.6%	1.3%	10,642
Other Non-Ferrous Metals (Not Magnetic)	0.2%	0.1%	685	Remainder/Composite Organics	4.1%	1.5%	12,176
Other Mixed Metals	1.3%	0.8%	3,784	Ash/Dust	0.0%	0.0%	78
Glass	2.4%	0.3%	7,182	Miscellaneous Inorganics	1.1%	0.4%	3,360
Clear Glass Bottles	1.1%	0.2%	3,168	Other Materials Not Elsewhere Classified	0.2%	0.1%	624
Brown Glass Bottles	0.5%	0.1%	1,521	Fines/Residuals	2.3%	0.3%	6,707
Green Glass Bottles	0.5%	0.1%	1,630				
Remainder/Composite Glass	0.3%	0.2%	863				
Grand Total					100.0%		296,812
Number of Samples					160		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - All Single and Multi-Family Ada County Manual Sort Samples - Seasons 1-4 - Adjusted

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	16.4%	1.4%	32,088	Organics	40.7%	3.3%	79,618
Newspaper	0.9%	0.2%	1,666	Food Waste	15.1%	1.4%	29,500
Corrugated Cardboard/Kraft Paper (Uncoated)	6.9%	1.2%	13,420	Yard Debris	25.6%	3.6%	50,117
Mixed Recyclable Paper	3.4%	0.6%	6,707	C&D	5.4%	1.3%	10,483
Compostable Paper	4.3%	0.4%	8,340	Wood - Treated/Painted/Stained	2.0%	0.8%	3,916
Other Non-Recyclable Paper	1.0%	0.2%	1,955	Wood - Untreated/Clean	1.6%	0.6%	3,044
Plastic	10.3%	1.0%	20,181	Remainder/Composite Construction & Demolition	1.8%	0.9%	3,523
PET (#1) Bottles	0.8%	0.1%	1,603	Special Wastes	0.4%	0.2%	724
PET (#1) Non-bottle Containers	0.2%	0.0%	391	Actual Hazardous Wastes	0.0%	0.0%	14
HDPE (#2) Natural Bottles	0.2%	0.0%	348	Automotive Products Hazardous Wastes	0.1%	0.1%	182
HDPE (#2) Colored Bottles	0.2%	0.0%	445	Garden Products Hazardous Wastes	0.0%	0.0%	14
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	29	Paints & Solvents	0.0%	0.0%	21
Rigid Containers #3, #4, #6 and #7	0.1%	0.0%	264	Other Special Wastes	0.3%	0.2%	493
#5 Rigid Plastic Containers	0.3%	0.1%	670	Other	20.5%	2.3%	40,106
Expanded Polystyrene "Styrofoam"	0.6%	0.2%	1,215	E-Waste	0.6%	0.4%	1,228
Bags & Film	3.8%	0.3%	7,460	Other Electronics	0.7%	0.4%	1,327
Durable/Bulky Rigid Plastics	2.4%	0.9%	4,753	Textiles	4.1%	0.8%	8,074
Remainder/Composite Plastic	1.5%	0.2%	3,002	Rubber	0.2%	0.1%	419
Metals	3.6%	0.9%	6,987	Diapers/Sanitary Products	2.5%	0.5%	4,856
Steel Cans & Lids	0.6%	0.2%	1,234	Carpet & Carpet Padding	1.5%	0.8%	2,845
Other Ferrous Metals (Magnetic)	1.2%	0.7%	2,264	Tires	0.2%	0.2%	451
Aluminum Cans and Foils	0.8%	0.2%	1,553	Furniture	3.3%	1.3%	6,421
Other Non-Ferrous Metals (Not Magnetic)	0.2%	0.2%	479	Remainder/Composite Organics	3.2%	1.7%	6,259
Other Mixed Metals	0.7%	0.5%	1,457	Ash/Dust	0.0%	0.0%	66
Glass	2.8%	0.4%	5,390	Miscellaneous Inorganics	1.2%	0.4%	2,260
Clear Glass Bottles	1.3%	0.2%	2,464	Other Materials Not Elsewhere Classified	0.3%	0.1%	535
Brown Glass Bottles	0.6%	0.1%	1,171	Fines/Residuals	2.7%	0.4%	5,367
Green Glass Bottles	0.7%	0.2%	1,402				
Remainder/Composite Glass	0.2%	0.1%	353				
Grand Total					100.0%		195,576
Number of Samples					110		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - Ada County Manual Sort - Single-Family Residential Samples

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	15.5%	1.4%	27,506	Organics	43.7%	3.3%	77,698
Newspaper	0.8%	0.2%	1,422	Food Waste	15.7%	1.4%	27,970
Corrugated Cardboard/Kraft Paper (Uncoated)	5.8%	1.1%	10,259	Yard Debris	28.0%	3.7%	49,728
Mixed Recyclable Paper	3.4%	0.6%	6,052	C&D	5.1%	1.4%	9,000
Compostable Paper	4.5%	0.4%	7,987	Wood - Treated/Painted/Stained	1.9%	0.8%	3,371
Other Non-Recyclable Paper	1.0%	0.2%	1,786	Wood - Untreated/Clean	1.3%	0.6%	2,354
Plastic	10.0%	1.0%	17,713	Remainder/Composite Construction & Demolition	1.8%	0.9%	3,276
PET (#1) Bottles	0.8%	0.1%	1,473	Special Wastes	0.4%	0.2%	714
PET (#1) Non-bottle Containers	0.2%	0.0%	373	Actual Hazardous Wastes	0.0%	0.0%	9
HDPE (#2) Natural Bottles	0.2%	0.0%	308	Automotive Products Hazardous Wastes	0.1%	0.1%	182
HDPE (#2) Colored Bottles	0.2%	0.0%	401	Garden Products Hazardous Wastes	0.0%	0.0%	14
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	27	Paints & Solvents	0.0%	0.0%	17
Rigid Containers #3, #4, #6 and #7	0.1%	0.0%	253	Other Special Wastes	0.3%	0.2%	492
#5 Rigid Plastic Containers	0.3%	0.1%	610	Other	19.0%	2.4%	33,846
Expanded Polystyrene "Styrofoam"	0.5%	0.1%	904	E-Waste	0.6%	0.5%	1,127
Bags & Film	4.0%	0.3%	7,054	Other Electronics	0.7%	0.5%	1,293
Durable/Bulky Rigid Plastics	2.1%	0.9%	3,708	Textiles	3.9%	0.8%	7,008
Remainder/Composite Plastic	1.5%	0.2%	2,602	Rubber	0.2%	0.1%	381
Metals	3.7%	1.0%	6,524	Diapers/Sanitary Products	2.5%	0.5%	4,491
Steel Cans & Lids	0.7%	0.2%	1,195	Carpet & Carpet Padding	1.3%	0.8%	2,371
Other Ferrous Metals (Magnetic)	1.3%	0.8%	2,247	Tires	0.1%	0.0%	92
Aluminum Cans and Foils	0.8%	0.2%	1,434	Furniture	1.9%	1.0%	3,351
Other Non-Ferrous Metals (Not Magnetic)	0.2%	0.2%	444	Remainder/Composite Organics	3.4%	1.8%	6,011
Other Mixed Metals	0.7%	0.5%	1,205	Ash/Dust	0.0%	0.0%	66
Glass	2.7%	0.4%	4,871	Miscellaneous Inorganics	1.1%	0.4%	2,020
Clear Glass Bottles	1.2%	0.2%	2,117	Other Materials Not Elsewhere Classified	0.3%	0.1%	519
Brown Glass Bottles	0.6%	0.1%	1,088	Fines/Residuals	2.9%	0.5%	5,116
Green Glass Bottles	0.8%	0.2%	1,343				
Remainder/Composite Glass	0.2%	0.1%	323				
Grand Total					100.0%		177,873
Number of Samples					102		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - Ada County Manual Sort - Multi-Family Residential Samples

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	25.9%	7.7%	4,582	Organics	10.8%	3.7%	1,920
Newspaper	1.4%	1.5%	244	Food Waste	8.6%	1.8%	1,531
Corrugated Cardboard/Kraft Paper (Uncoated)	17.9%	6.0%	3,161	Yard Debris	2.2%	3.3%	389
Mixed Recyclable Paper	3.7%	2.0%	655	C&D	8.4%	6.3%	1,483
Compostable Paper	2.0%	0.8%	353	Wood - Treated/Painted/Stained	3.1%	4.9%	546
Other Non-Recyclable Paper	1.0%	0.8%	169	Wood - Untreated/Clean	3.9%	4.3%	690
Plastic	13.9%	6.5%	2,468	Remainder/Composite Construction & Demolition	1.4%	2.5%	247
PET (#1) Bottles	0.7%	0.2%	130	Special Wastes	0.1%	0.1%	10
PET (#1) Non-bottle Containers	0.1%	0.1%	18	Actual Hazardous Wastes	0.0%	0.0%	5
HDPE (#2) Natural Bottles	0.2%	0.1%	40	Automotive Products Hazardous Wastes	0.0%	0.0%	0
HDPE (#2) Colored Bottles	0.3%	0.1%	44	Garden Products Hazardous Wastes	0.0%	0.0%	0
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	2	Paints & Solvents	0.0%	0.0%	4
Rigid Containers #3, #4, #6 and #7	0.1%	0.0%	10	Other Special Wastes	0.0%	0.0%	1
#5 Rigid Plastic Containers	0.3%	0.2%	61	Other	35.4%	8.1%	6,261
Expanded Polystyrene "Styrofoam"	1.8%	2.1%	312	E-Waste	0.6%	0.7%	101
Bags & Film	2.3%	0.7%	406	Other Electronics	0.2%	0.4%	34
Durable/Bulky Rigid Plastics	5.9%	5.9%	1,045	Textiles	6.0%	3.5%	1,066
Remainder/Composite Plastic	2.3%	1.1%	400	Rubber	0.2%	0.3%	38
Metals	2.6%	1.9%	462	Diapers/Sanitary Products	2.1%	1.4%	364
Steel Cans & Lids	0.2%	0.2%	40	Carpet & Carpet Padding	2.7%	3.5%	473
Other Ferrous Metals (Magnetic)	0.1%	0.1%	17	Tires	2.0%	3.8%	359
Aluminum Cans and Foils	0.7%	0.3%	119	Furniture	17.3%	9.0%	3,070
Other Non-Ferrous Metals (Not Magnetic)	0.2%	0.2%	35	Remainder/Composite Organics	1.4%	1.6%	248
Other Mixed Metals	1.4%	2.1%	252	Ash/Dust	0.0%	0.0%	0
Glass	2.9%	1.6%	519	Miscellaneous Inorganics	1.4%	1.6%	240
Clear Glass Bottles	2.0%	1.2%	347	Other Materials Not Elsewhere Classified	0.1%	0.1%	16
Brown Glass Bottles	0.5%	0.5%	83	Fines/Residuals	1.4%	0.5%	252
Green Glass Bottles	0.3%	0.5%	59				
Remainder/Composite Glass	0.2%	0.3%	30				
Grand Total					100.0%		17,704
Number of Samples					8		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - Ada County Manual Sort - City of Boise Residential Samples

Material Category	Est. Percent	Conf. Int (+/-)	Material Category	Est. Percent	Conf. Int (+/-)
Paper	17.3%	2.6%	Organics	35.7%	4.0%
Newspaper	0.9%	0.4%	Food Waste	21.6%	2.6%
Corrugated Cardboard/Kraft Paper (Uncoated)	7.1%	2.8%	Yard Debris	14.1%	4.7%
Mixed Recyclable Paper	3.4%	1.2%	C&D	7.7%	3.1%
Compostable Paper	4.6%	0.7%	Wood - Treated/Painted/Stained	3.0%	1.8%
Other Non-Recyclable Paper	1.3%	0.3%	Wood - Untreated/Clean	1.7%	1.4%
Plastic	11.0%	1.4%	Remainder/Composite Construction & Demolition	3.0%	2.4%
PET (#1) Bottles	0.9%	0.2%	Special Wastes	0.4%	0.4%
PET (#1) Non-bottle Containers	0.2%	0.1%	Actual Hazardous Wastes	0.0%	0.0%
HDPE (#2) Natural Bottles	0.2%	0.1%	Automotive Products Hazardous Wastes	0.0%	0.0%
HDPE (#2) Colored Bottles	0.3%	0.1%	Garden Products Hazardous Wastes	0.0%	0.0%
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	Paints & Solvents	0.0%	0.0%
Rigid Containers #3, #4, #6 and #7	0.1%	0.1%	Other Special Wastes	0.4%	0.4%
#5 Rigid Plastic Containers	0.4%	0.1%	Other	20.5%	3.5%
Expanded Polystyrene "Styrofoam"	0.5%	0.3%	E-Waste	1.1%	1.4%
Bags & Film	4.7%	0.5%	Other Electronics	1.4%	1.3%
Durable/Bulky Rigid Plastics	1.9%	1.2%	Textiles	2.7%	0.8%
Remainder/Composite Plastic	1.7%	0.6%	Rubber	0.3%	0.2%
Metals	3.7%	2.3%	Diapers/Sanitary Products	2.4%	0.9%
Steel Cans & Lids	0.6%	0.2%	Carpet & Carpet Padding	1.9%	2.4%
Other Ferrous Metals (Magnetic)	1.6%	2.2%	Tires	0.1%	0.1%
Aluminum Cans and Foils	1.0%	0.7%	Furniture	3.2%	2.6%
Other Non-Ferrous Metals (Not Magnetic)	0.1%	0.1%	Remainder/Composite Organics	2.3%	1.0%
Other Mixed Metals	0.4%	0.3%	Ash/Dust	0.0%	0.1%
Glass	3.7%	0.9%	Miscellaneous Inorganics	1.4%	0.8%
Clear Glass Bottles	1.7%	0.5%	Other Materials Not Elsewhere Classified	0.2%	0.2%
Brown Glass Bottles	0.7%	0.3%	Fines/Residuals	3.4%	1.2%
Green Glass Bottles	1.2%	0.4%			
Remainder/Composite Glass	0.1%	0.1%			
Grand Total				100.0%	
Number of Samples				29	

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study
Summary Composition Table - Ada County Manual Sort - Commercial (ICI) Samples

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons	Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	25.2%	4.0%	25,502	Organics	20.4%	5.1%	20,702
Newspaper	0.7%	0.3%	671	Food Waste	13.3%	4.2%	13,490
Corrugated Cardboard/Kraft Paper (Uncoated)	15.2%	3.5%	15,379	Yard Debris	7.1%	3.2%	7,211
Mixed Recyclable Paper	3.1%	0.8%	3,145	C&D	8.6%	3.4%	8,711
Compostable Paper	4.2%	0.8%	4,255	Wood - Treated/Painted/Stained	1.8%	1.2%	1,798
Other Non-Recyclable Paper	2.0%	1.4%	2,052	Wood - Untreated/Clean	4.3%	2.3%	4,353
Plastic	12.5%	2.9%	12,667	Remainder/Composite Construction & Demolition	2.5%	2.1%	2,561
PET (#1) Bottles	0.7%	0.2%	689	Special Wastes	4.7%	4.7%	4,801
PET (#1) Non-bottle Containers	0.1%	0.0%	122	Actual Hazardous Wastes	0.0%	0.0%	32
HDPE (#2) Natural Bottles	0.3%	0.2%	332	Automotive Products Hazardous Wastes	0.1%	0.1%	147
HDPE (#2) Colored Bottles	0.2%	0.1%	229	Garden Products Hazardous Wastes	0.0%	0.0%	0
HDPE (#2) Non-Bottle Containers	0.0%	0.0%	10	Paints & Solvents	0.0%	0.0%	12
Rigid Containers #3, #4, #6 and #7	0.2%	0.1%	181	Other Special Wastes	4.6%	4.7%	4,611
#5 Rigid Plastic Containers	0.3%	0.1%	258	Other	21.0%	5.2%	21,264
Expanded Polystyrene "Styrofoam"	0.4%	0.3%	438	E-Waste	0.3%	0.3%	280
Bags & Film	5.7%	1.9%	5,797	Other Electronics	0.1%	0.0%	57
Durable/Bulky Rigid Plastics	1.8%	1.1%	1,839	Textiles	4.6%	2.4%	4,652
Remainder/Composite Plastic	2.7%	1.7%	2,771	Rubber	0.6%	0.3%	597
Metals	5.7%	2.6%	5,797	Diapers/Sanitary Products	0.9%	0.4%	958
Steel Cans & Lids	1.0%	0.7%	1,053	Carpet & Carpet Padding	1.6%	1.7%	1,667
Other Ferrous Metals (Magnetic)	1.7%	1.3%	1,675	Tires	0.4%	0.5%	375
Aluminum Cans and Foils	0.5%	0.1%	535	Furniture	4.2%	3.3%	4,221
Other Non-Ferrous Metals (Not Magnetic)	0.2%	0.3%	206	Remainder/Composite Organics	5.8%	3.4%	5,916
Other Mixed Metals	2.3%	2.3%	2,327	Ash/Dust	0.0%	0.0%	12
Glass	1.8%	0.8%	1,792	Miscellaneous Inorganics	1.1%	0.7%	1,100
Clear Glass Bottles	0.7%	0.3%	704	Other Materials Not Elsewhere Classified	0.1%	0.1%	88
Brown Glass Bottles	0.3%	0.2%	350	Fines/Residuals	1.3%	0.3%	1,340
Green Glass Bottles	0.2%	0.1%	228				
Remainder/Composite Glass	0.5%	0.6%	510				
Grand Total					100.0%		101,236
Number of Samples					50		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Visual Survey Comparison Table - Bulky/Dry Waste and C&D Materials

Material Category	Dry/Bulky Waste Percent	C&D Materials Percent	Adjusted Agg. Percent
Paper	10.9%	4.1%	5.8%
Uncoated OCC - Recyclable	4.6%	3.2%	3.6%
Other Paper	6.3%	0.8%	2.2%
Plastic	1.7%	1.0%	1.2%
HDPE Buckets	0.0%	0.0%	0.0%
Tyvek Building wrap	0.0%	0.0%	0.0%
Film Plastic (commercial/industrial)	0.3%	0.3%	0.3%
Plastic furniture	0.3%	0.0%	0.1%
Durable plastic items	0.6%	0.1%	0.3%
Composite/Other Plastic (flooring, knobs, etc.)	0.6%	0.5%	0.5%
Metals	1.4%	3.3%	2.8%
Ferrous Scrap	1.4%	2.4%	2.2%
Non-Ferrous Scrap	0.0%	0.8%	0.6%
Glass	0.1%	0.6%	0.5%
All Glass Materials	0.1%	0.6%	0.5%
Wood	11.4%	21.6%	19.1%
Pallets and Crates	2.8%	5.2%	4.7%
Untreated/Unpainted Wood	1.2%	5.5%	4.4%
Treated/Painted/Stained Wood	0.7%	3.3%	2.7%
Engineered Wood	4.3%	7.3%	6.5%
Wood Furniture	1.5%	0.0%	0.4%
Other Wood	0.9%	0.3%	0.4%
Organics	12.3%	1.8%	4.4%
Yard Waste	1.7%	1.2%	1.3%
Dirt/Sand	10.5%	0.6%	3.1%
C&D	33.7%	66.1%	58.0%
Rock/Gravel	21.0%	4.8%	8.9%
Concrete, Brick, Block	5.2%	19.1%	15.6%
Asphalt	1.6%	0.9%	1.1%
Gypsum Wallboard - Clean	2.4%	8.1%	6.7%
Gypsum Wallboard - Painted	0.0%	5.2%	3.9%
Roofing Shingles	0.1%	17.7%	13.3%
Carpet	0.3%	0.7%	0.6%
Carpet Padding	0.1%	0.2%	0.2%
Ceramics/Porcelain Fixture	0.0%	3.6%	2.7%
HVAC Ducting	0.0%	0.1%	0.1%
Tires	0.0%	0.0%	0.0%
Appliances	0.0%	0.0%	0.0%
Remainder/Composite C&D	3.1%	5.5%	4.9%
Other Wastes	28.4%	1.6%	8.3%
E-Waste	0.0%	0.1%	0.1%
Bulky Items (inc. mattresses)	11.4%	0.3%	3.1%
Mixed MSW	17.0%	1.2%	5.1%
Total	100.0%	100.0%	100.0%

Number of Samples

49

110

159

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - All Ada County Visual Survey Samples - Seasons 1-4, Adjusted

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons		Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	5.8%	2.0%	10,364	Organics	4.4%	3.6%	7,918
Uncoated OCC - Recyclable	3.6%	1.0%	6,436	Yard Waste	1.3%	0.7%	2,405
Other Paper	2.2%	1.6%	3,928	Dirt/Sand	3.1%	3.4%	5,514
Plastic	1.2%	0.4%	2,097	C&D	58.0%	7.4%	104,179
HDPE Buckets	0.0%	0.0%	64	Rock/Gravel	8.9%	7.3%	15,898
Tyvek Building wrap	0.0%	0.0%	40	Concrete, Brick, Block	15.6%	6.6%	28,089
Film Plastic (commercial/industrial)	0.3%	0.1%	496	Asphalt	1.1%	1.3%	1,989
Plastic furniture	0.1%	0.1%	119	Gypsum Wallboard - Clean	6.7%	3.0%	12,052
Durable plastic items	0.3%	0.1%	470	Gypsum Wallboard - Painted	3.9%	2.5%	7,060
Composite/Other Plastic (flooring, knobs, etc.)	0.5%	0.3%	908	Roofing Shingles	13.3%	6.1%	23,887
Metals	2.8%	1.3%	5,057	Carpet	0.6%	0.3%	1,091
Ferrous Scrap	2.2%	1.2%	3,918	Carpet Padding	0.2%	0.1%	290
Non-Ferrous Scrap	0.6%	0.3%	1,139	Ceramics/Porcelain Fixture	2.7%	1.8%	4,876
Glass	0.5%	0.2%	852	HVAC Ducting	0.1%	0.1%	139
All Glass Materials	0.5%	0.2%	852	Tires	0.0%	0.0%	0
Wood	19.1%	4.1%	34,226	Appliances	0.0%	0.0%	22
Pallets and Crates	4.7%	1.7%	8,348	Remainder/Composite C&D	4.9%	1.9%	8,786
Untreated/Unpainted Wood	4.4%	1.5%	7,884	Other Wastes	8.3%	3.6%	14,827
Treated/Painted/Stained Wood	2.7%	1.1%	4,801	E-Waste	0.1%	0.1%	120
Engineered Wood	6.5%	2.5%	11,717	Bulky Items (inc. mattresses)	3.1%	1.6%	5,501
Wood Furniture	0.4%	0.3%	743	Mixed MSW	5.1%	3.1%	9,206
Other Wood	0.4%	0.3%	732				
				Grand Total	100%		179,520
				Number of Samples	159		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - Bulky/Dry Waste Visual Survey Samples - Seasons 1-4

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons		Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	10.9%	6.1%	4,882	Organics	12.3%	11.8%	5,488
Uncoated OCC - Recyclable	4.6%	2.4%	2,057	Yard Waste	1.7%	1.2%	778
Other Paper	6.3%	5.3%	2,824	Dirt/Sand	10.5%	11.2%	4,710
Plastic	1.7%	1.0%	780	C&D	33.7%	19.3%	15,047
HDPE Buckets	0.0%	0.0%	10	Rock/Gravel	21.0%	20.8%	9,366
Tyvek Building wrap	0.0%	0.0%	0	Concrete, Brick, Block	5.2%	5.9%	2,324
Film Plastic (commercial/industrial)	0.3%	0.4%	127	Asphalt	1.6%	2.7%	720
Plastic furniture	0.3%	0.2%	113	Gypsum Wallboard - Clean	2.4%	2.9%	1,063
Durable plastic items	0.6%	0.4%	282	Gypsum Wallboard - Painted	0.0%	0.0%	0
Composite/Other Plastic (flooring, knobs, etc.)	0.6%	0.6%	247	Roofing Shingles	0.1%	0.1%	23
Metals	1.4%	1.0%	645	Carpet	0.3%	0.3%	117
Ferrous Scrap	1.4%	1.0%	628	Carpet Padding	0.1%	0.1%	28
Non-Ferrous Scrap	0.0%	0.0%	17	Ceramics/Porcelain Fixture	0.0%	0.0%	0
Glass	0.1%	0.2%	52	HVAC Ducting	0.0%	0.0%	0
All Glass Materials	0.1%	0.2%	52	Tires	0.0%	0.0%	0
Wood	11.4%	6.6%	5,105	Appliances	0.0%	0.0%	0
Pallets and Crates	2.8%	1.9%	1,271	Remainder/Composite C&D	3.1%	3.6%	1,405
Untreated/Unpainted Wood	1.2%	1.1%	530	Other Wastes	28.4%	12.2%	12,696
Treated/Painted/Stained Wood	0.7%	0.6%	319	E-Waste	0.0%	0.0%	0
Engineered Wood	4.3%	4.3%	1,914	Bulky Items (inc. mattresses)	11.4%	5.6%	5,109
Wood Furniture	1.5%	1.0%	687	Mixed MSW	17.0%	10.3%	7,587
Other Wood	0.9%	0.9%	384				
				Grand Total	100%		44,694
				Number of Samples	49		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

2019 - 2020 Ada County Waste Composition Study

Summary Composition Table - C&D Materials Visual Survey Samples - Seasons 1-4

Material Category	Est. Percent	Conf. Int (+/-)	Est. Annual Tons		Est. Percent	Conf. Int (+/-)	Est. Annual Tons
Paper	4.1%	2.0%	5,482	Organics	1.8%	3.6%	2,430
Uncoated OCC - Recyclable	3.2%	1.0%	4,379	Yard Waste	1.2%	0.7%	1,627
Other Paper	0.8%	1.6%	1,103	Dirt/Sand	0.6%	3.4%	803
Plastic	1.0%	0.4%	1,317	C&D	66.1%	7.4%	89,132
HDPE Buckets	0.0%	0.0%	54	Rock/Gravel	4.8%	7.3%	6,532
Tyvek Building wrap	0.0%	0.0%	40	Concrete, Brick, Block	19.1%	6.6%	25,765
Film Plastic (commercial/industrial)	0.3%	0.1%	369	Asphalt	0.9%	1.3%	1,269
Plastic furniture	0.0%	0.1%	6	Gypsum Wallboard - Clean	8.1%	3.0%	10,988
Durable plastic items	0.1%	0.1%	188	Gypsum Wallboard - Painted	5.2%	2.5%	7,060
Composite/Other Plastic (flooring, knobs, etc.)	0.5%	0.3%	661	Roofing Shingles	17.7%	6.1%	23,864
Metals	3.3%	1.3%	4,412	Carpet	0.7%	0.3%	974
Ferrous Scrap	2.4%	1.2%	3,290	Carpet Padding	0.2%	0.1%	262
Non-Ferrous Scrap	0.8%	0.3%	1,122	Ceramics/Porcelain Fixture	3.6%	1.8%	4,876
Glass	0.6%	0.2%	800	HVAC Ducting	0.1%	0.1%	139
All Glass Materials	0.6%	0.2%	800	Tires	0.0%	0.0%	0
Wood	21.6%	4.1%	29,121	Appliances	0.0%	0.0%	22
Pallets and Crates	5.2%	1.7%	7,077	Remainder/Composite C&D	5.5%	1.9%	7,381
Untreated/Unpainted Wood	5.5%	1.5%	7,354	Other Wastes	1.6%	3.6%	2,130
Treated/Painted/Stained Wood	3.3%	1.1%	4,482	E-Waste	0.1%	0.1%	120
Engineered Wood	7.3%	2.5%	9,803	Bulky Items (inc. mattresses)	0.3%	1.6%	392
Wood Furniture	0.0%	0.3%	57	Mixed MSW	1.2%	3.1%	1,619
Other Wood	0.3%	0.3%	348				
				Grand Total	100%		134,825
				Number of Samples	110		

Confidence intervals calculated at the 90% confidence level. Percentages for materials may not exactly equal category subtotals due to rounding.

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APPENDIX B

MATERIAL CATEGORY DEFINITIONS

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2020 Ada County Waste Composition Study
Material Definitions

PAPER

1 NEWSPAPER: Paper used in newspapers and all items made from newsprint. Examples include newspapers and glossy inserts found in newspapers, and items such as free advertising guides, election guides, plain news packing paper, stapled college class schedules, and tax instruction booklets.

2 CORRUGATED CARDBOARD/KRAFT PAPER (UNCOATED): Corrugated boxes or paper bags made from Kraft paper. Wavy center layer sandwiched between two outer layers without wax coating on the inside or outside. Examples include cardboard shipping containers and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. Does not include chipboard. Examples of Kraft paper include paper grocery bags, un-soiled fast food bags, department store bags, and heavyweight sheets of Kraft packing paper. Relatively unsoiled pizza boxes acceptable.

3 MIXED RECYCLABLE PAPER: Recyclable paper other than the paper mentioned above. Examples include high grade office paper, and items made of chipboard or uncoated paperboard such as cereal boxes. Also includes junk mail, manila folders, manila envelopes, index cards, white envelopes, white window envelopes, notebook paper, carbonless forms, groundwood paper, softcover books, and deep-toned or fluorescent dyed paper. Other items included are glossy magazine catalogs, brochures, and pamphlets as well as aseptic boxes and gable top cartons.

4 COMPOSTABLE PAPER: Low-grade, biodegradable paper that cannot be recycled, as well as food contaminated paper. Examples include paper towels, napkins, paper plates, waxed papers and waxed cardboard, tissues, and unlined paper cups.

5 OTHER NON-RECYCLABLE PAPER: Paper products made mostly of paper but combined with large amounts of other materials such as plastic, metal, glues, foil, and moisture. Examples include corrugated cardboard coated with plastic, cellulose insulation, blueprints, sepia, onion skin, foiled lined fast food wrappers, frozen juice containers, carbon paper, self-adhesive notes, hardcover books, and photographs.

PLASTIC

6 PET (#1) BOTTLES: Clear or colored PET bottles. The plastic resin number “1” is visible in the center of the triangular recycling symbol and may also bear the letters “PETE” or “PET”. A PET container usually has a small dot left from the manufacturing process, not a seam. It does not turn white when bent.

7 PET (#1) NON-BOTTLE CONTAINERS: Non-bottle containers such as PET jars, rectangular PET clamshell or tray containers used for produce; etc. The plastic resin number “1” is visible in the center of the triangular recycling symbol and may also bear the letters “PETE” or “PET”. The color is usually transparent, green, or clear. This category only includes PET non-bottle containers that did not previously contain hazardous materials.

8 HDPE (#2) NATURAL BOTTLES : Natural colored HDPE bottles. This plastic is usually either cloudy white, allowing light to pass through it (natural). When marked for identification, it bears the number “2” in the triangular recycling symbol and may also bear the letters “HDPE”. This category only includes HDPE bottles that did not previously contain hazardous materials.

9 HDPE (#2) COLORED BOTTLES: Colored HDPE bottles. In contrast with natural HDPE, the colored HDPE is usually a solid color and opaque. When marked for identification, it bears the number “2” in the triangular recycling symbol and may also bear the letters “HDPE”. This category only includes HDPE bottles that did not previously contain hazardous materials.

10 HDPE (#2) NON-BOTTLE CONTAINERS: Natural and colored HDPE jars and non-bottle containers. When marked for identification, it bears the number “2” in the triangular recycling symbol and may also bear the letters “HDPE”. This category only includes HDPE containers that did not previously contain hazardous materials. Includes natural buckets, pails or paint cans made of HDPE and designed to hold 5 gallons or less of material.

11 RIGID CONTAINERS #3, #4, #6 AND #7 : Bottles, jars, containers, lids, and other packaging that are made of types of plastic other than PET (1), HDPE (2), or PP (5). Items may be made of vinyl, LDPE, PVC, PS, or other plastic. They may bear the number 3, 4, 6, or 7 in the triangular recycling symbol, or may bear no recycling symbol. Examples include clamshells, trays, tray lids, cups, bowls, plates, hardware and fastener packaging, detergent and cleaning products bottles, squeezable bottles, frozen food containers, microwave food trays, vitamin bottles, cookie trays found in cookie packages, small (less than 1 gallon) brittle (single-use) plant containers such as nursery pots and plant six-packs.

12 #5 RIGID PLASTIC CONTAINERS: Plastic bottles, jars, containers, lids and other packaging bearing the recycling symbol #5 or (PP).

2020 Ada County Waste Composition Study
Material Definitions

- 13 EXPANDED POLYSTYRENE "STYROFOAM": Food and Non-food packaging. Includes clamshell "Styrofoam" food containers, as well as cups, plates, and bowls. Includes finished products made of expanded polystyrene such as block Styrofoam padding and packing peanuts.
- 14 BAGS & FILM: Plastic film or bags including garbage bags, and other types of plastic bags (sandwich bags, zip (recloseable) bags, produce bags, frozen vegetable bags), painting tarps, food wrappers such as candy-bar wrappers. Also includes retail bags used to contain merchandise to transport from the place of purchase, given out by the store with the purchase, as well as commercial/industrial film.
- 15 DURABLE/BULKY RIGID PLASTICS: Plastic items other than containers or film plastic, that are made to last for more than one use. These items may bear the numbers 1 through 7 in the triangular recycling symbol. Examples include crates, buckets (including 5-gallon buckets), baskets, totes, large plastic garbage cans, large tubs, large storage tubs/bins (usually with lids), flexible (non-brittle) and durable flower pots of 1 gallon size or larger, lawn furniture, large plastic toys, tool boxes, first aid boxes, and some sporting goods, CDs and their cases, plastic housewares such as durable (not single-use) dishes, cups, and cutlery.
- 16 REMAINDER/COMPOSITE PLASTIC: Plastic that cannot be put in any other type or subtype. Includes items made mostly of plastic but combined with other materials. Examples include auto parts made of plastic attached to metal, plastic drinking straws, produce trays, foam packing blocks (not including expanded polystyrene blocks), plastic strapping, handles and knobs, plastic lids, some kitchenware, toys, plastic string (as used for hay bales), and plastic rigid bubble/foil packaging (as for medications).

METALS

- 17 STEEL CANS & LIDS: Steel or tin food or other containers. Includes steel aerosol cans.
- 18 OTHER FERROUS METALS (MAGNETIC): Any iron or steel that is magnetic or any stainless steel item. This type does not include tin/steel cans. Examples include structural steel beams, metal clothes hangers, metal pipes, stainless steel cookware, security bars, and scrap ferrous items. Also includes composite material that is mostly ferrous metal by weight.
- 19 ALUMINUM CANS AND FOILS: Aluminum Beverage or food containers. Includes aluminum foil and foil trays.
- 20 OTHER NON-FERROUS METALS (NOT MAGNETIC): Any metal item, other than aluminum cans, that is not stainless steel and that is not magnetic. These items may be made of aluminum, copper, brass, bronze, lead, zinc, or other metals. Examples include copper wire, shell casings, and brass pipe. Also includes composite material that is mostly non-ferrous metal by weight.
- 21 OTHER MIXED METALS: Products containing ferrous and non-ferrous metals, or mostly metal items mixed with other materials, such as plastics or textiles.

GLASS

- 22 CLEAR GLASS BOTTLES: All clear glass bottles or jars.
- 23 BROWN GLASS BOTTLES: All brown glass bottles or jars.
- 24 GREEN GLASS BOTTLES: All green glass bottles or jars.
- 25 REMAINDER/COMPOSITE GLASS : Glass that cannot be put in any other type. It includes glass bottle colors other than those listed above, as well as items made mostly of glass but combined with other materials. Examples include Pyrex, Corningware, crystal and other glass tableware, mirrors, non-fluorescent light bulbs, auto windshields, laminated glass, or any curved glass. Uncoated plate glass - includes window and door glass, table-tops, and some auto glass (side windows). Also includes ceramics, porcelain, and clay pots.

ORGANICS

- 26 FOOD WASTE: Food wastes and scraps, including meat, bone, dairy, grains, rinds, teabags, coffee grounds with filters, etc. Excludes the weight of food containers, except when container weight is not appreciable compared to the food inside. Compostable peanuts, food packaging with food scraps, and small wooden produce crates are also included in this category.
- 27 YARD DEBRIS: Plant material, including woody material, from any public or private landscapes. Examples include leaves, grass clippings, plants, brush and branch prunings and trimmings.

2020 Ada County Waste Composition Study
Material Definitions

CONSTRUCTION & DEMOLITION MATERIALS

- 28 WOOD – TREATED/PAINTED/STAINED: Wood that contains an adhesive, paint, stain, fire retardant, pesticide or preservative. Does not include wood furniture.
- WOOD – UNTREATED/CLEAN : Any wood which does not contain an adhesive, paint, stain, fire retardant, pesticide or preservative; includes such items as bulky wood waste or scraps from newly built wood products.
- 29 Does not including land clearing debris or yard waste prunings and trimmings. The presence of nails or screws in the wood are acceptable.
- REMAINDER/COMPOSITE CONSTRUCTION & DEMOLITION : Construction and demolition material that cannot be put in any other type or subtype. This type may include items from different types combined,
- 30 which would be very hard to separate. Also includes gypsum board products, asphalt roofing, asphalt paving, brick, concrete and rock. Other items include fiberglass insulation, ceramic fixtures, Portland cement mixtures (set or unset) and other miscellaneous C&D Materials not mentioned above.

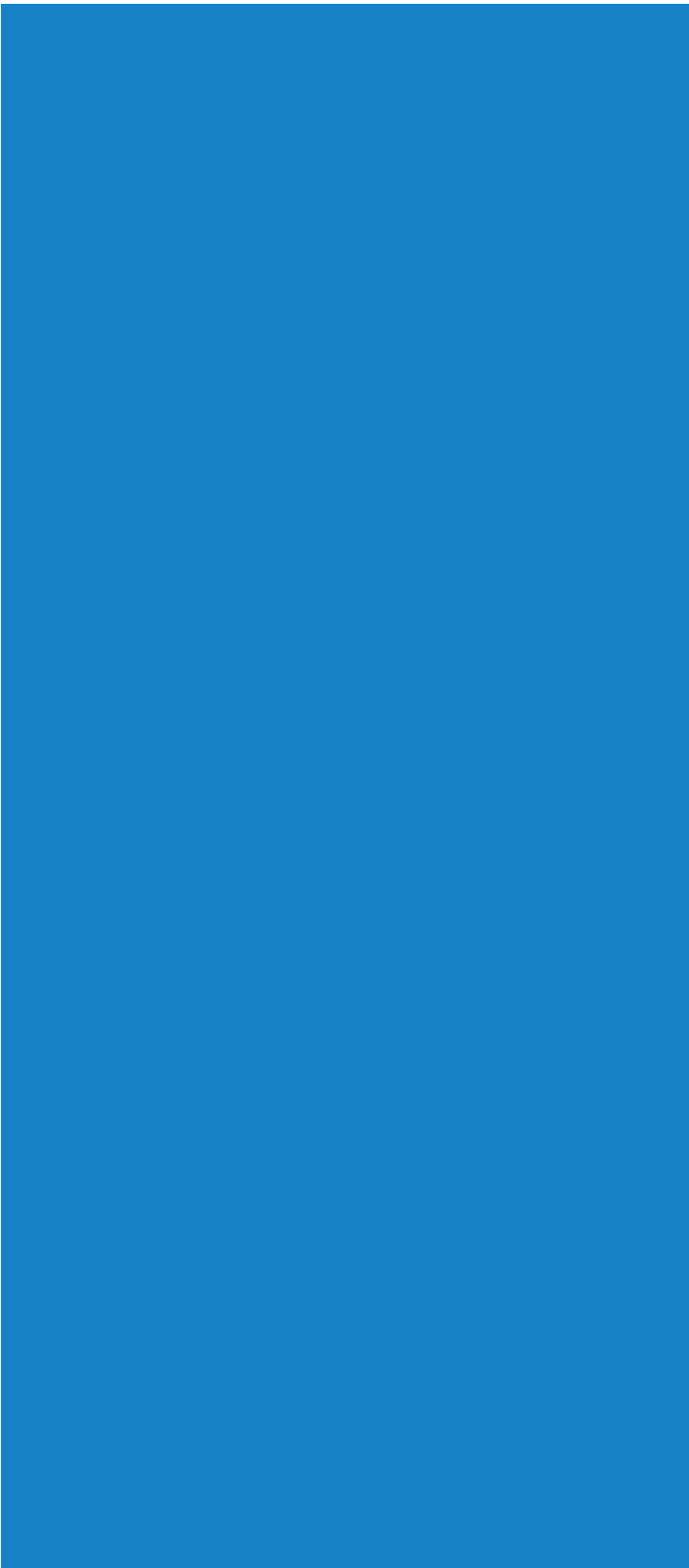
SPECIAL WASTES

- ACTUAL HAZARDOUS WASTES: Hazardous items marked as poisons, ignitable fuels, or other language
- 31 indicating dangerous hazardous to humans, pets, or wildlife. Includes, some laboratory chemicals, light ballasts, and mercury-containing devices.
- 32 AUTOMOTIVE PRODUCTS HAZARDOUS WASTES: Hazardous materials associated with automobiles or the automobile industry, including vehicle equipment fluids, lubricants, and degreasers. May include car batteries.
- 33 GARDEN PRODUCTS HAZARDOUS WASTES: Hazardous materials associated with gardening such as pesticides, herbicides and fertilizers.
- 34 PAINTS & SOLVENTS: Hazardous materials containing paints, thinners, non-auto related solvents
- OTHER SPECIAL WASTES: Treated or untreated medical waste. Includes bandages, gauze, diabetic strips,
- 35 syringes, needles, other sharps, and medical tubing. Includes similar items from veterinary usage, medical research, or industrial laboratories. Also includes fluorescent light bulbs and CFLs.

OTHER WASTES

- E-WASTE: Includes personal computers, laptop computers, notebook computers, processors, keyboards, etc.
- 36 Also includes stand-alone display systems containing a CRT or any other type of display primarily intended to receive video programming via broadcast. Examples also include non-CRT units such as plasma and LCD monitors.
- 37 OTHER ELECTRONICS: Includes stereos, VCRs, DVD players, etc. This category does not include automated typewriters or typesetters.
- 38 TEXTILES: Clothing or other items containing predominantly fabric. Includes leather goods such as belts, or shoes that are mostly leather or fabric.
- 39 RUBBER: Rubber products including gloves, boots, garden hoses, and footwear that is predominantly rubber.
- 40 DIAPERS: Infant or adult diapers.
- CARPET & CARPET PADDING: Flooring applications consisting of various natural or synthetic fibers bonded
- 41 to some type of backing material. Carpet padding may include plastic, foam, felt, or other material used under the carpet to provide insulation and padding.
- 42 TIRES: Radial tires for automobiles, bicycles and similar items. May include rim.
- FURNITURE: All sizes and types of furniture, mattresses, box springs, and base components. Can be wood or
- 43 metal-frame.
- REMAINDER/COMPOSITE ORGANICS: Organic material that is not food or yard waste. Includes cork,
- 44 popsicle sticks, hair, animal waste, cigarette butts, chopsticks, woven baskets, and small non-construction related wood products. Also includes vacuum cleaner bags.
- 45 ASH/DUST: Fine powdery material produced by burning (ash) or other industrial processes.
- 46 RESIDUALS: Small mixed fragments 2" and smaller, and includes miscellaneous fines (paper, plastic, glass, etc.), sand, and dirt.
- 47 MISCELLANEOUS INORGANICS: Inorganic material not classified elsewhere. Includes ceramic cookware, porcelain, clay pots, and similar items.
- 48 OTHER MATERIALS NOT ELSEWHERE CLASSIFIED : Any other type of waste material not listed in any other sort category. Includes cosmetics, shampoos, lotions, etc.

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