2011 IOWA STATEWIDE WASTE CHARACTERIZATION STUDY

Prepared for:

IOWA DEPARTMENT OF NATURAL RESOURCES

Final Report

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ACKNOWLEDGEMENTS

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- Des Moines County Regional Solid Waste Commission,
- Ottumwa-Wapello Solid Waste Commission,
- South Central Iowa Solid Waste Agency,
- Poweshiek Transfer Station,
- Metro Waste Authority,
- Carroll County Solid Waste Management Commission,
- Crawford County Area Solid Waste Agency,
- Shelby County Solid Waste Agency,
- Northwest Iowa Area Solid Waste Agency,
- Dubuque Metropolitan Area Solid Waste Agency,
- Iowa City Landfill & Recycling Center, and
- Waste Commission of Scott County.

ACKNOWLEDGEMENTS

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ES. EXECUTIVE SUMMARY

ES 1. INTRODUCTION

In 1998 and again in 2005, the Iowa Department of Natural Resources (DNR) sponsored a statewide waste characterization study that obtained representative samples of municipal solid waste (MSW) at landfills distributed geographically across the state. The results of these studies have been used by the DNR as well as by recycling and waste management planners and program managers across Iowa

In 2011, the Iowa Department of Natural Resources (DNR) retained the Project Team of MidAtlantic Solid Waste Consultants (MSW Consultants), Cascadia Consulting Group (Cascadia) and Foth Infrastructure & Environment to conduct a statistically representative analysis of Iowa's disposed waste stream. The six primary objectives of this update were to:

1. Gather waste composition data using a methodology that is statistically representative of the State's generated MSW being disposed of at both in-state and out-of-state permitted solid waste management facilities (both public and private facilities).
2. Develop a statewide waste characterization and quantification by weight for each measured material type of the MSW received for disposal at solid waste management facilities.
3. Determine demographic variability and differentiate waste composition from the Residential and Institutional/Commercial/Industrial (ICI) sectors for the purpose of differentiating MSW disposal composition from each of these sectors.
4. Determine the types and quantities of potentially recoverable recyclable and compostable materials found in the disposed MSW stream.
5. Gather data on the Iowa MSW disposal stream that can be used to improve existing solid waste programs and plan for the types of facilities that may be needed to manage targeted portions of the MSW stream.
6. Design of the study so that it can be compared to previous waste sort characterization studies and can be replicated for future studies:

This study characterizes wastes from the following generator sectors:

- **Residential**: Includes waste generated in single family and multi-family residential households.
- **Industrial/Commercial/Institutional** (**ICI**): Includes waste generated in commercial, industrial, and institutional establishments.
- **Municipal Solid Waste (MSW)**: This combines the results of the Residential and Commercial generator sectors, and reflects all of the MSW disposed in Iowa landfills.
- **All Solid Waste:** In addition to MSW, landfills in Iowa also receive separately coded Construction and Demolition (C&D) debris, as well as a range of special wastes requiring disposal. This study also provides the statewide composition of all Solid Waste (MSW + C&D + Special Wastes).

It should be noted that this study, unlike prior studies, sought to minimize the reporting and analysis of loads of waste that mixed together Residential and ICI wastes. In the prior studies,

so-called Mixed Waste results were provided as if Mixed Waste was a separate generator sector. A number of steps were taken in this study update to reduce reliance on loads of Mixed Waste, and also to obtain grab samples from Mixed loads that could be identified as Residential or ICI. Details are provided in the body of the report.

ES 2. OVERVIEW OF RESULTS

Figure ES-1 shows the breakdown of major material groups for the aggregate Iowa statewide MSW stream (top pie chart); the Residential and ICI waste stream pie charts are directly underneath so that readers can quickly compare the contribution of various material groups. Results are shown in estimated percent composition disposed.

Figure ES-1 2011 Iowa Statewide MSW Composition

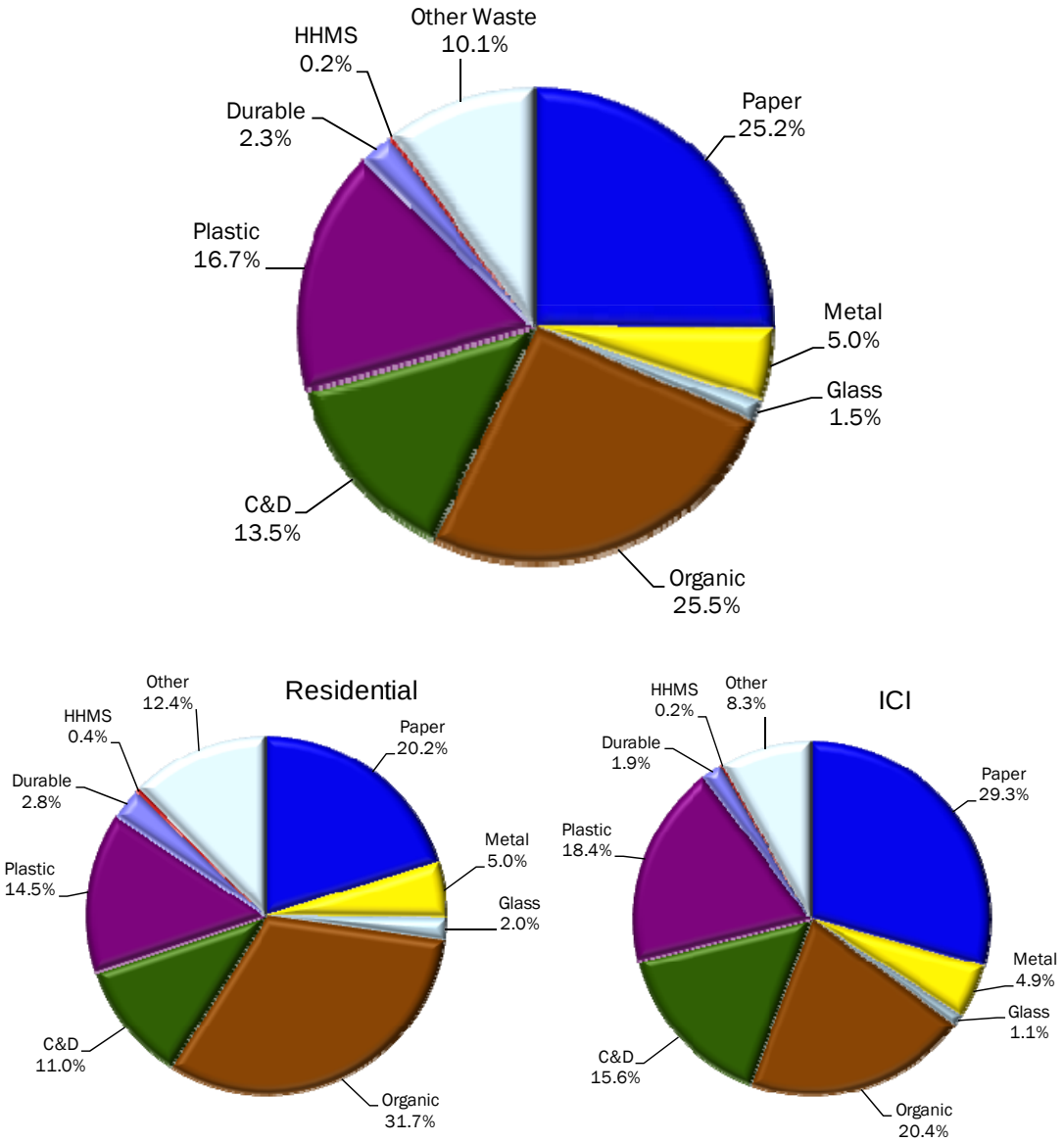

Table ES-1 shows the five most prevalent individual material categories disposed by Statewide Aggregate, Residential, and ICI generating sectors. The percent composition is shown in the table.

Table ES-1 Top 5 Most Prevalent Material Categories

Rank	Statewide MSW	Residential Waste	ICI Waste
1	Food Waste - 13.3%	Food Waste - 13.6%	OCC and Kraft Paper - 13.2%
2	OCC and Kraft Paper - 9.0%	Yard Waste - 7.8%	Food Waste - 13.1%
3	Other Film Plastic - 6.6%	Textiles and Leather - 5.9%	Other Plastic Products - 8.0%
4	Compostable Paper - 6.1%	Other Film Plastic - 5.8%	Wood – Untreated - 7.9%
5	Untreated Wood - 5.4%	Other Plastic Products - 5.2%	Other Film Plastic - 7.3%
Total	40.4%	38.3%	49.5%

Table ES-2 shown on the following page provides a detailed snapshot of the statewide MSW stream. Full results for statewide aggregate MSW, as well as for individual generator sectors and for Solid Waste, are contained in the full report.

Table ES-2 Statewide MSW Detailed Composition Results

Material	Estimated Percent	Lower Bound	Upper Bound	Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**25.2%**	**23.5% -**	**26.9%**	**Plastic**	**16.7%**	**15.0% -**	**18.3%**
Compostable Paper	6.1%	5.4% -	6.8%	#1 PET IA Deposit Beverage Containers	0.1%	0.1% -	0.2%
High Grade Office Paper	0.9%	0.6% -	1.2%	#1 PET Beverage Containers	0.5%	0.4% -	0.5%
Magazines/Catalogs	1.2%	1.0% -	1.4%	#2 HDPE Containers Natural	0.3%	0.2% -	0.3%
Mixed Recyclable Paper	3.7%	3.4% -	4.0%	#2 HDPE Containers Colored	0.4%	0.3% -	0.4%
Newsprint	1.6%	1.4% -	1.9%	Retail Shopping Bags	0.3%	0.2% -	0.3%
Non-Recyclable Paper	2.4%	1.8% -	2.9%	Other Film Plastic	6.4%	5.6% -	7.1%
OCC and Kraft Paper	9.0%	7.5% -	10.5%	Other #1 PET Containers	0.3%	0.2% -	0.3%
Aseptic/Gable Top Containers	0.2%	0.2% -	0.3%	Plastic Containers #3-#7	0.7%	0.6% -	0.7%
				Other plastic Containers	1.1%	0.1% -	2.0%
Metal	**5.0%**	**3.7% -**	**6.2%**	Expanded Polystyrene	1.5%	0.3% -	2.7%
Aluminum Beverage Containers	0.0%	0.0% -	0.1%	Other Plastic Products	5.3%	4.3% -	6.3%
Aluminum IA Deposit Beverage Containers	0.2%	0.2% -	0.2%				
Ferrous Food and Beverage Containers	0.7%	0.5% -	0.9%	**Durable**	**2.3%**	**1.5% -**	**3.1%**
Other Aluminum Containers	0.3%	0.2% -	0.4%	Cell Phones and Chargers	0.0%	0.0% -	0.0%
Other Ferrous Scrap Metals	2.2%	1.7% -	2.6%	Central Processing Units/Peripherals	0.4%	0.1% -	0.6%
Other Non-Ferrous Scrap Metals	1.6%	0.4% -	2.7%	Computer Monitors/T.V.s	0.3%	0.1% -	0.5%
				Electrical and Household Appliances	1.6%	0.9% -	2.3%
Glass	**1.5%**	**1.3% -**	**1.7%**				
Blue Glass	0.0%	0.0% -	0.0%	**HHMS**	**0.2%**	**0.2% -**	**0.3%**
Brown Glass	0.1%	0.1% -	0.2%	Automotive Products	0.1%	0.0% -	0.2%
Clear Glass	0.5%	0.5% -	0.6%	Household Cleaners	0.0%	0.0% -	0.0%
Glass Deposit Containers	0.2%	0.2% -	0.3%	Lead Acid Batteries	0.0%	0.0% -	0.0%
Green Glass	0.1%	0.0% -	0.1%	Mercury Container Products	0.0%	0.0% -	0.0%
Other Mixed Cullet	0.6%	0.4% -	0.7%	Other Batteries	0.1%	0.0% -	0.1%
				Paints and Solvents	0.0%	0.0% -	0.1%
Organic	**25.5%**	**23.8% -**	**27.1%**	Pesticides, Herbicides, Fungicides	0.0%	0.0% -	0.0%
Yard Waste	4.6%	3.9% -	5.2%	Sharps	0.0%	0.0% -	0.0%
Food Waste	13.3%	11.9% -	14.8%	Prescription Medications	0.0%	0.0% -	0.0%
Textiles and Leather	4.1%	3.5% -	4.7%				
Diapers	2.5%	2.1% -	2.8%	**Other**	**10.1%**	**9.2% -**	**11.1%**
Rubber	1.0%	0.6% -	1.5%	Other Organics	3.2%	2.7% -	3.7%
				Other Inorganics	0.3%	0.1% -	0.4%
C&D	**13.5%**	**11.3% -**	**15.7%**	Other C&D	1.1%	0.8% -	1.4%
Wood – Untreated	5.4%	3.7% -	7.1%	Other Durables	2.1%	1.4% -	2.8%
Wood – Treated	3.8%	3.1% -	4.5%	Other HHM	0.0%	0.0% -	0.1%
Asphalt Pavement, Brick, Rock, and Concrete	0.7%	0.5% -	0.9%	Fines	3.1%	2.6% -	3.5%
Asphalt Roofing	0.8%	0.0% -	1.6%	Other	0.5%	0.1% -	0.8%
Drywall/Gypsum Board	1.0%	0.5% -	1.5%				
Carpet and Carpet Padding	1.8%	1.2% -	2.5%	**Totals**	**100.0%**		
				Sample Count	**460**	**Conf.**	**90%**

1. INTRODUCTION

1.1. BACKGROUND

In 1998 and again in 2005, the Iowa Department of Natural Resources (DNR) sponsored a statewide waste characterization study that obtained representative samples of municipal solid waste (MSW) at landfills distributed geographically across the state. The results of these studies have been used by the DNR as well as by recycling and waste management planners and program managers across Iowa.

This report presents the results of the 2011 update of the Iowa statewide waste characterization. The six primary objectives of this update were to:

1. Gather waste composition data using a methodology that is statistically representative of the State's generated MSW being disposed of at both in-state and out-of-state permitted solid waste management facilities (both public and private facilities).
2. Develop a statewide waste characterization and quantification by weight for each measured material type of the MSW received for disposal at solid waste management facilities.
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4. Determine the types and quantities of potentially recoverable recyclable and compostable materials found in the disposed MSW stream.
5. Gather data on the Iowa MSW disposal stream that can be used to improve existing solid waste programs and plan for the types of facilities that may be needed to manage targeted portions of the MSW stream.
6. Design of the study so that it can be compared to previous waste sort characterization studies and can be replicated for future studies.

This study was conducted by the Project Team of MidAtlantic Solid Waste Consultants (MSW Consultants), Cascadia Consulting Group, and Foth Infrastructure & Environment.

1.2. COMPARISONS WITH PRIOR STUDIES

From the outset, it was DNR's intent that the 2011 Study be performed so that the results could be reasonably compared to prior study results. Such comparability will provide the greatest insight to solid waste and recycling planners in evaluating changes to the disposed waste stream.

It should be noted that the Project Team's approach for this update contained some new approaches to obtain the desired data. Readers should be aware of both the similarities and the differences (some minor and some potentially significant) between the two studies. These are summarized below and addressed in greater detail in the body of the report.

1.2.1 SIMILARITIES

- **Material Categories**: Material categories were almost identical in all three studies, although some minor modifications were incorporated in each successive study.

- **In-state Wastes Only**: Both studies were confined to sampling and sorting wastes generated and disposed of in Iowa.
- **Week-long Sorts at Host Facilities**: In the 2011 and prior studies, all sorting events lasted one week at each host facility, and targeted 50 samples of waste.
- **Development of Weighting Factors**: The 2005 Study relied on disposed waste reports from each host landfill to be used for weighting factors in aggregating facility-specific results to a statewide total. The 2011 Study uses the same methodology.
- **Continued Segregation of Residential and ICI Wastes**: Similar to both prior studies, the 2011 Study differentiated between Residential waste and Industrial/Commercial/ Institutional (ICI) wastes.
- **Continued Reporting on Municipal Solid Waste and All Solid Wastes**: The 2011 Study, like the prior studies, reports on the composition of municipal solid waste (MSW) as well as for all solid wastes (which include MSW, C&D and some special wastes).

1.2.2 DIFFERENCES

- **Increased Number of Host Facilities**: The host facilities have changed each iteration of the study. In 1998 there were five host facilities, and six in the 2005 Study. The 2011 Study sorted at a total of nine facilities, only four of which also hosted the 2005 Study.
- **Increase in Overall Sampling Targets**: Because of the increased number of host facilities, the total samples targeted in the study increased. This will have the impact of increasing the precision of the statewide results of the 2011 Study compared to prior studies, as confidence intervals will be narrower. (As stated above, facility-specific results will be comparable to prior studies because approximately 50 samples were obtained at each host facility in all studies.)
- **Different Seasonal Field Data Collection Periods**: Field data collection for both the 1998 and 2005 Studies was performed in the fall, spanning the months of September, October and November. The 2011 Study performed all field data collection in the months of April, May and June.
- **Increased Landfill Surveying**: The 2011 Study included significantly more effort associated with researching the origin of waste deliveries at host landfills compared to prior studies. Specifically, host landfills provided detailed data about deliveries by hauler and by truck type; this data was used by the Project Team to better stratify the waste stream by generator sector.
- **Integration of Upstream Sorting**: Unlike prior studies, the 2011 Study allowed for the sorting team to relocate from host landfills to originating transfer stations for the purpose of obtaining directly hauled loads of waste. Two of the host facilities took advantage of upstream sorting at originating transfer stations, and a third landfill supplied pure residential transfer trailers from an originating transfer station. This effort reduced the number of mixed loads obtained for sorting.
- **Integration of Mixed Loads into Residential and ICI Results**: As will be described more fully in the Methodology and Appendix C, a primary objective of this study was to minimize reliance on "mixed" loads of waste (i.e., loads that contain a mix of residential and ICI waste). In the 2005 Study, the composition of mixed loads was reported as if

mixed loads represented another generator sector. In practice, recycling and solid waste planners cannot design programs for "mixed" waste generators; only by targeting specific generator sectors can recycling and diversion programs be effective. Accordingly, the 2011 Study made allowances for qualitatively evaluating and assigning grab samples from mixed loads into either residential or ICI wastes, at the discretion of the field supervisor and crew chief. Based on the analysis contained in Appendix C, the 2011 Study does not report separately on mixed load composition.

The similarities and differences are addressed in further detail where appropriate throughout this report.

1.3. REPORT ORGANIZATION

The remainder of this report presents the methodology and results of the 2011 Iowa Statewide Waste Characterization Study. The report is divided into the following sections:

- **Methodology:** This section provides an overview of waste generation and disposal data available from disposal facility reports and supplemented with direct surveys, and provides the sampling plan that was developed to govern the study process and to provide statistically defensible data. This section also summarizes the field data collection methods and analytical methods applied in the study.
- **Results:** Detailed results about the composition of disposed waste are presented in this section. Results are presented in both tabular and graphical format to highlight findings of interest. Results are presented in the aggregate and by generator sector. Further, results are compared with prior studies to indicate how the waste stream has changed or remained the same over time.
- **Diversion Opportunities, Conclusions and Recommendations:** This section identifies the most prevalent and most recyclable and compostable materials that were found to be remaining in the disposed waste stream. This section also comments on programs and initiatives that should be explored by the DNR and Iowa solid waste and recycling stakeholders in the coming years to increase diversion and recycling. Although it was beyond the scope of this project to evaluate the waste stream for processing with emerging conversion technologies, it should also be noted that a number of such projects and technologies are in the developmental stage and that the data collected in this report could be informative in evaluating such technologies in the future.
- **Appendices:** Supplemental data and analysis are contained in several appendices. Specific appendices include detailed material category definitions and mapping for MSW to prior studies, individual results for each host facility, and a discussion of the analysis of mixed loads.

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2. METHODOLOGY

2.1. GENERATOR SECTORS

As in the two previous studies, this study retained the following three targeted waste generating sectors:

- **Residential**: Includes waste generated in single family and multi-family residential households.
- **Industrial/Commercial/Institutional** (**ICI**): Includes waste generated in commercial, industrial, and institutional establishments.
- **Mixed Waste**: Includes waste delivered to the designated solid waste facility originating from both the residential and ICI sectors, such that less than 80 percent of the load can be classified as Residential or ICI based on an interview with the vehicle driver.

It is important to note that this study has taken significant steps to minimize the number of mixed loads obtained. These steps include significant up front interviews with facility management and scalehouse personnel to stratify incoming loads by hauler and truck type, as well as driver interviews for selected loads. Further, the approach for this study allowed for Mixed Waste loads to be qualitatively assigned to Residential or ICI waste based on the judgment of the professional field staff. As a result of this approach, results are presented only for Residential and ICI wastes, as Mixed Waste samples have been integrated into the two distinct generator sectors. Appendix C describes the statistical analysis that supports this decision, and additional details on the field methodology are contained below.

Consistent with prior studies, loads of non-MSW, including Construction and Demolition (C&D) waste, special wastes (i.e., ash, grit, etc.), or other industrial processed wastes, were excluded from the sampling and sorting process, although were captured in the data reported for Solid Waste.

2.2. MATERIAL CATEGORIES AND GROUPS

The material categories in the 2011 Study were drawn largely from the 2005 and 1998 Studies. A set of 62 material categories were used in the 2011 Study; however, all material categories in the 2011 Study mapped directly to 2005 Study results, to assure comparability. The following new categories were added to the 2011 Study:

- Plastic Containers #3-#7,
- Aseptic/Gable Top Containers,
- Retail Plastic Bags,
- Expanded Polystyrene,
- Asphalt, Pavement, Brick, Block, Concrete,
- Asphalt Roofing,
- Gypsum Drywall,

- Carpet and Carpet Padding,
- Other C&D Debris, and
- Prescription Medications.

It should also be noted that the individual material categories have been re-grouped throughout this report into what the Project Team believes is a more logical and standardized taxonomy. Table 2-1 shows the material groups and material categories, and detailed material definitions are contained in Appendix A. Appendix A also shows the mapping of material categories across all three studies.

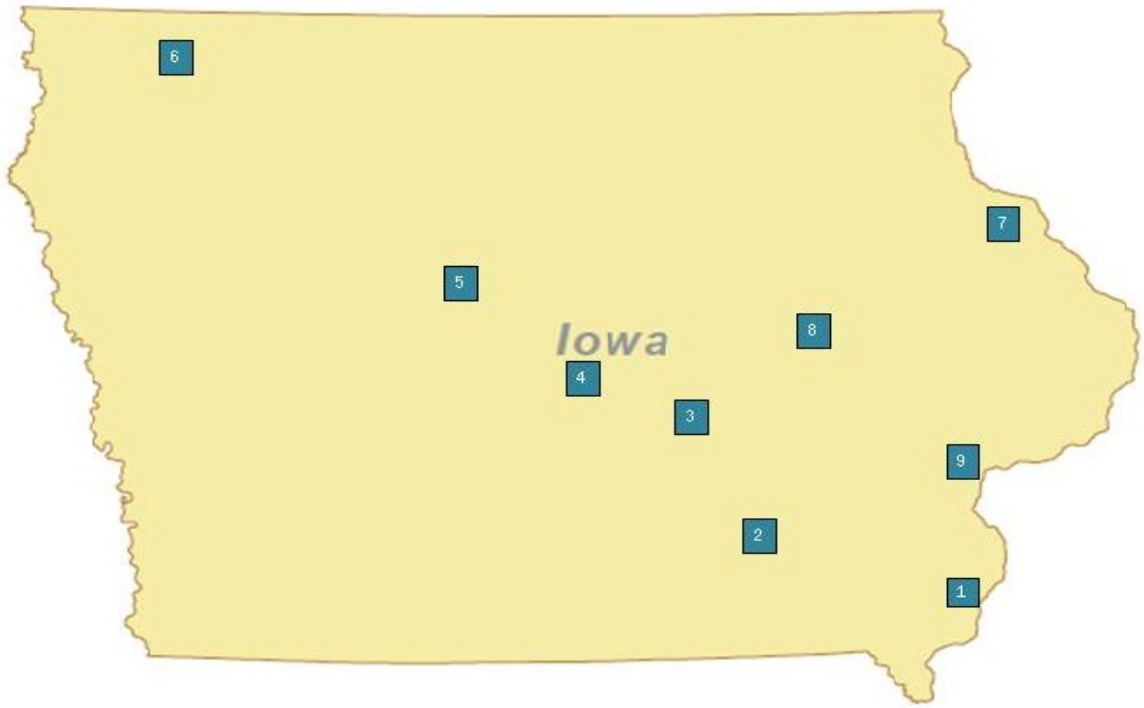
Table 2-1 Material Categories in 2011 Study

Group	No.	Material Category	Group	No.	Material Category
PAPER	1	Compostable Paper	PLASTIC	32	#1 PET IA Deposit Beverage Containers
	2	High Grade Office Paper		33	#1 PET Beverage Containers
	3	Magazines/Catalogs		34	#2 HDPE Containers Natural
	4	Mixed Recyclable Paper		35	#2 HDPE Containers Colored
	5	Newsprint		36	Retail Shopping Bags
	6	Non-Recyclable Paper		37	Other Film Plastic
	7	OCC and Kraft Paper		38	Other #1 PET Containers
	8	Aseptic/Gable Top Containers		39	Plastic Containers #3-#7
METAL	9	Aluminum Beverage Containers		40	Other plastic Containers
	10	Aluminum IA Deposit Beverage Containers		41	Expanded Polystyrene
	11	Ferrous Food and Beverage Containers		42	Other Plastic Products
	12	Other Aluminum Containers	DURABLE	43	Cell Phones and Chargers
	13	Other Ferrous Scrap Metals		44	Central Processing Units/Peripherals
	14	Other Non-Ferrous Scrap Metals		45	Computer Monitors/T.V.s
GLASS	15	Blue Glass		46	Electrical and Household Appliances
	16	Brown Glass	HHMS	47	Automotive Products
	17	Clear Glass		48	Household Cleaners
	18	Glass Deposit Containers		49	Lead Acid Batteries
	19	Green Glass		50	Mercury Container Products
	20	Other Mixed Cullet		51	Other Batteries
ORGANIC	21	Yard Waste		52	Paints and Solvents
	22	Food Waste		53	Pesticides, Herbicides, Fungicides
	23	Textiles and Leather		54	Sharps
	24	Diapers		55	Prescription Medications
	25	Rubber	OTHER	56	Other Organics
C&D	26	Wood – Untreated		57	Other Inorganics
	27	Wood – Treated		58	Other C&D
	28	Asphalt Pavement, Brick, Rock, and Concrete		59	Other Durables
	29	Asphalt Roofing		60	Other HHM
	30	Drywall/Gypsum Board		61	Fines
	31	Carpet and Carpet Padding		62	Other

2.3. HOST FACILITIES AND DISPOSAL QUANTITIES

The 1998 Study included five landfills and the 2005 Study included six landfills for hosting waste characterization analysis. The 2011 update has expanded the total to nine host solid waste commissions/agencies. Figure 2-1 below shows relative locations of the nine organizations that hosted sampling and sorting activities.

Figure 2-1 Location of Host Landfills, 2011 Study



1	Des Moines County Regional Solid Waste Commission	2	Ottumwa-Wapello County Solid Waste Commission	3	South Central Iowa Solid Waste Agency
4	Metro Waste Authority	5	Carroll County Solid Waste Management Commission	6	Northwest Iowa Area Solid Waste Agency
7	Dubuque Metropolitan Area Solid Waste Agency	8	Iowa City Landfill	9	Waste Commission of Scott County

Table 2-2 shows the tonnage and percentage of Municipal Solid Waste (MSW) disposed in the targeted landfills and total state-wide for the 2010 fiscal year. This table also shows which of the host organizations in this year's study hosted sampling and sorting events in prior studies. As shown, the nine targeted organizations dispose a little over 42 percent of the State's disposed MSW.

Table 2-2 Host Facilities and FY 2010 Disposal Quantities

HOST FACILITY	1998 Study [1]	2005 Study [2]	FY 2010 TOTAL TONNAGE	FY 2010 PERCENT OF STATE
Des Moines County Regional Solid Waste Commission	✓	✓	58,131	2.2%
Ottumwa-Wapello County Solid Waste Commission			34,991	1.3%
South Central Iowa Solid Waste Agency	✓		57,216	2.1%
Metro Waste Authority		✓	498,635	18.6%
Carroll County Solid Waste Management Commission			51,880	1.9%
Northwest Iowa Area Solid Waste Agency		✓	60,444	2.3%
Dubuque Metropolitan Area Solid Waste Agency		✓	95,089	3.5%
Iowa City Landfill	✓		120,584	4.5%
Waste Commission of Scott County			155,883	5.8%
Targeted Landfill Subtotal			**1,132,854**	**42.2%**
All Other Landfills			1,551,795	57.8%
Total State-Wide[3]			**2,684,649**	**100%**

[1] The 1998 Study also included the Floyd-Mitchell County SWA Landfill and the Monona County Transfer Station.

[2] The 2005 Study also included the Cedar Rapids/Linn County SWA Landfill Site #1 and the Boone County Landfill.

[3] Total State-wide tonnage excludes MSW going out of state, MSW coming into the state, and Fee-Exempted tonnage from flood and disaster debris disposed during this time period.

Consistent with prior studies, only the reported disposal quantities from the host landfills were used in this study to develop the statewide aggregate composition. In order to apply the composition data to the most recent reported time period, each host landfill was asked to provide the trailing 12-month disposal quantities through the March 31, 2011 reporting period separated by MSW, C&D, and Special Waste. These are shown in Table 2-3. These quantities were used to develop weighted averages for the statewide aggregate waste composition.

Table 2-3 Reported Solid Waste Disposal (April 1, 2010 through March 31, 2011)

Host Facility	MSW Tons	C&D Tons	Special Waste Tons	Total Solid Waste
Des Moines County Regional Solid Waste Commission	43,594	12,805	764	57,162
Ottumwa-Wapello County Solid Waste Commission	30,654	3,410	1,978	36,042
South Central Iowa Solid Waste Agency	51,849	17,100	1,704	70,653
Metro Waste Authority	400,161	103,715	3,137	507,012
Carroll County Solid Waste Management Commission	48,474	5,242	530	54,246
Northwest Iowa Area Solid Waste Agency	34,890	19,329	8,382	62,601
Dubuque Metropolitan Area Solid Waste Agency	88,040	8,732	4,882	101,654
Iowa City Landfill	118,706	[1]	744	119,450
Waste Commission of Scott County	72,953	31,673	31,797	136,423
Total Tons	**889,320**	**202,006**	**53,917**	**1,145,243**
Percentage	***77.7%***	***17.6%***	***4.7%***	***100.0%***
Implied Statewide Tons	***2,233,506***	***507,333***	***135,411***	***2,876,251***

[1] Iowa City Landfill does not differentiate between MSW and C&D wastes.

2.4. SAMPLING TARGETS AND STRATIFICATION

In prior statewide studies, field data collection crews relied on a purely random sample to obtain incoming loads of MSW. In this study update, the Project Team conducted a more thorough analysis of annual delivery data at each of the host landfills in order to stratify incoming wastes. Specifically, Project Team member Foth contacted each of the host facilities to collect available data on haulers, material quantities and generator sectors. Foth subsequently stratified the loads into Residential, ICI and Mixed (or unknown) categories. Samples were then allocated across each of the hauler/generator sector combinations proportionate to their percentage of total deliveries.

Additionally, some of the landfills were found to receive a significant fraction of incoming wastes from one or more local transfer stations. Unlike prior studies, the 2011 Study deployed field data collection crews to the originating transfer stations at two of the host facilities, so that direct-haul loads could be sampled and sorted prior to loading in a transfer trailer. Additionally, one landfill arranged to have Residential-only transfer trailers delivered from one of its originating transfer stations.

Table 2-4 summarizes the targets for sampling refuse drawn from each of the nine host organizations. As shown in this table, the Project Team met or exceeded sampling targets at each host facility.

Table 2-4 Proposed and Actual Samples for 2011 Study

Landfill	Proposed Samples	Actual Samples
Des Moines County Regional Solid Waste Commission	50	50
Ottumwa-Wapello County Solid Waste Commission	50	50
South Central Iowa Solid Waste Agency	50	50
Metro Waste Authority	50	50
Carroll County Solid Waste Management Commission	50	50
Northwest Iowa Area Solid Waste Agency	50	52
Dubuque Metropolitan Area Solid Waste Agency	50	54
Iowa City Landfill	50	54
Waste Commission of Scott County	50	50
Total Samples	**450**	**460**

2.5. FIELD DATA COLLECTION SCHEDULE

Field data collection was performed at each host site over one-week periods spanning the months of April, May and June 2011. Table 2-5 shows the field data collection schedule for this study. Where appropriate, this table also indicates when upstream sampling and sorting was scheduled at an originating transfer station.

The 1998 and 2005 Studies conducted field data collection during the months of September through November.

Table 2-5 Sorting Schedule

Landfill	Start Date	Complete Date
Des Moines County Regional Solid Waste Commission Landfill	25-Apr	29-Apr
Ottumwa-Wapello County Solid Waste Commission Landfill	2-May	6-May
South Central Iowa Solid Waste Agency Landfill	9-May	13-May
- Poweshiek Transfer Station	12-May	12-May
Metro Waste Authority Landfill [1]	16-May	20-May
Carroll County Solid Waste Management Commission	23-May	27-May
- Crawford Transfer Station	23-May	23-May
- Shelby Transfer Station	24-May	24-May
Memorial Day Week – Crews Off Duty	30-May	3-Jun
Northwest Iowa Area Solid Waste Agency Landfill	6-Jun	10-Jun
Dubuque Metropolitan Area Solid Waste Agency Landfill	13-Jun	17-Jun
Iowa City Landfill	20-Jun	24-Jun
Waste Commission of Scott County Landfill	27-Jun	1-Jul

[1] This landfill made special arrangements with an originating transfer station to segregate Residential wastes into separate transfer trailers for delivery to the landfill, where it could be sampled and sorted.

2.6. FIELD COLLECTION METHODS

This section describes the procedures applied by the Project Team while in the field.

2.6.1 LOAD SELECTION AT INDIVIDUAL FACILITIES

The load selection process attempted to maximize the ability of the Project Team to identify the waste generator sector of incoming loads and also of the specific grab samples obtained from incoming loads.

At the host facility, the sample selection strategy was a three part process involving pre-stratification of loads, driver interviews at the working face, and visual inspection of the load before collecting the sample. This process helped ensure that samples were representative of the waste stream, and provided robustness to the statistical analysis of results by tagging each sample in several different ways for subtotaling and statistical analysis.

As previously described, vehicles were first selected for sampling based on a pre-determined sampling interval unique to each hauler and the waste generator sector being delivered by the hauler. In some cases this was known – for example, municipal sideload and rearload collection vehicles that are collecting residential wastes only. Sampling intervals were determined by dividing the total number of loads for each hauler/generator pair expected to arrive at the facility on a given day by the number of samples needed each day. The resulting number is the sampling frequency and determined whether every third vehicle, every sixth vehicle, or every 20th vehicle within a stratum was selected for sampling. This strategy was referred to as "selecting every nth vehicle" within a waste sector. A sample selection form was

created for each day and each location of sampling activity. However, to allow for daily variation and to remain flexible, sampling intervals were allowed to be adjusted in order to ensure that enough loads could be intercepted during the time available.

The second step in the process was to interview drivers of selected loads as they arrived at the facility (or the designated tipping area). Drivers were asked if their load was primarily residential waste, primarily ICI waste, or a mixture of the two. If the load was a mix, the driver was further asked to estimate as best as possible the ratio between residential and ICI waste in the load, and this response was recorded. The Field Supervisor subsequently directed the driver to the delivery area. Driver responses to the interview and other relevant hauler and truck data were recorded on the Field Supervisor Sampling worksheet.

When a selected load arrived at the working face, the Field Supervisor further queried the driver as to the order of collection for loads containing Mixed Waste. The driver was then asked to unload as normal and the Field Supervisor conducted a final visual inspection of the load before collecting the sample.

The final step was for the Field Supervisor to obtain a 200 to 300 pound grab sample from the tipped load. First, the Field Supervisor performed a visual inspection to verify information provided during the driver interview. Based on the information provided, and on the visual inspection, each grab sample from a Mixed Waste load was qualitatively judged by the Field Supervisor as being either Residential or ICI waste. The Field Supervisor or Crew Chief recorded this judgment, which is used subsequently to enhance the statistical analysis.

As a result of this process, it was concluded that Project Team field personnel were reasonably able to identify Residential and ICI grab samples taken from Mixed Waste loads. A more complete discussion of the sampling process and resulting data is contained in Appendix C.

2.6.2 TAKING SAMPLES

Selected loads of waste were tipped in the designated area at the host facility. From each selected load, one sample of waste 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 .

Figure 2-2 Example of a Grab Sample Staged for Manual Sorting

Once the area of the tipped load was selected, the Field Supervisor coordinated with a facility-provided 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. Each was labeled by its identifying number using a white board. This is shown in Figure 2-2. The white board for sample identification stayed with

the sample until sorting and weigh out was completed. Only one sample was obtained from selected loads. As described in the previous sub-section, grab samples from mixed loads were judged as residential or ICI.

2.6.3 MANUAL SORTING

Once each sample was acquired, the material was manually sorted into the prescribed component categories. Plastic 20-gallon bins with sealed bottoms were used to contain the separated components. A picture of the sorting table and bins is shown in Figure 2-3.

Figure 2-3 Sort Table and Bins

Sorters were asked to specialize in certain material groups, with someone handling the paper categories, another the plastics, another the glass and metals, and so on. In this way, sorters became highly knowledgeable in a short period of time as to the definitions of individual material categories.

The Crew Chief monitored the bins as each sample was sorted, rejecting materials that were improperly classified. Open bins allowed the Crew Chief to see the material at all times. The Crew Chief also verified the purity of each component during the weigh-out (discussed below). The materials were sorted to particle size of 2-inches or less by hand, until no more than a small amount of homogeneous fine material ("mixed residue") remained. This layer of mixed 2-inch-minus material 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. Particles falling through a half inch screen were swept into a Fines category.

2.6.4 DATA RECORDING

The Crew Chief was singularly responsible for overseeing all weighing and data recording of each manually sorted sample once sorting was complete. Each bin containing sorted materials from the just-completed samples was carried over to a digital 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 waste composition data sheet to record the sorted sample weights, as well as to record other sampling requirements (such as counting and photographing). Each data sheet containing the sorted weights of each sample could be matched against the Field Supervisor's sample sheet to assure accurate tracking of the samples each day.

2.7. STATISTICAL METHODS

Using tested statistical procedures, Project Team member Cascadia developed detailed estimates of waste composition and quantities for each generator sector to statistically represent the County's waste stream.

The statistical confidence interval was calculated for each generator sector and in total. The approach used for calculating the mean weight estimates and the confidence intervals is described below. Confidence intervals were calculated at 90 percent.

Composition estimates represent the ratio of the material's weight to the total material for each noted material component in a particular segment of the waste stream. They were derived by summing each component's weight across all of the relevant samples and dividing by the sum of the total weight of waste/recyclables, as shown in the following equation:

$$r_j = \frac{\sum_i c_{ij}}{\sum_i w_i}$$

where:

c = weight of particular material component

w = sum of all component weights

for i = 1 to n, where n = number of selected samples

for j = 1 to m, where m = number of material components

The confidence interval for this estimate was derived in two steps. First, the variance around the estimate was calculated, accounting for the fact that the ratio includes two random variables (the component and total sample weights). The variance of the ratio estimator equation follows:

$$\hat{V}_{r_j} = \left(\frac{1}{n}\right) \cdot \left(\frac{1}{\overline{w}^2}\right) \cdot \left(\frac{\sum_i \left(c_{ij} - r_j w_i\right)^2}{n-1} \right) \qquad \textit{where} \quad \overline{w} = \frac{\sum_i w_i}{n}$$

Second, confidence intervals at the 90 percent confidence level were calculated for a component's mean as follows:

$$r_j \pm \left(t \cdot \sqrt{\hat{V}_{r_j}}\right)$$

where

t = the value of the t-statistic corresponding to a 90 percent confidence level.

As a final step, aggregate composition of waste was calculated as the weighted average of the various generator sectors that were individually analyzed. Weighting factors are based on disposed solid wastes reported in Table 2-2.

3. RESULTS

3.1. INTRODUCTION

This chapter describes the composition of disposed wastes in Iowa, both in the aggregate and by generator sector. Throughout the section, the results are illustrated via the following exhibits:

- A pie chart showing the breakdown of wastes by material group, and
- A detailed tabular summary showing the mean composition and upper and lower confidence intervals at a 90 percent confidence level, for each individual material category included in the study.

Consistent with the 2005 Study, in this report the following specific generator sectors are characterized:

- **Municipal Solid Waste (MSW)**: MSW refers to the combination of Residential and ICI wastes that were disposed at the nine host facilities. MSW excludes source separated C&D debris and any Special Wastes that were disposed in these landfills.
- **Residential Waste**: Refers to the portion of MSW generated at residential dwellings, including single family and multi-family wastes.
- **ICI Waste**: Refers to the portion of MSW generated at industrial, commercial and institutional establishments.
- **Solid Waste**: Solid Waste combines the MSW, source separated C&D debris and Special Wastes that were reported to be disposed at the host landfills.

It is important to note that the Solid Waste composition was calculated by adding C&D and Special Waste quantities to the calculated mean disposal quantities of MSW, and recalculating the percentages accordingly. Because the C&D and Special Waste streams were not statistically sampled, no confidence intervals are provided for the Solid Waste composition. Results by sector are shown in the following sections.

3. RESULTS

3.2. STATEWIDE MSW COMPOSITION

Figure 3-1 shows the breakdown of major material groups for the statewide MSW stream. Results are shown in percentage terms. As shown, Organics and Paper are the largest material groups, followed by Plastic and C&D debris. Note that the C&D contained in MSW excludes source separated C&D debris.

Figure 3-1 2011 MSW Composition

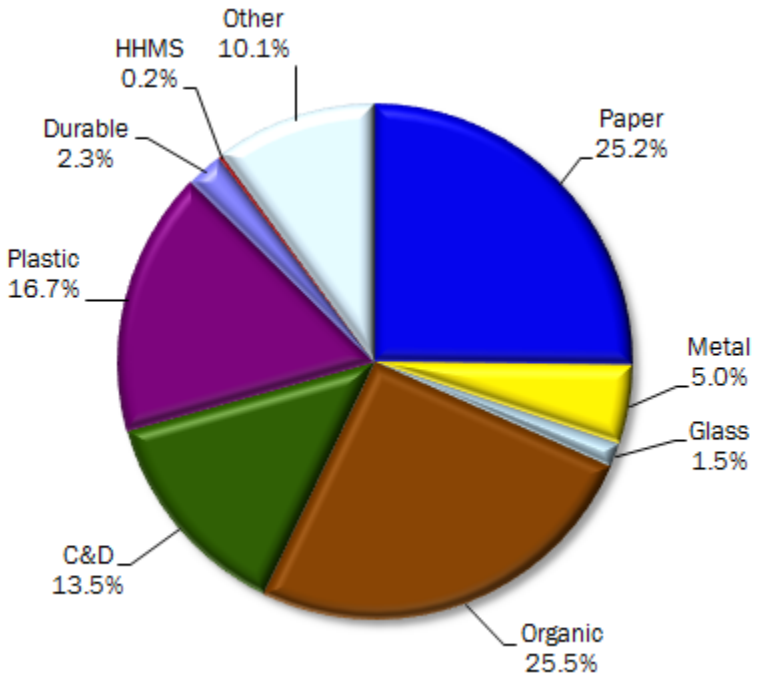


Table 3-1 on the following page provides a detailed statistical profile of the statewide disposed MSW stream. For each material category, the mean percent, and lower and upper confidence intervals are shown. Confidence intervals are calculated at a 90 percent level of confidence. It should be noted that the sum of the mean percentages for all of the individual materials within a material group should sum to the mean percentage shown for the group. For example, the sum of all of the paper materials is the same as the 25.2 percent shown for Paper as a material group. However, the same does not hold true for the confidence intervals. Confidence intervals are calculated individually for each row in this table; the sum of the confidence intervals for each individual material will not equal the confidence intervals shown for the material group. This is because the material groups display lower variation compared to individual material categories, so the confidence intervals for the material group are narrower.

Table 3-1 2011 Detailed MSW Composition

Material	Estimated Percent	Lower Bound	Upper Bound	Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**25.2%**	**23.5%**	**26.9%**	**Plastic**	**16.7%**	**15.0%**	**18.3%**
Compostable Paper	6.1%	5.4%	6.8%	#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
High Grade Office Paper	0.9%	0.6%	1.2%	#1 PET Beverage Containers	0.5%	0.4%	0.5%
Magazines/Catalogs	1.2%	1.0%	1.4%	#2 HDPE Containers Natural	0.3%	0.2%	0.3%
Mixed Recyclable Paper	3.7%	3.4%	4.0%	#2 HDPE Containers Colored	0.4%	0.3%	0.4%
Newsprint	1.6%	1.4%	1.9%	Retail Shopping Bags	0.3%	0.2%	0.3%
Non-Recyclable Paper	2.4%	1.8%	2.9%	Other Film Plastic	6.4%	5.6%	7.1%
OCC and Kraft Paper	9.0%	7.5%	10.5%	Other #1 PET Containers	0.3%	0.2%	0.3%
Aseptic/Gable Top Containers	0.2%	0.2%	0.3%	Plastic Containers #3-#7	0.7%	0.6%	0.7%
				Other plastic Containers	1.1%	0.1%	2.0%
Metal	**5.0%**	**3.7%**	**6.2%**	Expanded Polystyrene	1.5%	0.3%	2.7%
Aluminum Beverage Containers	0.0%	0.0%	0.1%	Other Plastic Products	5.3%	4.3%	6.3%
Aluminum IA Deposit Beverage Containers	0.2%	0.2%	0.2%				
Ferrous Food and Beverage Containers	0.7%	0.5%	0.9%	**Durable**	**2.3%**	**1.5%**	**3.1%**
Other Aluminum Containers	0.3%	0.2%	0.4%	Cell Phones and Chargers	0.0%	0.0%	0.0%
Other Ferrous Scrap Metals	2.2%	1.7%	2.6%	Central Processing Units/Peripherals	0.4%	0.1%	0.6%
Other Non-Ferrous Scrap Metals	1.6%	0.4%	2.7%	Computer Monitors/T.V.s	0.3%	0.1%	0.5%
				Electrical and Household Appliances	1.6%	0.9%	2.3%
Glass	**1.5%**	**1.3%**	**1.7%**				
Blue Glass	0.0%	0.0%	0.0%	**HHMS**	**0.2%**	**0.2%**	**0.3%**
Brown Glass	0.1%	0.1%	0.2%	Automotive Products	0.1%	0.0%	0.2%
Clear Glass	0.5%	0.5%	0.6%	Household Cleaners	0.0%	0.0%	0.0%
Glass Deposit Containers	0.2%	0.2%	0.3%	Lead Acid Batteries	0.0%	0.0%	0.0%
Green Glass	0.1%	0.0%	0.1%	Mercury Container Products	0.0%	0.0%	0.0%
Other Mixed Cullet	0.6%	0.4%	0.7%	Other Batteries	0.1%	0.0%	0.1%
				Paints and Solvents	0.0%	0.0%	0.1%
Organic	**25.5%**	**23.8%**	**27.1%**	Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Yard Waste	4.6%	3.9%	5.2%	Sharps	0.0%	0.0%	0.0%
Food Waste	13.3%	11.9%	14.8%	Prescription Medications	0.0%	0.0%	0.0%
Textiles and Leather	4.1%	3.5%	4.7%				
Diapers	2.5%	2.1%	2.8%	**Other**	**10.1%**	**9.2%**	**11.1%**
Rubber	1.0%	0.6%	1.5%	Other Organics	3.2%	2.7%	3.7%
				Other Inorganics	0.3%	0.1%	0.4%
C&D	**13.5%**	**11.3%**	**15.7%**	Other C&D	1.1%	0.8%	1.4%
Wood – Untreated	5.4%	3.7%	7.1%	Other Durables	2.1%	1.4%	2.8%
Wood – Treated	3.8%	3.1%	4.5%	Other HHM	0.0%	0.0%	0.1%
Asphalt Pavement, Brick, Rock, and Concrete	0.7%	0.5%	0.9%	Fines	3.1%	2.6%	3.5%
Asphalt Roofing	0.8%	0.0%	1.6%	Other	0.5%	0.1%	0.8%
Drywall/Gypsum Board	1.0%	0.5%	1.5%				
Carpet and Carpet Padding	1.8%	1.2%	2.5%	**Totals**	**100.0%**		
				Sample Count	**460**	**Conf.**	**90%**

3.3. STATEWIDE RESIDENTIAL WASTE COMPOSITION

Figure 3-2 presents the breakdown of Residential waste. Organics is the predominant material group in Residential waste, followed by Paper, Plastics and C&D.

Figure 3-2 2011 Residential Waste Composition

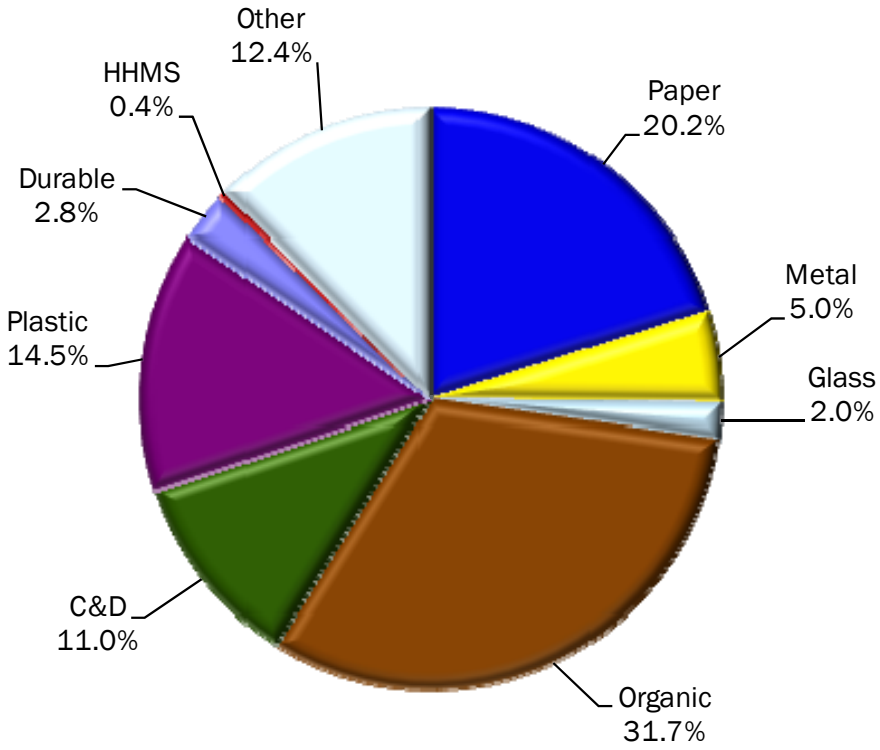


Table 3-2 on the following page provides a detailed statistical profile of the disposed Residential waste stream.

Table 3-2 2011 Detailed Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound	Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**20.2%**	**19.0% -**	**21.3%**	**Plastic**	**14.5%**	**13.5% -**	**15.4%**
Compostable Paper	6.2%	5.7% -	6.7%	#1 PET IA Deposit Beverage Containers	0.1%	0.1% -	0.1%

3.4. STATEWIDE ICI WASTE COMPOSITION

Figure 3-3 presents the breakdown of ICI wastes by material group. In contrast to the Residential sector, Paper is the most prevalent category, followed by Organics and Plastic. C&D debris is also significant in ICI waste.

Figure 3-3 2011 ICI Waste Composition

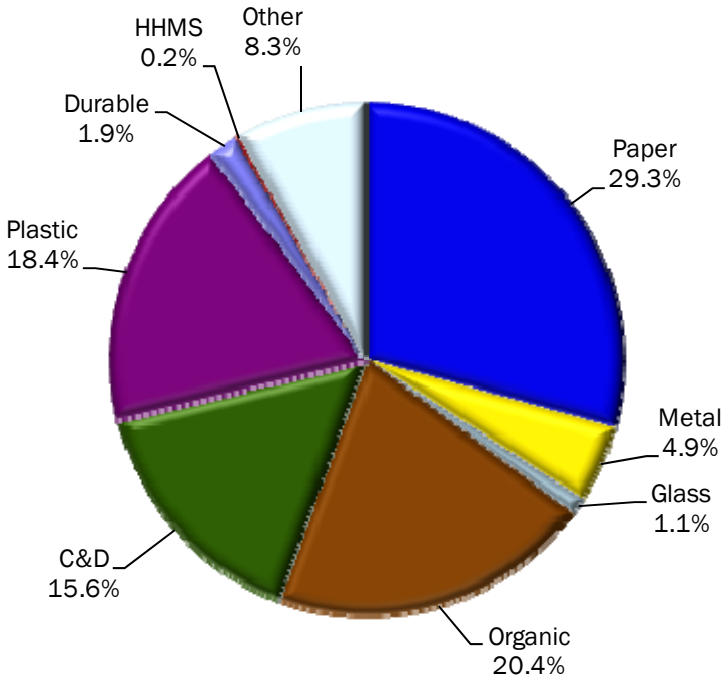


Table 3-3 on the following page provides a detailed statistical profile of the statewide disposed ICI waste stream.

Table 3-3 2011 Detailed ICI Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound	Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**29.3%**	**26.3% - 32.3%**		**Plastic**	**18.4%**	**15.6% - 21.3%**	
Compostable Paper	6.1%	4.8% - 7.3%		#1 PET IA Deposit Beverage Containers	0.2%	0.1% - 0.2%	
High Grade Office Paper	1.2%	0.7% - 1.7%		#1 PET Beverage Containers	0.3%	0.3% - 0.4%	
Magazines/Catalogs	0.9%	0.6% - 1.2%		#2 HDPE Containers Natural	0.3%	0.2% - 0.3%	
Mixed Recyclable Paper	3.1%	2.6% - 3.6%		#2 HDPE Containers Colored	0.3%	0.2% - 0.3%	
Newsprint	1.4%	1.0% - 1.8%		Retail Shopping Bags	0.2%	0.1% - 0.2%	
Non-Recyclable Paper	3.1%	2.1% - 4.1%		Other Film Plastic	7.1%	5.9% - 8.4%	
OCC and Kraft Paper	13.2%	10.5% - 15.9%		Other #1 PET Containers	0.2%	0.1% - 0.3%	
Aseptic/Gable Top Containers	0.3%	0.2% - 0.4%		Plastic Containers #3-#7	0.5%	0.4% - 0.6%	
				Other plastic Containers	1.4%	0.0% - 3.1%	
Metal	**4.9%**	**2.7% - 7.0%**		Expanded Polystyrene	2.1%	0.0% - 4.3%	
Aluminum Beverage Containers	0.0%	0.0% - 0.0%		Other Plastic Products	5.9%	4.1% - 7.7%	
Aluminum IA Deposit Beverage Containers	0.1%	0.1% - 0.2%					
Ferrous Food and Beverage Containers	0.7%	0.4% - 0.9%		**Durable**	**1.9%**	**0.9% - 2.9%**	
Other Aluminum Containers	0.3%	0.1% - 0.4%		Cell Phones and Chargers	0.0%	0.0% - 0.0%	
Other Ferrous Scrap Metals	1.7%	1.2% - 2.1%		Central Processing Units/Peripherals	0.1%	0.0% - 0.3%	
Other Non-Ferrous Scrap Metals	2.2%	0.0% - 4.3%		Computer Monitors/T.V.s	0.5%	0.1% - 0.8%	
				Electrical and Household Appliances	1.2%	0.4% - 2.0%	
Glass	**1.1%**	**0.8% - 1.4%**					
Blue Glass	0.0%	0.0% - 0.0%		**HHMS**	**0.2%**	**0.1% - 0.2%**	
Brown Glass	0.1%	0.0% - 0.2%		Automotive Products	0.0%	0.0% - 0.1%	
Clear Glass	0.4%	0.3% - 0.5%		Household Cleaners	0.0%	0.0% - 0.0%	
Glass Deposit Containers	0.1%	0.1% - 0.2%		Lead Acid Batteries	0.0%	0.0% - 0.0%	
Green Glass	0.0%	0.0% - 0.1%		Mercury Container Products	0.0%	0.0% - 0.0%	
Other Mixed Cullet	0.4%	0.2% - 0.6%		Other Batteries	0.0%	0.0% - 0.1%	
				Paints and Solvents	0.0%	0.0% - 0.1%	
Organic	**20.4%**	**17.9% - 22.8%**		Pesticides, Herbicides, Fungicides	0.0%	0.0% - 0.0%	
Yard Waste	1.9%	1.3% - 2.6%		Sharps	0.0%	0.0% - 0.0%	
Food Waste	13.1%	10.9% - 15.4%		Prescription Medications	0.0%	0.0% - 0.0%	
Textiles and Leather	2.7%	1.8% - 3.6%					
Diapers	1.3%	0.9% - 1.7%		**Other**	**8.3%**	**7.0% - 9.6%**	
Rubber	1.3%	0.6% - 2.1%		Other Organics	2.1%	1.5% - 2.7%	
				Other Inorganics	0.3%	0.1% - 0.4%	
C&D	**15.6%**	**12.1% - 19.1%**		Other C&D	1.2%	0.7% - 1.6%	
Wood – Untreated	7.9%	4.8% - 10.9%		Other Durables	1.2%	0.8% - 1.7%	
Wood – Treated	3.3%	2.4% - 4.1%		Other HHM	0.0%	0.0% - 0.1%	
Asphalt Pavement, Brick, Rock, and Concrete	0.4%	0.2% - 0.5%		Fines	2.7%	2.0% - 3.4%	
Asphalt Roofing	1.3%	0.0% - 2.6%		Other	0.8%	0.1% - 1.5%	
Drywall/Gypsum Board	1.4%	0.5% - 2.4%					
Carpet and Carpet Padding	1.4%	0.5% - 2.4%		**Totals**	**100.0%**		
				Sample Count	**247**	**Conf.**	**90%**

3.5. STATEWIDE SOLID WASTE COMPOSITION

Figure 3-4 presents the breakdown of the statewide Solid Waste. This data shows the impact of separately recorded C&D and Special Wastes. As shown, C&D wastes are the most prevalent material category, with Paper and Organics virtually identical.

Figure 3-4 2011 Solid Waste Composition

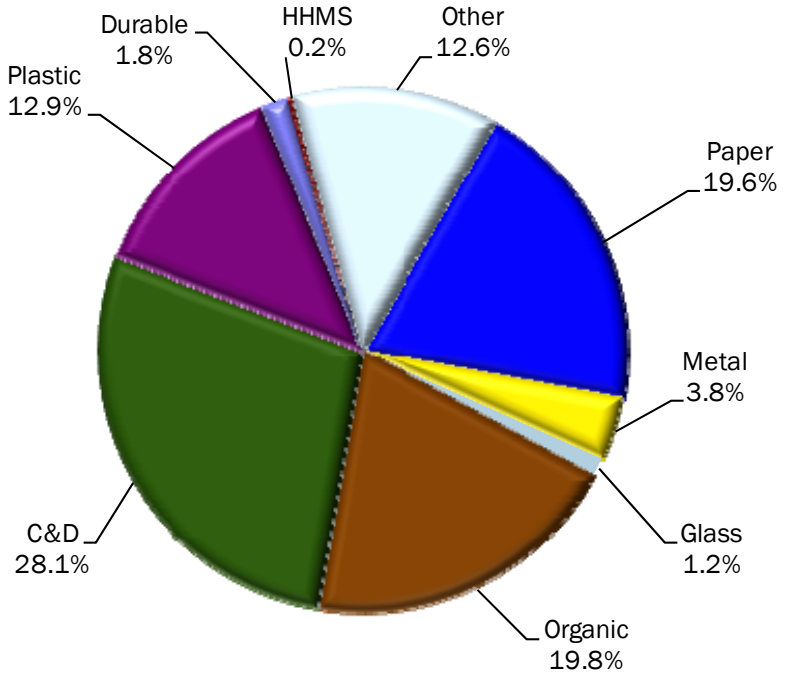


Table 3-4 on the following page provides a detailed profile of the statewide disposed Solid Waste stream. Note that no confidence intervals are shown, as the composition has been calculated based on absolute disposal quantities for C&D and Special Waste, and no statistical sampling of these substreams was performed.

Table 3-4 2011 Detailed Solid Waste Composition

Material		Material	
Paper	**19.6%**	**Plastic**	**12.9%**
Compostable Paper	4.8%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.7%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	1.0%	#2 HDPE Containers Natural	0.2%
Mixed Recyclable Paper	2.9%	#2 HDPE Containers Colored	0.3%
Newsprint	1.3%	Retail Shopping Bags	0.2%
Non-Recyclable Paper	1.9%	Other Film Plastic	4.9%
OCC and Kraft Paper	7.0%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.2%	Plastic Containers #3-#7	0.5%
		Other plastic Containers	0.8%
Metal	**3.8%**	Expanded Polystyrene	1.2%
Aluminum Beverage Containers	0.0%	Other Plastic Products	4.1%
Aluminum IA Deposit Beverage Containers	0.2%		
Ferrous Food and Beverage Containers	0.5%	**Durable**	**1.8%**
Other Aluminum Containers	0.2%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	1.7%	Central Processing Units/Peripherals	0.3%
Other Non-Ferrous Scrap Metals	1.2%	Computer Monitors/T.V.s	0.2%
		Electrical and Household Appliances	1.2%
Glass	**1.2%**		
Blue Glass	0.0%	**HHMS**	**0.2%**
Brown Glass	0.1%	Automotive Products	0.1%
Clear Glass	0.4%	Household Cleaners	0.0%
Glass Deposit Containers	0.2%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.4%	Other Batteries	0.0%
		Paints and Solvents	0.0%
Organic	**19.8%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	3.5%	Sharps	0.0%
Food Waste	10.3%	Prescription Medications	0.0%
Textiles and Leather	3.2%		
Diapers	1.9%	**Other**	**12.6%**
Rubber	0.8%	Other Organics	2.5%
		Other Inorganics	0.2%
C&D	**28.1%**	Other C&D	0.8%
Wood – Untreated	4.2%	Other Durables	1.6%
Wood – Treated	3.0%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	0.6%	Fines	2.4%
Asphalt Roofing	0.6%	Other	0.4%
Drywall/Gypsum Board	0.8%	Special Waste	4.7%
Carpet and Carpet Padding	1.4%		
Mixed C&D	17.6%	**Totals**	**100%**

3. RESULTS

3.6. COMPARISON BY GENERATOR SECTOR

Table 3-5 presents the comparison of mean percent by generator sector.

Table 3-5 Comparison of Composition by Generator Sector

Material	Residential	ICI	MSW	Solid Waste
Paper	**20.2%**	**29.3%**	**25.2%**	**19.6%**
Compostable Paper	6.2%	6.1%	6.1%	4.8%
High Grade Office Paper	0.5%	1.2%	0.9%	0.7%
Magazines/Catalogs	1.6%	0.9%	1.2%	1.0%
Mixed Recyclable Paper	4.5%	3.1%	3.7%	2.9%
Newsprint	1.9%	1.4%	1.6%	1.3%
Non-Recyclable Paper	1.5%	3.1%	2.4%	1.9%
OCC and Kraft Paper	3.8%	13.2%	9.0%	7.0%
Aseptic/Gable Top Containers	0.2%	0.3%	0.2%	0.2%
Metal	**5.0%**	**4.9%**	**5.0%**	**3.8%**
Aluminum Beverage Containers	0.1%	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.3%	0.1%	0.2%	0.2%
Ferrous Food and Beverage Containers	0.8%	0.7%	0.7%	0.5%
Other Aluminum Containers	0.3%	0.3%	0.3%	0.2%
Other Ferrous Scrap Metals	2.8%	1.7%	2.2%	1.7%
Other Non-Ferrous Scrap Metals	0.8%	2.2%	1.6%	1.2%
Glass	**2.0%**	**1.1%**	**1.5%**	**1.2%**
Blue Glass	0.0%	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.1%	0.1%	0.1%
Clear Glass	0.7%	0.4%	0.5%	0.4%
Glass Deposit Containers	0.3%	0.1%	0.2%	0.2%
Green Glass	0.1%	0.0%	0.1%	0.0%
Other Mixed Cullet	0.8%	0.4%	0.6%	0.4%
Organic	**31.7%**	**20.4%**	**25.5%**	**19.8%**
Yard Waste	7.8%	1.9%	4.6%	3.5%
Food Waste	13.6%	13.1%	13.3%	10.3%
Textiles and Leather	5.9%	2.7%	4.1%	3.2%
Diapers	3.8%	1.3%	2.5%	1.9%
Rubber	0.7%	1.3%	1.0%	0.8%
C&D	**11.0%**	**15.6%**	**13.5%**	**28.1%**
Wood – Untreated	2.4%	7.9%	5.4%	4.2%
Wood – Treated	4.5%	3.3%	3.8%	3.0%
Asphalt Pavement, Brick, Rock, and Concrete	1.1%	0.4%	0.7%	0.6%
Asphalt Roofing	0.2%	1.3%	0.8%	0.6%
Drywall/Gypsum Board	0.5%	1.4%	1.0%	0.8%
Carpet and Carpet Padding	2.3%	1.4%	1.8%	1.4%
Mixed C&D	N/A	N/A	N/A	17.6%

Material	Residential	ICI	MSW	Solid Waste
Plastic	**14.5%**	**18.4%**	**16.7%**	**12.9%**
#1 PET IA Deposit Beverage Containers	0.1%	0.2%	0.1%	0.1%
#1 PET Beverage Containers	0.6%	0.3%	0.5%	0.4%
#2 HDPE Containers Natural	0.3%	0.3%	0.3%	0.2%
#2 HDPE Containers Colored	0.5%	0.3%	0.4%	0.3%
Retail Shopping Bags	0.4%	0.2%	0.3%	0.2%
Other Film Plastic	5.4%	7.1%	6.4%	4.9%
Other #1 PET Containers	0.3%	0.2%	0.3%	0.2%
Plastic Containers #3-#7	0.9%	0.5%	0.7%	0.5%
Other plastic Containers	0.7%	1.4%	1.1%	0.8%
Expanded Polystyrene	0.7%	2.1%	1.5%	1.2%
Other Plastic Products	4.5%	5.9%	5.3%	4.1%
Durable	**2.8%**	**1.9%**	**2.3%**	**1.8%**
Cell Phones and Chargers	0.0%	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.6%	0.1%	0.4%	0.3%
Computer Monitors/T.V.s	0.1%	0.5%	0.3%	0.2%
Electrical and Household Appliances	2.1%	1.2%	1.6%	1.2%
HHMS	**0.4%**	**0.2%**	**0.2%**	**0.2%**
Automotive Products	0.2%	0.0%	0.1%	0.1%
Household Cleaners	0.0%	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%	0.0%
Paints and Solvents	0.0%	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%	0.0%
Other	**12.4%**	**8.3%**	**10.1%**	**12.6%**
Other Organics	4.6%	2.1%	3.2%	2.5%
Other Inorganics	0.2%	0.3%	0.3%	0.2%
Other C&D	0.9%	1.2%	1.1%	0.8%
Other Durables	3.1%	1.2%	2.1%	1.6%
Other HHM	0.0%	0.0%	0.0%	0.0%
Fines	3.5%	2.7%	3.1%	2.4%
Other	0.0%	0.8%	0.5%	0.4%
Special Waste	N/A	N/A	N/A	4.7%
Total	**100%**	**100%**	**100%**	**100%**

From this table, we can make a variety of observations about the differences in disposed waste:

- Significantly more Paper is disposed in the ICI waste stream, driven by significantly more OCC/Kraft paper. However, the Residential sector disposed of a higher percentage of Newspaper and Magazines/Catalogs.
- There are significantly more Organics disposed in Residential wastes compared to ICI wastes. This is driven by larger fractions of Yard Waste, Diapers, and Textiles. It should be noted that this study was conducted in the spring/summer months, in which Yard Waste generation is typically higher compared to other seasons.
- The incidence of Glass is low across both generator sectors, although slightly higher in the Residential sector.
- There appears to be more plastics disposed in ICI wastes.
- The fraction of Metal is roughly comparable for Residential and ICI wastes.
- The percentage of HHMS materials is very low across both Residential and ICI wastes.
- The State's bottle deposit system is highly effective at keeping deposit containers out of the disposed waste stream.
- The Residential waste stream contains a higher percentage of Electrical and Household Appliances, although apparently fewer Computers, than the ICI waste stream.
- There is significantly more Untreated Wood in the ICI waste stream, which in turn drives a higher fraction of C&D wastes in ICI wastes.

3.7. COMPARISON BY HOST FACILITY

Table 3-6 provides a comparison of the MSW composition at each of the nine host facilities in the 2011 Study. So that all nine results sets can fit on one table, only the mean composition percentages are shown. However, full confidence intervals are contained in Appendix B for each facility. A detailed comparison of results by facility should include consideration of the confidence intervals as well as the mean composition.

Table 3-6 Comparison of MSW Composition by Host Facility

Material	Carroll County	Des Moines	Dubuque	Iowa City	Metro Waste Authority	Northwest Iowa	Ottumwa Wapellow	Scott County	South Central
Paper	**23.7%**	**27.7%**	**21.2%**	**27.5%**	**25.2%**	**32.3%**	**21.0%**	**21.4%**	**25.5%**
Compostable Paper	4.6%	6.2%	5.8%	6.4%	6.8%	5.1%	6.6%	5.9%	4.3%
High Grade Office Paper	1.0%	0.9%	0.5%	0.4%	1.2%	0.7%	0.7%	1.0%	0.8%
Magazines/Catalogs	1.3%	1.0%	0.9%	0.8%	1.3%	2.3%	2.5%	1.3%	1.3%
Mixed Recyclable Paper	4.4%	4.6%	2.7%	3.7%	3.1%	8.0%	4.1%	4.7%	4.4%
Newsprint	1.9%	2.4%	1.0%	1.7%	1.4%	2.6%	2.5%	1.9%	1.7%
Non-Recyclable Paper	3.0%	4.7%	2.2%	4.3%	1.3%	5.6%	1.6%	1.4%	3.6%
OCC and Kraft Paper	7.5%	7.5%	7.8%	10.1%	9.8%	7.9%	2.9%	4.9%	9.4%
Aseptic/Gable Top Containers	0.1%	0.4%	0.2%	0.1%	0.3%	0.1%	0.2%	0.1%	0.2%
Metal	**3.5%**	**4.4%**	**5.9%**	**4.5%**	**5.2%**	**4.3%**	**4.7%**	**3.6%**	**5.3%**
Aluminum Beverage Containers	0.0%	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.2%	0.0%
Aluminum IA Deposit Beverage Containers	0.1%	0.3%	0.2%	0.1%	0.2%	0.4%	0.2%	0.1%	0.2%
Ferrous Food and Beverage Containers	0.8%	1.0%	1.1%	0.5%	0.6%	0.8%	0.6%	0.9%	0.5%
Other Aluminum Containers	0.2%	0.4%	0.2%	0.3%	0.3%	0.2%	0.2%	0.3%	0.1%
Other Ferrous Scrap Metals	1.9%	1.9%	2.9%	3.0%	1.8%	2.1%	2.2%	1.5%	2.9%
Other Non-Ferrous Scrap Metals	0.5%	0.8%	1.5%	0.6%	2.2%	0.8%	1.5%	0.6%	1.5%
Glass	**1.5%**	**2.5%**	**1.3%**	**1.7%**	**1.3%**	**2.4%**	**1.6%**	**1.5%**	**1.9%**
Blue Glass	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.1%	0.3%	0.1%	0.1%	0.1%	0.1%	0.0%
Clear Glass	0.4%	0.7%	0.5%	0.6%	0.5%	1.0%	0.6%	0.6%	0.5%
Glass Deposit Containers	0.4%	1.2%	0.1%	0.0%	0.2%	0.3%	0.3%	0.2%	0.4%
Green Glass	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.1%	0.0%
Other Mixed Cullet	0.6%	0.5%	0.5%	0.7%	0.5%	0.9%	0.5%	0.4%	1.0%
Organic	**21.2%**	**25.5%**	**27.8%**	**25.4%**	**25.1%**	**25.7%**	**27.9%**	**32.0%**	**24.4%**
Yard Waste	2.6%	2.7%	3.9%	3.5%	5.2%	3.1%	2.8%	11.1%	3.2%
Food Waste	10.8%	16.0%	14.2%	14.8%	13.1%	16.0%	17.1%	9.5%	12.5%
Textiles and Leather	3.7%	4.4%	4.8%	3.9%	3.7%	3.0%	4.5%	7.2%	5.4%
Diapers	3.2%	1.7%	4.2%	2.5%	2.2%	2.6%	2.8%	3.3%	1.9%
Rubber	0.9%	0.7%	0.7%	0.7%	1.0%	0.9%	0.8%	0.9%	1.4%
C&D	**15.5%**	**13.3%**	**15.9%**	**8.7%**	**14.5%**	**9.6%**	**12.8%**	**11.1%**	**13.0%**
Wood – Untreated	4.4%	5.0%	2.4%	2.5%	7.8%	2.9%	1.9%	0.7%	6.1%
Wood – Treated	7.6%	4.2%	6.1%	3.7%	2.3%	1.7%	6.1%	7.1%	3.9%
Asphalt Pavement, Brick, Rock, and Concrete	1.3%	0.4%	1.7%	0.1%	0.6%	1.7%	0.3%	0.5%	0.5%
Asphalt Roofing	0.5%	0.0%	1.0%	0.3%	1.1%	0.8%	0.1%	0.2%	0.8%
Drywall/Gypsum Board	0.4%	2.2%	1.3%	0.8%	1.0%	0.2%	1.1%	0.0%	0.4%
Carpet and Carpet Padding	1.3%	1.4%	3.2%	1.2%	1.7%	2.4%	3.3%	2.6%	1.4%

Table 3-6 (Continued) Comparison of MSW Percent Composition by Host Facility

Material	Carroll County LF	Des Moines LF	Dubuque LF	Iowa City LF	Metro Waste Authority LF	Northwest Iowa LF	Ottumwa Wapellow LF	Scott County LF	South Central LF
Plastic	**12.6%**	**14.7%**	**13.0%**	**21.3%**	**17.7%**	**15.1%**	**13.4%**	**15.7%**	**15.6%**
#1 PET IA Deposit Beverage Containers	0.2%	0.5%	0.1%	0.1%	0.1%	0.2%	0.3%	0.1%	0.1%
#1 PET Beverage Containers	0.5%	0.5%	0.4%	0.4%	0.5%	0.6%	0.5%	0.7%	0.5%
#2 HDPE Containers Natural	0.3%	0.4%	0.2%	0.3%	0.2%	0.4%	0.2%	0.3%	0.2%
#2 HDPE Containers Colored	0.5%	0.5%	0.2%	0.3%	0.4%	0.8%	0.7%	0.5%	0.3%
Retail Shopping Bags	0.2%	0.5%	0.3%	0.3%	0.2%	0.4%	0.7%	0.6%	0.3%
Other Film Plastic	4.2%	6.6%	5.3%	9.3%	6.5%	6.7%	4.4%	5.2%	5.4%
Other #1 PET Containers	0.3%	0.4%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.2%
Plastic Containers #3-#7	0.7%	0.7%	0.6%	0.7%	0.6%	1.2%	0.9%	1.3%	0.6%
Other plastic Containers	0.6%	0.5%	0.5%	0.5%	1.8%	0.4%	0.1%	0.7%	0.5%
Expanded Polystyrene	1.2%	1.5%	1.4%	0.7%	2.1%	1.3%	0.6%	0.5%	0.4%
Other Plastic Products	3.9%	2.5%	3.7%	8.4%	5.2%	2.7%	4.7%	5.6%	7.0%
Durable	**3.2%**	**1.9%**	**2.0%**	**1.0%**	**2.6%**	**1.8%**	**3.1%**	**2.5%**	**1.8%**
Cell Phones and Chargers	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
Central Processing Units/Peripherals	0.7%	0.0%	0.0%	0.0%	0.4%	0.1%	0.2%	1.0%	0.3%
Computer Monitors/T.V.s	0.5%	0.3%	0.7%	0.3%	0.2%	0.0%	0.0%	0.0%	0.2%
Electrical and Household Appliances	1.9%	1.5%	1.3%	0.7%	2.0%	1.6%	2.8%	1.5%	1.2%
HHMS	**0.8%**	**0.5%**	**0.2%**	**0.1%**	**0.2%**	**0.5%**	**0.3%**	**0.3%**	**0.2%**
Automotive Products	0.4%	0.2%	0.1%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.1%	0.1%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Paints and Solvents	0.2%	0.2%	0.0%	0.0%	0.0%	0.2%	0.1%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other	**18.0%**	**9.5%**	**12.7%**	**9.8%**	**8.2%**	**8.2%**	**15.2%**	**11.8%**	**12.4%**
Other Organics	9.2%	3.1%	3.4%	1.6%	3.0%	2.8%	3.5%	4.6%	1.7%
Other Inorganics	0.2%	0.2%	0.3%	0.4%	0.1%	0.1%	0.2%	0.1%	1.2%
Other C&D	0.8%	1.2%	2.0%	2.0%	0.2%	1.7%	1.2%	2.1%	2.4%
Other Durables	3.3%	1.2%	4.5%	2.7%	1.0%	0.7%	7.4%	2.1%	2.8%
Other HHM	0.1%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%
Fines	2.4%	3.6%	2.5%	2.4%	3.5%	2.7%	2.5%	2.8%	3.5%
Other	2.1%	0.2%	0.0%	0.4%	0.4%	0.2%	0.4%	0.1%	0.7%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**99.9%**	**100.0%**	**100.0%**

4. 2005 STUDY COMPARISON AND DIVERSION OPPORTUNITIES

4.1. INTRODUCTION

The Iowa DNR has performed two prior statewide waste composition studies, the most recent completed in 2005. This section first compares the results of the 2011 Study with the composition from the previous studies. This section also identifies the most prevalent disposed wastes in 2011, which in turn suggest opportunities for increased diversion in the future.

4.2. COMPARISON WITH PRIOR STUDIES

Since 1998, all Iowa statewide waste composition studies have reported the mean composition as well as 90 percent confidence intervals. To determine if there have been changes in composition, it is possible to compare the mean composition from one study to previous studies.

Table 4-1 shows the composition of MSW from the 2011, 2005, and the 1998 Studies. Results include the estimated mean composition as well as the upper and lower confidence intervals. The far right column has been added to indicate if there has been a statistically significant change in composition between the 2005 and 2011 Studies. Specifically, this column contains an 'x' if the mean composition from both Studies falls outside of the confidence interval of the other Study.

For example, it is estimated in 2011 that OCC/Kraft comprised 9.0 percent of disposed waste. We can be 90 percent confident that the actual fraction of OCC/Kraft ranged between 7.5 and 10.5 percent. In 2005, OCC/Kraft was found to be 8.5 percent. This falls between the 2011 Study confidence intervals for OCC/Kraft. We can therefore conclude that OCC/Kraft has not changed to a statistically significant degree between the 2005 and 2011 Studies, even though the mean composition increased slightly.

Conversely, High Grade Office Paper shrank from 2.5 percent in 2005 to 0.9 percent in 2011. The upper confidence interval in 2011 is 1.2 percent, which is still below the estimated mean in 2005. The inverse is also true – the lower bound of 1.9 percent from the 2005 Study is still higher than the 2011 Study mean. For this reason, we can state that High Grade Office Paper has declined at a statistically significant level.

The far right column indicates the individual material categories and material groups that have changed to a statistically significant degree since 2005.

Note that confidence intervals are not shown for all material groups. This is because the materials have been more logically re-grouped for the 2011 Study, and no comparable group confidence intervals are contained in prior studies. It is noted again that the sum of the mean percentages for all of the individual materials within a material group should sum to the mean percentage shown for the group. However, the same does not hold true for the confidence intervals. Confidence intervals are calculated individually for each row in this table; the sum of the confidence intervals for each individual material will not equal the confidence intervals shown for the material group.

4. COMPARISON AND DIVERSION OPPORTUNITIES

Table 4-1 Comparison with Prior Studies – MSW

Comparison of Statewide Overall MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Paper	**25.2%**	**23.5%**	**26.9%**	**33.1%**	**30.5%**	**35.7%**	**32.3%**	**30.5%**	**34.0%**	**x**
Compostable Paper	6.1%	5.4%	6.8%	6.5%	5.7%	7.4%	NA	NA	NA	
High Grade Office Paper	0.9%	0.6%	1.2%	2.5%	1.9%	3.1%	2.3%	2.0%	2.5%	x
Magazines/Catalogs	1.2%	1.0%	1.4%	1.8%	1.6%	2.1%	2.5%	2.2%	2.8%	x
Mixed Recyclable Paper	3.7%	3.4%	4.0%	7.0%	6.3%	7.7%	5.4%	5.0%	5.9%	x
Newsprint	1.6%	1.4%	1.9%	4.0%	3.4%	4.7%	3.3%	2.9%	3.6%	x
Non-Recyclable Paper	2.4%	1.8%	2.9%	2.8%	2.3%	3.3%	10.3%	9.4%	11.2%	
OCC and Kraft Paper	9.0%	7.5%	10.5%	8.5%	7.2%	9.4%	8.5%	7.7%	10.1%	
Aseptic/Gable Top Paper Containers	0.2%	0.2%	0.3%	NA	NA	NA	NA	NA	NA	
Metal	**5.0%**	**3.7%**	**6.2%**	**4.7%**	**4.1%**	**5.5%**	**6.0%**	**5.5%**	**6.6%**	
Aluminum Beverage Containers	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	x
Aluminum IA Deposit Beverage Containers	0.2%	0.2%	0.2%	0.2%	0.1%	0.2%	0.1%	0.1%	0.2%	
Ferrous Food and Beverage Containers	0.7%	0.5%	0.9%	1.0%	0.8%	1.2%	1.7%	1.5%	1.9%	
Other Aluminum Containers	0.3%	0.2%	0.4%	0.1%	0.1%	0.2%	NA	NA	NA	
Other Ferrous Scrap Metals	2.2%	1.7%	2.6%	2.8%	2.3%	3.5%	3.4%	3.0%	3.8%	
Other Non-Ferrous Scrap Metals	1.6%	0.4%	2.7%	0.5%	0.4%	0.6%	0.7%	0.6%	0.8%	
Glass	**1.5%**	**1.3%**	**1.7%**	**1.6%**	**1.5%**	**2.0%**	**2.7%**	**2.2%**	**2.9%**	
Blue Glass	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	
Brown Glass	0.1%	0.1%	0.2%	0.0%	0.0%	0.1%	0.2%	0.1%	0.2%	
Clear Glass	0.5%	0.5%	0.6%	0.7%	0.6%	0.9%	1.0%	0.9%	1.1%	
Glass Deposit Containers	0.2%	0.2%	0.3%	0.3%	0.2%	0.4%	0.3%	0.3%	0.4%	
Green Glass	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	x
Other Mixed Cullet	0.6%	0.4%	0.7%	0.5%	0.4%	0.7%	1.1%	0.9%	1.3%	

Table 4-1 (Continued) Comparison with Prior Studies – MSW

Comparison of Statewide Overall MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Organic	**25.5%**	**23.8%**	**27.1%**	**20.1%**			**19.7%**			
Pumpkins	NA	NA	NA	0.3%	0.2%	0.4%	0.4%	0.3%	0.5%	
Yard Waste	4.6%	3.9%	5.2%	1.4%	1.0%	1.9%	1.3%	1.1%	1.5%	x
Food Waste	13.3%	11.9%	14.8%	10.6%	9.3%	12.2%	10.7%	9.6%	11.8%	
Textiles and Leather	4.1%	3.5%	4.7%	4.9%	4.0%	6.1%	4.2%	3.7%	4.7%	
Diapers	2.5%	2.1%	2.8%	2.4%	2.0%	2.8%	2.3%	2.0%	2.7%	
Rubber	1.0%	0.6%	1.5%	0.5%	0.3%	0.6%	0.8%	0.7%	0.9%	x
C&D	**13.5%**	**11.3%**	**15.7%**	**13.5%**			**11.2%**			
Wood – Untreated	5.4%	3.7%	7.1%	3.4%	2.7%	4.4%	2.8%	2.3%	3.2%	
Wood – Treated	3.8%	3.1%	4.5%	4.6%	3.6%	6.0%	3.6%	3.0%	4.2%	
Asphalt Pavement, Brick, Rock, and Concrete [1]	0.7%	0.5%	0.9%	5.5%	4.1%	7.6%	4.8%	4.0%	5.7%	
Asphalt Roofing [1]	0.8%	0.0%	1.6%							
Drywall/Gypsum Board [1]	1.0%	0.5%	1.5%							
Carpet and Carpet Padding [1]	1.8%	1.2%	2.5%							
Plastic	**16.7%**	**15.0%**	**18.3%**	**14.9%**	**13.4%**	**16.6%**	**14.4%**	**13.3%**	**15.6%**	
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.2%	x
#1 PET Beverage Containers	0.5%	0.4%	0.5%	0.4%	0.4%	0.5%	0.2%	0.2%	0.3%	
#2 HDPE Containers Natural [2]	0.3%	0.2%	0.3%	1.0%	0.9%	1.2%	1.0%	0.9%	1.1%	
#2 HDPE Containers Colored [2]	0.4%	0.3%	0.4%							
Plastic Retail Shopping Bags [3]	0.3%	0.2%	0.3%	6.6%	5.7%	7.5%	4.8%	4.3%	5.2%	
Other Film Plastic [3]	6.4%	5.6%	7.1%							
Other #1 PET Containers	0.3%	0.2%	0.3%	0.3%	0.2%	0.3%	NA	NA	NA	
#3-#7 Plastic Containers	0.7%	0.6%	0.7%	NA	NA	NA	NA	NA	NA	
Other Plastic Containers	1.1%	0.1%	2.0%	0.4%	0.3%	0.5%	0.8%	0.7%	0.9%	
Expanded Polystyrene	1.5%	0.3%	2.7%	NA	NA	NA	NA	NA	NA	
Other Plastic Products	5.3%	4.3%	6.3%	6.0%	5.3%	6.9%	7.5%	6.7%	8.4%	

Table 4-1 (Continued) Comparison with Prior Studies – MSW

Comparison of Statewide Overall MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Durable	**2.3%**	**1.5%**	**3.1%**	**2.4%**			**1.6%**			
Cell Phones and Chargers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA	NA	x
Central Processing Units/Peripherals	0.4%	0.1%	0.6%	0.2%	0.1%	0.3%	NA	NA	NA	
Computer Monitors/T.V.s	0.3%	0.1%	0.5%	0.1%	0.0%	0.1%	NA	NA	NA	
Electrical and Household Appliances	1.6%	0.9%	2.3%	2.1%	1.6%	2.9%	1.6%	1.3%	1.9%	
HHMS	**0.2%**	**0.2%**	**0.3%**	**0.3%**			**1.4%**			
Automotive Products	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.3%	0.2%	0.3%	x
Household Cleaners	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	x
Lead Acid Batteries	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Mercury Containing Products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA	NA	x
Other Batteries	0.1%	0.0%	0.1%	0.2%	0.2%	0.3%	0.1%	0.1%	0.1%	x
Paints and Solvents	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	x
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Sharps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.5%	0.8%	x
Prescription Medications	0.0%	0.0%	0.0%	NA	NA	NA	NA	NA	NA	
Other	**10.1%**	**9.2%**	**11.1%**	**9.6%**			**10.9%**			
Other Organic	3.2%	2.7%	3.7%	1.5%	1.2%	1.8%	1.7%	1.5%	2.0%	x
Other Inorganic	0.3%	0.1%	0.4%	2.4%	1.9%	3.0%	1.7%	1.4%	2.1%	x
Other C&D [1]	1.1%	0.8%	1.4%	NA	NA	NA	NA	NA	NA	
Other Durable	2.1%	1.4%	2.8%	2.7%	1.9%	3.8%	2.2%	1.8%	2.7%	
Other HHM	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	x
Fines	3.1%	2.6%	3.5%	2.4%	2.1%	2.8%	5.2%	4.6%	5.6%	
Other	0.5%	0.1%	0.8%	0.5%	0.3%	0.8%	NA	NA	NA	
Grand Total	**100.0%**			**100.0%**			**100.0%**			

[1] The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011

[2] The 2005 material #2 HDPE Containers has been split into #2 HDPE Containers Natural and #2 HDPE Containers Colored in 2011

[3] The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011

4. COMPARISON AND DIVERSION OPPORTUNITIES

Table 4-2 shows the top 10 most prevalent materials in the MSW stream in the 2011, 2005, and 1988 Studies. Results shown are estimated mean percent. As shown, the most prevalent material in all three studies was Food Waste.

Table 4-2 Comparison of Top 10 Most Prevalent Materials in MSW Stream

2011	2005	1998
Food Waste - 13.3%	Food Waste - 10.6%	Food Waste - 10.7%
OCC and Kraft Paper - 9.0%	OCC and Kraft Paper - 8.5%	Non-Recyclable Paper - 10.3%
Other Film Plastic [2] - 6.6%	Mixed Recyclable Paper - 7.0%	OCC and Kraft Paper - 8.5%
Compostable Paper - 6.1%	Film/Wrap/Bags [2] - 6.6%	Film/Wrap/Bags - 7.5%
Wood – Untreated - 5.4%	Compostable Paper - 6.5%	Mixed Recyclable Paper - 5.4%
Demolition/Renovation/ Construction [1] - 5.4%	Other Plastic Products - 6.0%	Fines - 5.2%
Other Plastic Products - 5.3%	Demolition/Renovation/ Construction [1] - 5.5%	Demolition/Renovation/ Construction [1] - 4.8%
Yard Waste - 4.6%	Textiles and Leather - 4.9%	Other Film Plastic [2] - 4.8%
Textiles and Leather - 4.1%	Wood – Treated - 4.6%	Textiles and Leather - 4.2%
Wood – Treated - 3.8%	Newsprint - 4.0%	Wood – Treated - 3.6%
Cumulative – 61.7%	**Cumulative – 64.2%**	**Cumulative – 65.0%**

[1] The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011.

[2] The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011.

Of interest, there are seven material categories ranked in the top ten during all three studies: Food Waste, OCC & Kraft Paper, Other Film Plastic, Demolition/Renovation/Construction, Other Plastic Products, Textiles and Leather, and Wood – Treated.

Also noteworthy, Yard Waste made the top ten for the first time in 2011. Yard waste diversion programs are common in Iowa, so the prevalence of Yard Waste in the 2011 Study warrants attention. However, sorting was conducted in late Spring in the 2011 Study, compared to Fall sorts in the prior two studies. This may have contributed to the increase in yard waste.

Table 4-3 shows the Residential waste stream comparison results between the 2011, 2005, and the 1988 Studies. Several of the paper categories percentages decreased.

Table 4-3 Comparison with Prior Studies – Residential Waste

Comparison of Statewide Residential MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Paper	**20.2%**	**19.0%**	**21.3%**	**31.1%**	**27.5%**	**34.8%**	**29.0%**	**26.2%**	**31.7%**	**x**
Compostable Paper	6.2%	5.7%	6.7%	7.9%	6.4%	9.7%	NA	NA	NA	
High Grade Office Paper	0.5%	0.4%	0.7%	1.5%	1.2%	2.0%	1.8%	1.4%	2.1%	x
Magazines/Catalogs	1.6%	1.4%	1.9%	2.4%	1.9%	3.0%	3.2%	2.7%	3.7%	
Mixed Recyclable Paper	4.5%	4.1%	4.8%	7.9%	6.7%	9.2%	6.1%	5.4%	6.9%	x
Newsprint	1.9%	1.7%	2.1%	5.7%	4.3%	7.3%	4.2%	3.5%	4.9%	x
Non-Recyclable Paper	1.5%	1.2%	1.7%	1.9%	1.5%	2.3%	9.6%	8.4%	10.8%	
OCC and Kraft Paper	3.8%	3.2%	4.4%	3.8%	2.8%	4.9%	4.1%	3.5%	4.8%	
Aseptic/Gable Top Paper Containers	0.2%	0.1%	0.2%	NA	NA	NA	NA	NA	NA	
Metal	**5.0%**	**4.1%**	**6.0%**	**4.2%**	**3.3%**	**5.3%**	**7.2%**	**6.1%**	**8.3%**	
Aluminum Beverage Containers	0.1%	0.0%	0.1%	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	
Aluminum IA Deposit Beverage Containers	0.3%	0.2%	0.3%	0.2%	0.1%	0.3%	0.2%	0.1%	0.2%	
Ferrous Food and Beverage Containers	0.8%	0.7%	0.9%	1.2%	1.0%	1.5%	1.3%	1.1%	1.6%	x
Other Aluminum Containers	0.3%	0.2%	0.4%	0.1%	0.1%	0.1%	NA	NA	NA	x
Other Ferrous Scrap Metals	2.8%	1.9%	3.7%	2.0%	1.4%	2.7%	4.6%	3.6%	5.7%	
Other Non-Ferrous Scrap Metals	0.8%	0.6%	1.1%	0.7%	0.5%	0.9%	1.0%	0.8%	1.3%	
Glass	**2.0%**	**1.8%**	**2.3%**	**2.5%**	**1.9%**	**3.1%**	**2.5%**	**2.2%**	**2.9%**	
Blue Glass	0.0%	0.0%	0.0%	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	
Brown Glass	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	0.2%	0.2%	0.3%	
Clear Glass	0.7%	0.6%	0.8%	1.0%	0.8%	1.3%	1.4%	1.2%	1.7%	
Glass Deposit Containers	0.3%	0.2%	0.4%	0.3%	0.2%	0.4%	0.4%	0.3%	0.5%	
Green Glass	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%	0.1%	0.0%	0.1%	x
Other Mixed Cullet	0.8%	0.5%	1.0%	0.9%	0.5%	1.4%	0.4%	0.3%	0.5%	

Table 4-3 (Continued) Comparison with Prior Studies – Residential Waste

Comparison of Statewide Residential MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Organic	**31.7%**	**29.6%**	**33.9%**	**22.5%**			**23.5%**			
Pumpkins	NA	NA	NA	0.1%	0.1%	0.2%	0.9%	0.6%	1.3%	
Yard Waste	7.8%	6.6%	9.0%	1.6%	0.9%	2.5%	1.9%	1.4%	2.5%	x
Food Waste	13.6%	11.9%	15.2%	11.2%	9.2%	13.6%	10.8%	9.2%	12.4%	
Textiles and Leather	5.9%	5.2%	6.6%	5.4%	4.0%	7.1%	5.5%	4.6%	6.4%	
Diapers	3.8%	3.2%	4.5%	4.1%	3.1%	5.4%	3.7%	3.0%	4.5%	
Rubber	0.7%	0.4%	0.9%	0.1%	0.1%	0.1%	0.7%	0.5%	0.9%	x
C&D	**11.0%**	**8.7%**	**13.2%**	**12.5%**			**10.4%**			
Wood – Untreated	2.4%	1.7%	3.1%	2.2%	1.1%	3.8%	1.4%	1.0%	1.8%	
Wood – Treated	4.5%	3.4%	5.6%	4.9%	2.9%	7.8%	5.0%	3.7%	6.5%	
Asphalt Pavement, Brick, Rock, and Concrete [1]	1.1%	0.7%	1.6%	5.4%	2.5%	10.0%	4.0%	2.9%	5.3%	
Asphalt Roofing [1]	0.2%	0.0%	0.4%							
Drywall/Gypsum Board [1]	0.5%	0.1%	0.8%							
Carpet and Carpet Padding [1]	2.3%	1.5%	3.1%							
Plastic	**14.5%**	**13.5%**	**15.4%**	**13.2%**	**10.9%**	**15.8%**	**10.4%**	**9.3%**	**11.4%**	
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.1%	0.2%	0.2%	0.3%	0.2%	0.1%	0.2%	x
#1 PET Beverage Containers	0.6%	0.6%	0.7%	0.5%	0.4%	0.6%	0.3%	0.2%	0.4%	
#2 HDPE Containers Natural [2]	0.3%	0.2%	0.3%	1.3%	1.0%	1.6%	0.9%	0.8%	1.0%	
#2 HDPE Containers Colored [2]	0.5%	0.4%	0.6%							
Plastic Retail Shopping Bags [3]	0.4%	0.3%	0.5%	5.3%	4.3%	6.5%	3.9%	3.4%	4.5%	
Other Film Plastic [3]	5.4%	4.9%	6.0%							
Other #1 PET Containers	0.3%	0.3%	0.4%	0.4%	0.3%	0.6%	NA	NA	NA	
#3-#7 Plastic Containers	0.9%	0.8%	1.0%	NA	NA	NA	NA	NA	NA	
Other Plastic Containers	0.7%	0.5%	0.8%	0.5%	0.4%	0.6%	0.7%	0.6%	0.9%	
Expanded Polystyrene	0.7%	0.5%	0.9%	NA	NA	NA	NA	NA	NA	
Other Plastic Products	4.5%	4.0%	5.0%	5.0%	4.0%	6.2%	4.4%	3.9%	5.0%	

Table 4-3 (Continued) Comparison with Prior Studies – Residential Waste

Comparison of Statewide Residential MSW Composition										
Materials	**2011**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Durable	**2.8%**	**1.4%**	**4.2%**	**2.0%**			**2.3%**			
Cell Phones and Chargers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA	NA	x
Central Processing Units/Peripherals	0.6%	0.1%	1.1%	0.0%	0.0%	0.1%	NA	NA	NA	x
Computer Monitors/T.V.s	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	NA	NA	NA	x
Electrical and Household Appliances	2.1%	1.0%	3.2%	2.0%	1.1%	3.4%	2.3%	1.7%	3.0%	
HHMS	**0.4%**	**0.2%**	**0.5%**	**0.5%**			**1.1%**			
Automotive Products	0.2%	0.0%	0.3%	0.0%	0.0%	0.0%	0.3%	0.2%	0.4%	x
Household Cleaners	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.0%	0.1%	x
Lead Acid Batteries	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Mercury Containing Products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA	NA	x
Other Batteries	0.1%	0.1%	0.1%	0.3%	0.2%	0.5%	0.1%	0.1%	0.2%	x
Paints and Solvents	0.0%	0.0%	0.1%	0.2%	0.1%	0.4%	0.2%	0.1%	0.2%	x
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Sharps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%	0.6%	x
Prescription Medications	0.0%	0.0%	0.0%	NA	NA	NA	NA	NA	NA	
Other	**12.4%**	**11.1%**	**13.8%**	**11.3%**			**13.7%**			
Other Organic	4.6%	3.9%	5.2%	2.2%	1.6%	3.0%	1.8%	1.4%	2.3%	x
Other Inorganic	0.2%	0.1%	0.4%	3.9%	2.8%	5.4%	1.9%	1.4%	2.4%	x
Other C&D [1]	0.9%	0.6%	1.3%	NA	NA	NA	NA	NA	NA	
Other Durable	3.1%	1.7%	4.5%	1.6%	1.0%	2.7%	4.1%	2.8%	5.7%	
Other HHM	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	x
Fines	3.5%	3.2%	3.8%	3.6%	2.8%	4.6%	5.8%	5.0%	6.6%	
Other Material	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	NA	NA	NA	x
Grand Total	**100.0%**			**100.0%**			**100.0%**			

[1]The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011

[2]The 2005 material #2 HDPE Containers has been split into #2 HDPE Containers Natural and #2 HDPE Containers Colored in 2011

[3]The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011

[4] May not sum to 100 percent due to rounding

Table 4-4 shows the 2011, 2005, and 1988 Studies top 10 most prevalent materials in the Residential Waste stream.

Table 4-4 Comparison of Top 10 Most Prevalent Materials in Residential Stream

Material 2011	Material 2005	Material 1998
Food Waste - 13.6%	Food Waste - 11.2%	Food Waste - 10.8%
Yard Waste - 7.8%	Mixed Recyclable Paper - 7.9%	Non-Recyclable Paper - 9.6%
Compostable Paper - 6.2%	Newsprint - 5.7%	Mixed Recyclable Paper - 6.1%
Textiles and Leather - 5.9%	Textiles and Leather - 5.4%	Fines - 5.8%
Other Film Plastic [2] - 5.8%	Demolition/Renovation/ Construction [1] - 5.4%	Textiles and Leather - 5.5%
Other Plastic Products - 5.2%	Film/Wrap/Bags [2] - 5.3%	Wood – Treated - 5.0%
Demolition/Renovation/ Construction [1] - 5.0%	Other Plastic Products - 5.0%	Other Ferrous Scrap Metals - 4.6%
Wood - Treated - 4.5%	Wood – Treated - 4.9%	Other Plastic Products - 4.4%
Other Plastic Products - 4.5%%	Diapers - 4.1%	Newsprint - 4.2%
Mixed Recyclable Paper - 4.5%	Other Inorganic - 3.9%	OCC and Kraft Paper - 4.1%
Cumulative - 60.7%	**Cumulative - 58.8%**	**Cumulative - 60.1%**

[1] The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011.

[2] The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011.

Only Food Waste, Textiles and Leather, and Wood – Treated made the top ten all three years. Food Waste has topped Residential Waste in all three studies. However, recyclable fibers have decreased and/or dropped out of the Residential Waste top 10 list. As an example, Newsprint no longer made the top 10 list in 2011. This is because Newsprint has been shown to be affected by "lightweighting." There have also been expansions of recycling programs and targeting additional paper via single-stream collection, which is suspected to contribute to the reduction of Mixed Paper in the disposed waste stream.

Conversely, Yard Wastes in the residential waste stream increased significantly in 2011, making the top 10 list for the first time. As noted previously, this could be partially the result of sorting being conducted in late spring rather than the fall, which may have increased the potential for generation of grass clippings. Even so, it may be appropriate to focus some attention on monitoring disposal of residentially generated yard wastes that are currently banned from landfill disposal in Iowa. This may be needed in light of the relatively rapid conversion to automated collection systems using 90 gallon carts; such carts invite mixing of yard wastes because of the ease of use and the available disposal volume.

Table 4-5 shows the ICI waste stream comparison results between the 2011, 2005, and the 1988 Studies. Results are shown in estimated percent mean, upper and lower bounties, and if the change was likely statistically significant.

Table 4-5 Comparison with Prior Studies – ICI

Comparison of Statewide ICI MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Paper	**29.3%**	**26.3%**	**32.3%**	**34.0%**	**29.6%**	**38.8%**	**32.5%**	**28.8%**	**36.1%**	
Compostable Paper	6.1%	4.8%	7.3%	5.4%	4.3%	6.8%	NA	NA	NA	
High Grade Office Paper	1.2%	0.7%	1.7%	3.4%	2.4%	4.6%	1.9%	1.5%	2.3%	x
Magazines/Catalogs	0.9%	0.6%	1.2%	1.1%	0.8%	1.5%	1.2%	0.9%	1.5%	
Mixed Recyclable Paper	3.1%	2.6%	3.6%	6.0%	5.0%	7.2%	4.0%	3.2%	4.8%	x
Newsprint	1.4%	1.0%	1.8%	2.3%	1.7%	3.2%	1.5%	1.1%	1.8%	
Non-Recyclable Paper	3.1%	2.1%	4.1%	3.4%	2.7%	4.5%	10.7%	8.7%	12.8%	
OCC and Kraft Paper	13.2%	10.5%	15.9%	12.4%	9.8%	15.3%	13.2%	11.0%	15.5%	
Aseptic/Gable Top Paper Containers	0.3%	0.2%	0.4%	NA	NA	NA	NA	NA	NA	
Metal	**4.9%**	**2.7%**	**7.0%**	**4.9%**	**3.8%**	**6.2%**	**5.2%**	**4.3%**	**6.5%**	
Aluminum Beverage Containers	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	x
Aluminum IA Deposit Beverage Containers	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%	0.1%	0.1%	0.2%	
Ferrous Food and Beverage Containers	0.7%	0.4%	0.9%	0.8%	0.5%	1.2%	2.0%	1.5%	2.6%	
Other Aluminum Containers	0.3%	0.1%	0.4%	0.1%	0.0%	0.1%	NA	NA	NA	x
Other Ferrous Scrap Metals	1.7%	1.2%	2.1%	3.4%	2.4%	4.6%	2.4%	1.8%	3.1%	x
Other Non-Ferrous Scrap Metals	2.2%	0.0%	4.3%	0.4%	0.3%	0.5%	0.7%	0.5%	0.9%	
Glass	**1.1%**	**0.8%**	**1.4%**	**1.0%**	**0.8%**	**1.4%**	**3.3%**	**2.3%**	**4.3%**	
Blue Glass	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Brown Glass	0.1%	0.0%	0.2%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	x
Clear Glass	0.4%	0.3%	0.5%	0.4%	0.3%	0.6%	0.6%	0.4%	0.7%	
Glass Deposit Containers	0.1%	0.1%	0.2%	0.2%	0.1%	0.3%	0.3%	0.2%	0.4%	
Green Glass	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.0%	0.0%	0.0%	
Other Mixed Cullet	0.4%	0.2%	0.6%	0.3%	0.2%	0.5%	2.3%	1.5%	3.1%	

Table 4-5 (Continued) Comparison with Prior Studies – ICI

Comparison of Statewide ICI MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Organic	**20.4%**	**17.9%**	**22.8%**	**17.8%**			**15.4%**			
Pumpkins	NA	NA	NA	0.4%	0.2%	0.8%	0.1%	0.0%	0.1%	
Yard Waste	1.9%	1.3%	2.6%	0.7%	0.4%	1.1%	0.8%	0.5%	1.0%	x
Food Waste	13.1%	10.9%	15.4%	10.3%	8.1%	13.1%	10.2%	8.2%	12.5%	
Textiles and Leather	2.7%	1.8%	3.6%	4.8%	3.2%	6.8%	2.5%	1.9%	3.2%	
Diapers	1.3%	0.9%	1.7%	0.9%	0.6%	1.2%	0.8%	0.6%	1.0%	
Rubber	1.3%	0.6%	2.1%	0.7%	0.5%	1.0%	1.0%	0.8%	1.4%	
C&D	**15.6%**	**12.1%**	**19.1%**	**14.9%**			**14.6%**			
Wood – Untreated	7.9%	4.8%	10.9%	4.7%	3.4%	6.3%	4.7%	3.5%	6.1%	
Wood – Treated	3.3%	2.4%	4.1%	4.6%	3.2%	6.6%	3.8%	2.7%	5.0%	
Asphalt Pavement, Brick, Rock, and Concrete [1]	0.4%	0.2%	0.5%	5.6%	3.7%	8.2%	6.1%	4.4%	8.2%	
Asphalt Roofing [1]	1.3%	0.0%	2.6%							
Drywall/Gypsum Board [1]	1.4%	0.5%	2.4%							
Carpet and Carpet Padding [1]	1.4%	0.5%	2.4%							
Plastic	**18.4%**	**15.6%**	**21.3%**	**16.1%**	**13.5%**	**19.1%**	**18.6%**	**15.5%**	**21.7%**	
#1 PET IA Deposit Beverage Containers	0.2%	0.1%	0.2%	0.2%	0.1%	0.3%	0.1%	0.1%	0.1%	
#1 PET Beverage Containers	0.3%	0.3%	0.4%	0.4%	0.3%	0.5%	0.2%	0.1%	0.2%	
#2 HDPE Containers Natural [2]	0.3%	0.2%	0.3%	0.8%	0.6%	1.0%	1.1%	0.8%	1.3%	
#2 HDPE Containers Colored [2]	0.3%	0.2%	0.3%							
Plastic Retail Shopping Bags [3]	0.2%	0.1%	0.2%	7.6%	6.0%	9.4%	4.6%	3.8%	5.5%	
Other Film Plastic [3]	7.1%	5.9%	8.4%							
Other #1 PET Containers	0.2%	0.1%	0.3%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	
#3-#7 Plastic Containers	0.5%	0.4%	0.6%	NA	NA	NA	NA	NA	NA	
Other Plastic Containers	1.4%	0.0%	3.1%	0.2%	0.2%	0.3%	1.1%	0.8%	1.4%	
Expanded Polystyrene	2.1%	0.0%	4.3%	NA	NA	NA	NA	NA	NA	
Other Plastic Products	5.9%	4.1%	7.7%	6.8%	5.5%	8.4%	11.5%	9.0%	14.2%	

Table 4-5 (Continued) Comparison with Prior Studies – ICI

Comparison of Statewide ICI MSW Composition										
Materials	**2011 Results**			**2005 Results**			**1998 Results**			**Likely Statistically Significant**
	Mean	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	**Mean**	**Lower Bound**	**Upper Bound**	
Durable	**1.9%**	**0.9%**	**2.9%**	**2.5%**			**1.3%**			
Cell Phones and Chargers	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA	NA	x
Central Processing Units/Peripherals	0.1%	0.0%	0.3%	0.1%	0.0%	0.1%	NA	NA	NA	
Computer Monitors/T.V.s	0.5%	0.1%	0.8%	0.0%	0.0%	0.0%	NA	NA	NA	x
Electrical and Household Appliances	1.2%	0.4%	2.0%	2.4%	1.4%	3.6%	1.3%	0.9%	1.7%	
HHMS	**0.2%**	**0.1%**	**0.2%**	**0.1%**			**1.4%**			
Automotive Products	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.3%	0.2%	0.3%	
Household Cleaners	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Lead Acid Batteries	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	
Mercury Containing Products	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA	NA	x
Other Batteries	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	x
Paints and Solvents	0.0%	0.0%	0.1%	0.0%	0.0%	0.1%	0.3%	0.2%	0.3%	
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	x
Sharps	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.6%	1.1%	x
Prescription Medications	0.0%	0.0%	0.0%	NA	NA	NA	NA	NA	NA	
Other	**8.3%**	**7.0%**	**9.6%**	**8.5%**			**8.0%**			
Other Organic	2.1%	1.5%	2.7%	0.9%	0.6%	1.3%	1.7%	1.2%	2.2%	x
Other Inorganic	0.3%	0.1%	0.4%	1.3%	0.9%	2.0%	1.9%	1.2%	2.6%	x
Other C&D [1]	1.2%	0.7%	1.6%	NA	NA	NA	0.0%	0.0%	0.0%	
Other Durable	1.2%	0.8%	1.7%	4.0%	2.5%	6.1%	1.4%	0.9%	1.9%	x
Other HHM	0.0%	0.0%	0.1%	0.1%	0.0%	0.1%	0.1%	0.1%	0.2%	
Fines	2.7%	2.0%	3.4%	1.4%	1.2%	1.8%	2.9%	2.2%	3.5%	x
Other Material	0.8%	0.1%	1.5%	0.8%	0.4%	1.3%	NA	NA	NA	
Grand Total	**100.0%**			**100.0%**			**100.0%**			

[1]The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011.

[2] The 2005 material #2 HDPE Containers has been split into #2 HDPE Containers Natural and #2 HDPE Containers Colored in 2011.

[3] The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011.

Table 4-6 shows the 2011, 2005, and 1988 Studies top 10 most prevalent materials in the ICI waste stream. Results are shown in estimated percent mean.

Table 4-6 Comparison of Top 10 Most Prevalent Materials in ICI Stream

2011	2005	1998
OCC and Kraft Paper - 13.2%	OCC and Kraft Paper - 12.4%	OCC and Kraft Paper - 13.2%
Food Waste - 13.1%	Food Waste - 10.3%	Other Plastic Products - 11.5%
Other Plastic Products - 8.0%	Film/Wrap/Bags [2] - 7.6%	Non-Recyclable Paper - 10.7%
Wood – Untreated - 7.9%	Other Plastic Products - 6.8%	Food Waste - 10.2%
Other Film Plastic [2] - 7.3%	Mixed Recyclable Paper - 6.0%	Other C&D [1] - 6.1%
Compostable Paper - 6.1%	Construction/Renovation/ Demolition [1] - 5.6%	Wood – Untreated - 4.7%
Construction/Renovation/ Demolition [1] - 5.7%	Compostable Paper - 5.4%	Film/Wrap/Bags [2] - 4.6%
Non-Recyclable Paper - 3.4%	Textiles and Leather - 4.8%	Mixed Recyclable Paper - 4.0%
Wood – Treated - 3.3%	Wood – Untreated - 4.7%	Wood – Treated - 3.8%
Mixed Recyclable Paper - 3.1%	Wood – Treated - 4.6%	Fines - 2.9%
Total Percent 2011 - 71.0%	**Total Percent 2005 - 68.2%**	**Total Percent 1998 - 71.7%**

[1] The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011.

[2] The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011.

As shown, Food Waste was first and OCC/Kraft Paper was either second or third in all three studies. In addition, Other Plastic Products, Wood – Treated, Other Film Plastic, and Construction/Renovation/Demolition were in the top ten during all three studies.

Yard Waste also appeared in the top 10 in the 2011 Study. This is possibly due to the sampling and sorting occurring in the late spring instead of the fall as in the prior two studies.

Table 4-7 shows the statewide Solid Waste stream comparison results between the 2011, 2005, and the 1988 Studies. Results are shown in estimated percent mean and total tons for each material category.

Table 4-7 Comparison with Prior Studies – Solid Waste

Solid Waste Composition						
Materials	**2011 Results**		**2005 Results**		**1998 Results**	
	Mean	**Quantities (tons)**	**Mean**	**Quantities (tons)**	**Mean**	**Quantities (tons)**
Paper	**19.6%**	**562,651**	**26.2%**	**701,277**	**24.3%**	**594,148**
Compostable Paper	4.8%	136,817	5.2%	138,005	NA	NA
High Grade Office Paper	0.7%	19,760	2.0%	52,254	1.9%	45,316
Magazines/Catalogs	1.0%	27,413	1.4%	38,588	2.0%	47,834
Mixed Recyclable Paper	2.9%	82,731	5.5%	148,187	2.3%	55,387
Newsprint	1.3%	36,291	3.2%	85,214	3.1%	75,527
Non-Recyclable Paper	1.9%	53,255	2.2%	58,417	7.8%	191,336
OCC and Kraft Paper	7.0%	200,926	6.8%	180,612	7.3%	178,748
Aseptic/Gable Top Paper Containers	0.2%	5,458	NA	NA	NA	NA
Metal	**3.8%**	**110,614**	**3.7%**	**99,954**	**4.3%**	**105,739**
Aluminum Beverage Containers	0.0%	1,047	0.1%	2,948	0.1%	2,518
Aluminum IA Deposit Beverage Containers	0.2%	4,404	0.1%	3,484	0.1%	2,518
Ferrous Food and Beverage Containers	0.5%	15,749	0.8%	20,902	0.8%	20,141
Other Aluminum Containers	0.2%	5,949	0.1%	2,144	NA	NA
Other Ferrous Scrap Metals	1.7%	48,528	2.2%	60,025	2.9%	70,492
Other Non-Ferrous Scrap Metals	1.2%	34,936	0.4%	10,451	0.4%	10,070
Glass	**1.2%**	**33,931**	**1.4%**	**36,444**	**1.9%**	**45,318**
Blue Glass	0.0%	255	0.0%	804	0.0%	0
Brown Glass	0.1%	2,938	0.0%	804	0.1%	2,518
Clear Glass	0.4%	11,846	0.6%	15,274	0.8%	20,141
Glass Deposit Containers	0.2%	5,148	0.2%	5,627	0.3%	7,553
Green Glass	0.0%	1,244	0.1%	2,412	0.1%	2,518
Other Mixed Cullet	0.4%	12,500	0.4%	11,523	0.5%	12,588

Table 4-7 (Continued) Comparison with Prior Studies – Solid Waste

Solid Waste Composition						
Materials	**2011 Results**		**2005 Results**		**1998 Results**	
	Mean	**Quantities (tons)**	**Mean**	**Quantities (tons)**	**Mean**	**Quantities (tons)**
Organic	**19.8%**	**568,999**	**15.9%**	**423,660**	**13.7%**	**334,839**
Pumpkins	NA	NA	0.2%	5,627	0.3%	7,553
Yard Waste	3.5%	101,857	1.1%	28,673	1.2%	30,211
Food Waste	10.3%	297,384	8.4%	225,095	7.6%	186,301
Textiles and Leather	3.2%	91,835	3.9%	103,972	2.5%	60,422
Diapers	1.9%	54,944	1.9%	50,646	1.5%	37,764
Rubber	0.8%	22,980	0.4%	9,647	0.5%	12,588
C&D	**28.1%**	**809,309**	**25.7%**	**686,271**	**22.1%**	**541,280**
Wood – Untreated	4.2%	120,403	2.7%	72,084	2.5%	60,422
Wood – Treated	3.0%	85,125	3.6%	97,541	3.2%	78,045
Asphalt Pavement, Brick, Rock, and Concrete	0.6%	15,819	19.3%	516,646	16.5%	402,813
Asphalt Roofing [1]	0.6%	17,769				
Drywall/Gypsum Board [1]	0.8%	22,320				
Carpet and Carpet Padding [1]	1.4%	40,575				
Mixed C&D	17.6%	507,298				
Plastic	**12.9%**	**371,989**	**11.8%**	**315,937**	**11.7%**	**287,004**
#1 PET IA Deposit Beverage Containers	0.1%	3,130	0.2%	4,288	0.1%	2,518
#1 PET Beverage Containers	0.4%	10,605	0.3%	9,111	0.2%	5,035
#2 HDPE Containers Natural [2]	0.2%	6,019	0.8%	21,438	0.7%	17,623
#2 HDPE Containers Colored [2]	0.3%	8,272				
Plastic Retail Shopping Bags [3]	0.2%	6,159	5.2%	139,344	4.3%	105,738
Other Film Plastic [3]	4.9%	142,201				
Other #1 PET Containers	0.2%	6,003	0.2%	5,627	NA	NA
#3-#7 Plastic Containers	0.5%	14,859	NA	NA	NA	NA
Other Plastic Containers	0.8%	23,699	0.3%	8,307	0.6%	15,105
Expanded Polystyrene	1.2%	33,220	NA	NA	NA	NA
Other Plastic Products	4.1%	117,822	4.8%	127,822	5.8%	140,985

Table 4-7 (Continued) Comparison with Prior Studies – Solid Waste

Solid Waste Composition						
Materials	**2011 Results**		**2005 Results**		**1998 Results**	
	Mean	**Quantities (tons)**	**Mean**	**Quantities (tons)**	**Mean**	**Quantities (tons)**
Durable	**1.8%**	**51,172**	**1.9%**	**50,647**	**1.0%**	**25,176**
Cell Phones and Chargers	0.0%	567	0.0%	0	NA	NA
Central Processing Units/Peripherals	0.3%	7,984	0.2%	4,020	NA	NA
Computer Monitors/T.V.s	0.2%	6,690	0.0%	1,072	NA	NA
Electrical and Household Appliances	1.2%	35,932	1.7%	45,555	1.0%	25,176
HHMS	**0.2%**	**5,473**	**0.3%**	**8,040**	**0.9%**	**22,658**
Automotive Products	0.1%	2,056	0.0%	536	0.2%	5,035
Household Cleaners	0.0%	215	0.0%	268	0.0%	0
Lead Acid Batteries	0.0%	182	0.0%	0	0.0%	0
Mercury Containing Products	0.0%	163	0.0%	0	NA	NA
Other Batteries	0.0%	1,339	0.2%	4,288	0.0%	0
Paints and Solvents	0.0%	894	0.1%	2,412	0.1%	2,518
Pesticides, Herbicides, Fungicides	0.0%	56	0.0%	268	0.0%	0
Sharps	0.0%	128	0.0%	268	0.6%	15,105
Prescription Medications	0.0%	439	NA	NA	NA	NA
Other	**12.6%**	**361,912**	**13.1%**	**350,236**	**20.0%**	**488,412**
Other Organic	2.5%	71,293	1.2%	31,620	1.8%	42,799
Other Inorganic	0.2%	5,651	1.9%	50,378	1.3%	32,729
Other C&D [1]	0.8%	23,609	NA	NA	NA	NA
Other Durable	1.6%	46,446	2.1%	56,810	2.1%	50,352
Other HHM	0.0%	832	0.1%	1,608	0.1%	2,518
Fines	2.4%	68,271	1.9%	50,646	3.7%	90,633
Other Material	0.4%	10,408	0.3%	8,307	NA	NA
Special Wastes	4.7%	135,402	5.6%	150,867	11.0%	269,381
Grand Total	100.0%	2,876,051	100.0%	2,672,466	100.0%	**2,444,574**

[1]The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011

[2]The 2005 material #2 HDPE Containers has been split into #2 HDPE Containers Natural and #2 HDPE Containers Colored in 2011

[3]The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011

Table 4-8 shows the 2011, 2005, and 1988 Studies top 10 most prevalent materials in the statewide Solid Waste stream.

Table 4-8 Comparison of Top 10 Most Prevalent Materials in Solid Waste

Materials - 2011 Mean	Material - 2005 Mean	Material - 1998 Mean
Mixed C&D [1] - 21.8%	Mixed C&D [1] - 19.3%	Mixed C&D [1] - 16.5%
Food Waste - 10.3%	Food Waste - 8.4%	Special Wastes - 11.0%
OCC and Kraft Paper - 7.0%	OCC and Kraft Paper - 6.8%	Non-Recyclable Paper - 7.8%
Other Plastic Products - 5.3%	Special Wastes - 5.6%	Food Waste - 7.6%
Other Film Plastic [2] - 5.2%	Mixed Recyclable Paper - 5.5%	OCC and Kraft Paper - 7.3%
Compostable Paper - 4.8%	Film/Wrap/Bags [2] - 5.2%	Other Plastic Products - 5.8%
Special Wastes - 4.7%	Compostable Paper - 5.2%	Film/Wrap/Bags [2] - 4.3%
Wood – Untreated - 4.2%	Other Plastic Products - 4.8%	Fines - 3.7%
Yard Waste - 3.5%	Textiles and Leather - 3.9%	Wood – Treated - 3.2%
Textiles and Leather - 3.2%	Wood – Treated - 3.6%	Newsprint - 3.1%
Total Percent 2011 - 69.9%	**Total Percent 2005 - 68.4%**	**Total Percent 1998 - 70.3%**

[1] The 2005 material Demolition/Renovation/Construction has been split into Asphalt Pavement, Brick, Rock, and Concrete; Asphalt Roofing; Drywall/Gypsum Board; Carpet and Carpet Padding; and Other C&D in 2011

[2] The 2005 material Film/Wrap/Bags has been split into Retail Shopping Bags and Other Film Plastic in 2011

4. COMPARISON AND DIVERSION OPPORTUNITIES

4.3. DIVERSION OPPORTUNITIES

This section identifies disposed wastes that could be targeted by the state's solid waste and recycling planners for incremental diversion.

4.3.1 RECYCLABLE FIBER AND CONTAINERS

Table 4-9 below shows the recyclable fibers and containers that were disposed in the statewide Residential, ICI, and MSW waste stream. As shown, roughly 20 percent of disposed MSW are comprised of fiber and containers that are typically targeted in residential, multi-family and many commercial recycling programs. ICI contributes a slightly higher percentage because of more fibers compared to Residential wastes. While recyclable containers are being disposed at very low frequency, the OCC/Kraft paper category and the Mixed Paper category suggest that there are opportunities for incremental improvement simply by maximizing existing recycling programs.

Table 4-9 Disposal of Recyclable Fiber and Containers in MSW

Recyclable Material	Residential Composition	ICI Composition	MSW Composition
Fiber			
High Grade Office Paper	0.5%	1.2%	0.9%
Magazines/Catalogs	1.6%	0.9%	1.2%
Mixed Recyclable Paper	4.5%	3.1%	3.7%
Newsprint	1.9%	1.4%	1.6%
OCC and Kraft Paper	3.8%	13.2%	9.0%
Subtotal Fiber	**12.3%**	**19.8%**	**16.4%**
Containers			
Aluminum Beverage Containers	0.1%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.3%	0.1%	0.2%
Other Aluminum Containers	0.3%	0.3%	0.3%
Ferrous Food and Beverage Containers	0.8%	0.7%	0.7%
Glass Iowa Deposit Containers	0.3%	0.1%	0.2%
Green Glass	0.1%	0.0%	0.1%
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.1%	0.1%
Clear Glass	0.7%	0.4%	0.5%
#1 PET Iowa Deposit Beverage Containers	0.1%	0.2%	0.1%
#1 PET Beverage Containers	0.6%	0.3%	0.5%
Other #1 PET Containers	0.5%	0.3%	0.4%
#2 HDPE Containers Natural	0.3%	0.3%	0.3%
#2 HDPE Containers Colored	0.3%	0.2%	0.3%
Subtotal Containers	**4.5%**	**3.0%**	**3.7%**
Total	**16.9%**	**22.8%**	**20.1%**

It was beyond the scope of this study to compare disposed quantities to recycled quantities, and clearly these materials are being recycled in a variety of residential and commercial recycling programs across Iowa. Some of the disposed recyclables may have been contaminated or otherwise unfit for recycling, so the numbers in Table 4-9 overstate the potential for incremental recycling. However, this data affirms the importance of ongoing public education to maximize the use of existing recycling programs.

4.3.2 COMPOSTABLE ORGANICS

Table 4-10 shows the estimated fraction of compostable materials in the statewide Residential, ICI, and MSW stream. As shown, approximately 29 percent of the waste stream is comprised of food wastes, yard wastes, and compostable papers. Organics diversion is widely regarded in the waste management industry as the next big opportunity for reducing landfilled wastes, and these data confirm why. Certainly, there remain significant obstacles for source separation and separate collection of certain compostable wastes. However, significant diversion potential exists for a program that can successfully target the Organics substream.

Table 4-10 Disposal of Compostable Organics in MSW

Compostable Material	Residential Composition	ICI Composition	MSW Composition
Compostable Paper	6.2%	6.1%	6.1%
Yard Waste	7.8%	1.9%	4.6%
Food Waste	13.6%	13.1%	13.3%
Wood – Untreated	2.4%	7.9%	5.4%
Total	**29.9%**	**29.0%**	**29.4%**

4.3.3 CONSTRUCTION AND DEMOLITION DEBRIS

For the first time, the 2011 Study broke out different components of C&D waste rather than reporting on C&D in the aggregate. As shown in Table 4-11, there is close to 15 percent of C&D debris in MSW. Relatively more C&D debris is contributed by the ICI waste stream. Much of this material – including both treated and untreated wood, concrete/brick/rock, gypsum drywall, and carpet – have been found to be recyclable and/or used as a fuel feedstock with appropriate end markets and recycling infrastructure. The bottom row of this table adds in the C&D that was delivered separately to the state's landfills. As shown, significantly more C&D is delivered separately, and would be a candidate for incremental recycling and/or intermediate processing to recover materials.

Table 4-11 Disposal of Processible/Recoverable C&D in MSW

Compostable Material	Residential Composition	ICI Composition	MSW Composition
Wood – Untreated	2.4%	7.9%	5.4%
Wood – Treated	4.5%	3.3%	3.8%
Asphalt Pavement, Brick, Rock, and Concrete	1.1%	0.4%	0.7%
Asphalt Roofing	0.2%	1.3%	0.8%
Drywall/Gypsum Board	0.5%	1.4%	1.0%
Carpet and Carpet Padding	2.3%	1.4%	1.8%
Other C&D	0.9%	1.2%	1.1%
Total	**11.9%**	**16.8%**	**14.6%**
Separate C&D Deliveries	N/A	N/A	17.6%

4.3.4 MOST PREVALENT DISPOSED INDIVIDUAL MATERIALS

Table 4-12 itemizes the 15 most prevalent individual material categories in the MSW stream. Many of these materials are mentioned in the groupings above. For each material, the table also comments on the potential for diverting the material from disposal. As shown, many of the most prevalent materials in disposed waste are entirely recyclable and/or compostable. However, some prevalent materials are not easily divertible.

Table 4-12 Top 15 Most Prevalent Materials in MSW

Material	Estimated Percent	Cumulative Percent	Notes
Food Waste	13.3%	13.3%	Compostable
OCC and Kraft Paper	9.0%	22.3%	Recyclable
Other Film Plastic	6.4%	28.7%	Highly contaminated and therefore difficult to recycle [1]
Compostable Paper	6.1%	34.8%	Compostable
Wood – Untreated	5.4%	40.2%	Reusable/ Compostable
Other Plastic Products	5.3%	45.5%	Wide variety of items/resins impair recycling [1]
Yard Waste	4.6%	50.0%	Compostable
Textiles and Leather	4.1%	54.1%	Partially reusable, although many items are in poor or unusable condition
Wood – Treated	3.8%	58.0%	Recoverable as fuel for certain boiler types
Mixed Recyclable Paper	3.7%	61.7%	Recyclable
Other Organics	3.2%	64.9%	May be compostable
Fines	3.1%	67.9%	Byproduct of sorting method, not a discrete recoverable material

Material	Estimated Percent	Cumulative Percent	Notes
Diapers	2.5%	70.4%	Problematic to divert, despite pilot programs in several municipalities nationally
Non-Recyclable Paper	2.4%	72.8%	Problematic to divert due to multi-material construction
Other Ferrous Scrap Metals	2.2%	74.9%	Recyclable
Total	**74.9%**		

[1] It should be noted that a number of emerging technologies are in various stages of development and commercialization that are reported to be capable of processing mixed plastics and converting them into fuel, synthetic gas, or other forms of energy.

Table 4-13 itemizes the 15 most prevalent individual material categories in the Residential Waste stream. Of particular interest, the top three most prevalent materials are all compostable using traditional, proven commercial composting systems.

Table 4-13 Top 15 Most Prevalent Materials in Residential Waste

Material	Estimated Percent	Cumulative Percent	Notes
Food Waste	13.6%	13.6%	Compostable
Yard Waste	7.8%	21.4%	Compostable
Compostable Paper	6.2%	27.6%	Compostable
Textiles and Leather	5.9%	33.5%	Partially reusable, although many items are in poor or unusable condition
Other Film Plastic	5.4%	38.9%	Highly contaminated and therefore difficult to recycle [1]
Other Organics	4.6%	43.4%	May be compostable
Wood – Treated	4.5%	47.9%	Recoverable as fuel for certain boiler types
Other Plastic Products	4.5%	52.4%	Wide variety of items/resins impair recycling [1]
Mixed Recyclable Paper	4.5%	56.9%	Recyclable
Diapers	3.8%	60.7%	Problematic to divert, despite pilot programs in several municipalities nationally
OCC and Kraft Paper	3.8%	64.5%	Recyclable
Fines	3.5%	68.0%	Byproduct of sorting method, not a discrete recoverable material
Other Durables	3.1%	71.1%	Not likely recoverable
Other Ferrous Scrap Metals	2.8%	73.9%	Recyclable
Wood – Untreated	2.4%	76.3%	Reusable /Compostable
Total	**76.3%**		

[1] It should be noted that a number of emerging technologies are in various stages of development and commercialization that are reported to be capable of processing mixed plastics and converting them into fuel, synthetic gas, or other forms of energy.

Table 4-14 itemizes the 15 most prevalent individual material categories in the ICI Waste stream. Of particular interest, the top three most prevalent materials are all compostable using traditional, proven commercial composting systems.

Table 4-14 Top 15 Most Prevalent Materials in ICI Waste

ICI Material	Estimated Percent	Cumulative Percent	Notes
OCC and Kraft Paper	13.2%	13.2%	Recyclable
Food Waste	13.1%	26.3%	Compostable
Wood – Untreated	7.9%	34.2%	Reusable /Compostable
Other Film Plastic	7.1%	41.3%	Highly contaminated and therefore difficult to recycle [1]
Compostable Paper	6.1%	47.4%	Compostable
Other Plastic Products	5.9%	53.3%	Wide variety of items/resins impair recycling [1]
Wood – Treated	3.3%	56.5%	Recoverable as fuel for certain boiler types
Non-Recyclable Paper	3.1%	59.7%	Problematic to divert due to multi-material construction
Mixed Recyclable Paper	3.1%	62.8%	Recyclable
Fines	2.7%	65.5%	Byproduct of sorting method, not a discrete recoverable material
Textiles and Leather	2.7%	68.2%	Partially reusable, although many items are in poor or unusable condition
Other Non-Ferrous Scrap Metals	2.2%	70.3%	Recyclable
Expanded Polystyrene	2.1%	72.4%	Recyclable in some areas of the U.S., but prone to contamination [1]
Other Organics	2.1%	74.5%	May be compostable
Yard Waste	1.9%	76.4%	Compostable
Total	**76.4%**		

[1] It should be noted that a number of emerging technologies are in various stages of development and commercialization that are reported to be capable of processing mixed plastics and converting them into fuel, synthetic gas, or other forms of energy.

4.4. CONCLUSIONS

- **Comprehensiveness**: The 2011 Study was successfully able to obtain and analyze samples of wastes spanning the generator sectors and geographic regions of Iowa. With over 450 samples of waste captured at nine landfills, the study provided a comprehensive snapshot of disposed waste composition for the preceding 12 month period.
- **Comparability**: Broadly, the 2011 Study provided results that can be compared directly with the results of prior studies. However, each successive study has introduced slight modifications. In the 2011 Study, the number of host landfills was expanded and the

dates of field data collection differed from the prior two studies. Additionally, the 2011 Study took steps to minimize reliance on mixed loads of waste. Finally, the material categories were re-grouped in the 2011 Study to better conform with other waste composition studies.

- **Dwindling Incidence of Recyclables**: The results of this study (as well as other studies that have been performed nationally) show that the incidence of recyclable materials, especially fibers, continues to diminish in the disposed waste stream. In the case of fibers, this is probably due to a combination of factors beyond just an increase in recycling (i.e., reductions in paper production). For example, Project Team member Foth did a study for the Waste Commission of Scott County that showed their newspaper had decreased over 30 percent due to smaller page size, lighter paper, reduced ads and obits, and reduced subscriptions. Regardless of the cause, it appears that the incidence of recyclable fiber and containers in disposed waste continues to decrease, and that the expansion of curbside recycling program (especially single stream) contributes to this. Iowa appears to be doing a good job diverting traditional fiber and container recyclables because there were not significant percentages observed in disposed wastes.
- **Opportunities**: Iowa continues to have opportunities to divert additional wastes from landfill disposal. Compostable organics and C&D Debris comprise the largest divertible fractions of waste that could be targeted for separation and diversion. Given that C&D generation is below historical levels because of adverse economic conditions affecting the building sector, it is likely that this waste stream will increase going forward, so incremental build-up of recycling infrastructure now may pay dividends in the future.

4.5. RECOMMENDATIONS

- **Continue Performing Statewide Studies**: Statewide studies both inform about the overall disposed waste stream for state-level planners, and also provide data to county, municipal, and private solid waste and recycling stakeholders for a variety of uses. The Department of Natural Resources joins state agencies from roughly ten other states at conducting statewide waste characterization analyses on a regular basis, and should continue to perform a similar project over five to seven year intervals.
- **Consider C&D Visual Surveying**: The 2011 and prior Studies have all excluded C&D debris. In 1998, excluding C&D debris made sense, as this waste stream is difficult to quantify using physical sorting techniques. However, since that time, significant advances have been made at visual surveying protocols for C&D debris. These protocols have been successfully applied in studies across the country. DNR may wish to consider expanding future studies to capture the composition of C&D debris so that this waste stream can be aggregated with the MSW waste stream that is historically analyzed.
- **Consider Statewide Landfill Survey**: In the 2011 and prior studies, a relatively small number of host landfills were selected to provide representative samples of statewide waste. In 2010, these nine landfills disposed of only 42 percent of the state's waste stream. Other states that have performed statewide waste characterization studies have devoted incremental effort to surveying landfills and transfer stations, and analyzing the entire waste stream during the sampling plan development process in order to stratify host facilities based on geography, population density, or other factors beyond simple waste

disposal. Such stratification may improve the accuracy of aggregating composition results in Iowa in the future.

- **Expand Sorting at Transfer Stations**: The strategy of sorting at landfills has been successful, and the state's landfills have been exceptionally good hosts. However, DNR should continue to encourage upstream sorting at transfer stations in future studies. While some transfer stations may not have sufficient space to host field data collection, it is hypothesized that other facilities would be interested and able to host such field work. Waste handling practices – such as floor sorts and other processing – could be better identified and would provide direct data on the management of wastes in urban and suburban areas relative to rural areas.

- **Specialization in Future Studies**: A number of other states that have regularly conducted statewide waste characterization studies have, over time, structured the studies to investigate certain waste streams in greater detail. Specialized analysis has often been conducted in response to feedback from solid waste and recycling stakeholders in the state. For example, in addition to measuring the composition of disposed wastes in total and by generator sector, some states have opted to focus on:

  - Targeted generator sampling of the most prevalent business types (e.g., grocery stores, manufacturing, retail malls, etc.) that generate significant quantities of waste;
  - Enhanced research into waste generation indicators for certain waste streams, especially C&D debris, to improve future sampling plans for this waste stream;
  - Measuring contamination rates in disposed material (for both particulate matter and moisture) as a means of investigating dirty MRF processing potential;
  - Calculating energy and heating values in disposed waste for incineration and thermal conversion processes; and
  - Determining the composition of residuals from recyclables processing facilities to test recovery efficiency, expansion of targeted materials, and potential for additional processing.

  If Iowa continues to support large statewide waste characterization studies, it may consider integrating one or more of these tests in the future. In particular, it was mentioned to the Project Team by several host facilities during this study that a focus on residential recycling and capture rate analysis would be particularly informative. Specifically, DNR might consider selecting one or two host facilities where it would be possible to sample and sort both the disposed wastes and the curbside collected recyclables (ideally from the same routes), to definitively evaluate the effectiveness of the recycling program and to calculate material-specific capture rates. This method has yielded highly informative information where it has been performed (with New York City's 2005 Residential Waste Characterization Study a stand-out example).

  Such future efforts would be limited by available funding, but could provide additional insight into diversion and recycling opportunities in Iowa.

APPENDIX A

MATERIAL DEFINITIONS AND MAPPING TO PRIOR STUDIES

MidAtlantic Solid Waste Consultants
Cascadia Consulting Group
Foth Infrastructure & Environment

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Class	No.	2011 Categories	Material Definition
PAPER	1	Newsprint	Class or kind of paper chiefly used for printing newspapers – i.e. uncoated groundwood paper includes glossy inserts.
	2	Magazines	Items made of glossy coated paper. This paper is usually slick, smooth to the touch, and reflects light. Examples include glossy magazines, catalogs, brochures, and pamphlets.
	3	High Grade Office Paper	The type of paper that is free of ground wood fibers; usually sulfite or sulphate paper; includes office printing and writing papers such as white ledger, color ledger, envelopes, and computer printout paper, bond, rag, or stationary grade paper. This subtype does not include fluorescent dyed paper or deep-tone dyed paper such a goldenrod colored paper.
	4	OCC and Kraft Bags	Corrugated boxes or paper bags made from Kraft paper. Old Corrugated Cardboard has a wavy center layer and is sandwiched between the two outer layers. Examples include entire cardboard containers, such as shipping and moving boxes, computer packaging cartons, and sheets and pieces of boxes and cartons. This type 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.
	5	Mixed Recyclable Paper	Paper, other than the paper mentioned above, which can be recycled. Examples include manila folders, manila envelopes, index cards, white envelopes, notebook paper, carbonless forms, junk mail, chipboard and uncoated paperboard, phone directories, non glossy catalogs, offshore cardboard, books and deep-toned or fluorescent dyed paper.
	6	Aseptic/Gable Top Containers	Containers made from paper, polyethylene, and aluminum layers. Examples include non-refrigerated drinks and food containers such as juice boxes, soy milk containers, and silken tofu containers. Polycoated bleached paperboard boxes that contain ready-to-drink beverages such as milk or orange juice. May include plastic pour spouts as part of the carton. Excludes take-out containers.
	7	Compostable Paper	Low grade paper that is not capable of being recycled, as well as food contaminated paper. Examples include paper towels, paper plates, waxed papers, egg cartons, pizza boxes, frozen food packaging, and tissues.
	8	Non-Recyclable Paper	Items made mostly of paper but combined with large amounts of other materials such as plastic, metal, glues, foil, and moisture. Examples include plastic coated corrugated cardboard, cellulose insulation, blueprints, sepia, onionskin, foiled lined fast food wrappers, frozen juice containers, carbon paper, self-adhesive notes, and photographs.
PLASTIC	9	#1 PET Beverage Containers	Clear or colored PET beverage bottles other than IA deposit containers (water, flavored water, juice, sports drinks, etc.). When marked for identification, it bears the number —1 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.
	10	#1 PET IA Deposit Beverage Containers	Plastic beverage containers subject to IA's bottle bill and marked as deposit containers in Iowa.

Class	No.	2011 Categories	Material Definition
PLASTIC	11	Other #1 PET Containers	Types of containers such as PET jars, rectangular, cups, or clam shell PET containers used for food, produce, egg cartons, etc.
	12	#2 High Density Polyethylene (HDPE) Natural Containers	Natural HDPE containers. This plastic is usually either cloudy white, allowing light to pass through it. When marked for identification, it bears
	13	#2 High Density Polyethylene (HDPE) Colored Containers	Colored HDPE containers. This plastic is a solid color, preventing light from passing through it. When marked for identification, it bears the number —2 in the triangular recycling symbol and may also bear the letters—HDPE
	14	Plastic Containers #3-#7	Plastic containers made of types of plastic other than HDPE or PET. Items may be made of PVC, PP, or PS. When marked for identification, these items may bear the number 3, 4, 5, 6, or 7 in the triangular recycling symbol. This subtype also includes unmarked plastic containers.
	15	Other Plastic Containers	All other non-film packaging that does not fit into the above categories including pails, cups, plant pots and flats, caps, closures, blister packs tubs, and other miscellaneous plastic packaging not listed above.
	16	Retail Shopping Bags	Plastic shopping bags, used to contain merchandise to transport from the place of purchase, given out by the store with the purchase.
	17	Other Plastic Film	Examples include garbage bags and other types of plastic bags (sandwich bags, zipper-re-closeable bags, produce bags, frozen vegetable bags), painting tarps, food wrappers such as candy-bar wrappers, mailing pouches, bank bags, X-ray film, metalized film (wine containers and balloons), plastic food wrap, and source contaminated commercial/industrial film.
	18	Expanded Polystyrene	"Styrofoam" products includes food packaging and finished products made of expanded polystyrene including cups, plates, trays, clamshells, packaging products, including packing peanuts and other packaging materials.
	19	Other Plastic Products	Remainder or composite plastic composed of at least 50% plastic that is not identifiable as one of the categories above. Molded toys, plastic clothes hangers, corrugated plastic, plastic lawn furniture, disposable razors, kitchen ware, plastic hoses, drinking straws, credit cards, CD and DVDs, car parts, and writing pens.
METAL	20	Aluminum Beverage Containers	Beverage containers made from aluminum other than IA deposit containers.
	21	Aluminum IA Deposit Beverage Containers	Aluminum metal beverage containers subject to IA's deposit bill and marked as deposit containers in Iowa.
	22	Other Aluminum Containers	Aluminum containers such as food containers, empty aerosol cans, etc.

Class	No.	2011 Categories	Material Definition
METAL	23	Ferrous Food and Beverage Containers	Rigid containers made mainly of steel, such as food and beverage containers. These items will stick to a magnet and may be tin-coated.
	24	Other Ferrous Scrap Metals	Any iron or steel that is magnetic. This subtype does not include non-food "tin/steel containers". Examples include empty or dry paint cans, structural steel beams, boilers, clothes hangers, pipes, some cookware, security bars, scrap ferrous items, and galvanized items such as nails and flashing.
	25	Other Non-Ferrous Scrap Metals	Metal items that are not magnetic (copper, brass, lead, zinc, etc).
GLASS	26	Clear Glass Containers	Clear glass bottles and jars that do not have an IA deposit. These Include wine bottles, nonalcoholic beverage containers, liquor bottles, food jars, etc.
	27	Green Glass Containers	Green glass bottles and jars that do not have an IA deposit. These Include wine bottles, nonalcoholic beverage containers, liquor bottles, food jars, etc.
	28	Blue Glass Containers	Blue glass bottles and jars that do not have an IA deposit. These Include wine bottles, nonalcoholic beverage containers, liquor bottles, food jars, etc.
	29	Brown Glass Containers	Brown glass bottles and jars that do not have an IA deposit. These Include wine bottles, nonalcoholic beverage containers, liquor bottles, food jars, etc.
	30	IA Deposit Glass Containers	Glass beverage containers subject to IA's bottle bill and marked as deposit containers in Iowa.
	31	Other Mixed Cullet	Glass that cannot be put in any other type. It may include items made mostly of glass but combined with other materials. Examples include Pyrex, Corning ware, crystal, plate glass, window and door glass, , ceramics, porcelain, and other glass tableware, mirrors, non-fluorescent light bulbs, auto windshields, laminated glass, or any curved glass.
ORGANIC	32	Yard Waste	Debris such as grass clippings, leaves, garden waste, brush, tree stumps and trees.
	33	Food Waste	Food material resulting from the processing, storage, preparation, cooking, handling, or consumption of food. Includes material from industrial, commercial, or residential sources. Examples include discarded meat scraps, dairy products, eggshells, fruit or vegetable peels, and other food items from homes, stores and restaurants. Includes apple pomace and other processed residues or material from canneries, wineries or other industrial sources. Also includes, liquids drained from PET #1, HDPE #2, metal, or glass containers discarded as waste such as unconsumed soft drinks, water, milk, pickle juice, etc. Excludes any liquid not meant for human consumption.
	34	Textiles and Leather	Items composed of at least 50% natural or manmade textile and leather. Items such yarn, thread, clothing, apparel, shop rags, blankets, pillows, shoes, stuffed toys, backpacks, and in some cases suite/brief cases. Leather items such as wallets, purses, belts, shoes, and scrap leather.

Class	No.	2011 Categories	Material Definition
ORGANIC	35	Rubber	Natural or manmade rubber products such as hoses; foam rubber; latex or nitril gloves; rubber bands and solid or pneumatic tires intended for use on any type of vehicle (including bicycles), or trailer to be used in tandem with any type vehicle.
	36	Diapers/Sanitary Napkins	Adult or infant diapers includes soiled absorbing bed covers and sanitary napkins.
	37	Fines/Super Mix	Un-sortable small fragments that pass through the 1/2" sort screen composed of organic material and miscellaneous fines and dirt.
	38	Other Organics	Organic material that cannot be put in any other type or subtype. This type includes items made mostly of organic materials but combined with other materials. Examples include cork, hemp rope, hair, cigarette butts, full vacuum bags, sawdust, wax, sponges, and animal feces from residential dwellings.
C&D	39	Wood – Treated	Wood that contains an adhesive, paint, stain, fire retardant, pesticide or preservative includes all engineered wood.
	40	Wood – Untreated	Refers to any wood which does not contain an adhesive, paint, stain, fire retardant, pesticide or preservative; includes such items as pallets, skids, spools, packaging materials, bulky wood waste or scraps from newly built wood products and wood pallets. Does not including land clearing debris or yard waste prunings and trimmings.
	41	Asphalt Pavement, Brick, Rock, and Concrete	Includes asphalt pavement, brick, rock, and concrete from construction activities and demolition of buildings, roads, and bridges and similar sources. Asphalt pavement also includes other black or brown, tar-like material mixed with aggregate and used as a paving material. Brick also includes masonry brick, landscaping or walkway brick. Concrete also includes pieces of building foundations, concrete paving, and cinder blocks.
	42	Asphalt Roofing	composite shingles and other roofing material made with asphalt. Examples include asphalt shingles and attached roofing tar and tar paper.
	43	Drywall/Gypsum Board	Painted or unpainted interior wall covering made of a sheet of gypsum sandwiched between paper layers. Examples include used or unused, broken or whole sheets of sheetrock, drywall, gypsum board, plasterboard, gypsum board, gyproc, and wallboard
	44	Carpet and Carpet Padding	Flooring applications consisting of various natural or synthetic fibers which maybe bonded to some type of backing material and plastic, foam, felt, or other material used under carpet to provide insulation and padding.

Class	No.	2011 Categories	Material Definition
C&D	45	Remainder/Composite C&D	Construction and demolition material that cannot be put in any other type or subtype. This type may include items from different types of material that are combined, which would be very hard to separate. Also includes items used in construction/demolition/renovations activities such as ceiling tiles, insulation, tiles, linoleum, used paint brushes, caulking tubes, glue, plaster mixtures, etc. Does not include paints or other solvents.
DURABLE	46	Electrical and Household Appliances	Includes PODs, PDAs, small electronic appliances such as toasters, telephones, stereos, radios, clocks, hair dryers, microwaves, electric motors, alternators, etc.
	47	Central Processing Units/Peripherals	Includes computer CPUs, laptop computers, notebook computers, processors, printers, scanners, keyboards, etc. This category does not include automated typewriters or typesetters, portable handheld calculators, portable digital assistants or other similar devices with circuit boards.
	48	Computer Monitors/T.V.s	A stand-alone display system 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.
	49	Cell Phones and Chargers	Cellular phones and the related chargers.
	50	Other Durables	House hold furniture and mattresses.
HHW	51	Automotive Products	Containers with fluids used in vehicles or engines. Examples include antifreeze, oil, and brake fluid. Does not include empty vehicle and equipment fluid containers. Includes oil filters from vehicle engines or motors.
	52	Paints and Solvents	Containers with paint or solvents in them. Examples include latex paint, oil based paint, and tubes of pigment or fine art paint. This type does not include dried paint, empty paint cans, or empty aerosol containers. Examples of solvents include mineral sprits, lacquer thinner, alcohol, etc.
	53	Pesticides, Herbicides, Fungicides	Household and commercial products used to destroy or control organisms such as insects, plants, or fungus growth.
	54	Household Cleaners	Household cleaners that are toxic or corrosive. These products typically have either a high (>7.0) or low (,7.0) pH factor.
	55	Lead Acid Batteries	Lead acid storage batteries most commonly used in vehicles such as cars, trucks, boats, etc.
	56	Other Batteries	Alkaline (including rechargeable) or household batteries such as AA, AAA, C, D, 4.5 volt, button cell, rechargeable and 9 volt used for flashlights, small appliances, and electronic devices.
	57	Mercury Containing Products	Items or product that contain mercury. Items such as thermostats, thermometers, and light switches. This category also includes fluorescent light ballasts, which are devices that electrically control fluorescent light fixtures and that include a capacitor, CFLs, which are compact fluorescent bulbs, and other fluorescent lighting, which includes tubular fluorescent lamps, neon lamps, black lights, and other lamps used for sanitation or cosmetic purposes.

Class	No.	2011 Categories	Material Definition
HHW	58	Sharps	Discarded needles that have been used in animal or human patient care or treatment or in medical, research or laboratories.
	59	Other HHW	All household or commercial products characterized as toxic, corrosive, flammable, ignitable, radioactive, poisonous, reactive, or not elsewhere classified.
	60	Prescription Medications	Medication which requires a doctor's prescription. Does not include over-the-counter medications.
OTHER	61	Other Inorganics	All other inorganic items not elsewhere classified. Includes products such as de-icing chemicals, hand warming packets, desiccant, shampoo, tooth paste, hair coloring products and some non-prescription medication and creams.
	62	Other	Items not elsewhere classified (Specify on field sheets).

Mapping of Material Categories

Class	No.	2011 Categories	2005 Material Categories Mapped	1998 Material Categories Mapped
PAPER	1	Newsprint	Newsprint	Newsprint
	2	Magazines	Magazines	Magazines
	3	High Grade Office Paper	High Grade Paper	High Grade Paper
	4	OCC and Kraft Bags	OCC and Kraft Bags	OCC and Kraft Bags
	5	Mixed Recyclable Paper	Mixed Recyclable Paper	Mixed Recyclable Paper
	6	Aseptic/Gable Top Containers	Non-Recyclable Paper	Non-Recyclable Paper
	7	Compostable Paper	Compostable Paper	Compostable Paper
	8	Non-Recyclable Paper	Non-Recyclable Paper	Non-Recyclable Paper
PLASTIC	9	#1 PET Beverage Containers	#1 PET Beverage Containers	#1 PET Beverage Containers
	10	#1 PET IA Deposit Beverage Containers	#1 PET IA Deposit Beverage Containers	#1 PET IA Deposit Beverage Containers
	11	Other #1 PET Containers	Other #1 PET Containers	N/A
	12	#2 High Density Polyethylene (HDPE) Natural Containers	#2 High Density Polyethylene (HDPE) Containers	#2 High Density Polyethylene (HDPE) Containers
	13	#2 High Density Polyethylene (HDPE) Colored Containers	#2 High Density Polyethylene (HDPE) Containers	#2 High Density Polyethylene (HDPE) Containers
	14	Plastic Containers #3-#7	Other Plastic Containers	Other Plastic Containers
	15	Other Plastic Containers		
	16	Retail Shopping Bags	Film Wrap/Bags	Film Wrap/Bags
	17	Other Plastic Film		
	18	Expanded Polystyrene	Other Plastic Products	Other Plastic Products
	19	Other Plastic Products	Other Plastic Products	Other Plastic Products
METAL	20	Aluminum Beverage Containers	Aluminum Beverage Containers	Aluminum Beverage Containers
	21	Aluminum IA Deposit Beverage Containers	Aluminum IA Deposit Beverage Containers	Aluminum IA Deposit Beverage Containers
	22	Other Aluminum Containers	Other Aluminum Containers	N/A
	23	Ferrous Food and Beverage Containers	Ferrous Food and Beverage Containers	Ferrous Food and Beverage Containers
	24	Other Ferrous Scrap Metals	Other Ferrous Scrap Metals	Other Ferrous Scrap Metals
	25	Other Non-Ferrous Scrap Metals	Other Non-Ferrous Scrap Metals	Other Non-Ferrous Scrap Metals
GLASS	26	Clear Glass Containers	Non-Deposit Clear Glass Containers	Non-Deposit Clear Glass Containers
	27	Green Glass Containers	Non-Deposit Green Containers	Non-Deposit Green Containers
	28	Blue Glass Containers	Non-Deposit Blue Glass Containers	Non-Deposit Blue Glass Containers
	29	Brown Glass Containers	Non-Deposit Brown Glass Containers	Non-Deposit Brown Glass Containers
	30	IA Deposit Glass Containers	IA Deposit Glass Containers	IA Deposit Glass Containers
	31	Other Mixed Cullet	Other Mixed Cullet	Other Mixed Cullet
ORGANIC	32	Yard Waste	Yard Waste	Yard Waste
	33	Food Waste	Food Waste	Food Waste
	34	Textiles and Leather	Textiles and Leather	Textiles and Leather
	35	Rubber	Rubber	Rubber
	36	Diapers	Diapers	Diapers
	37	Fines/Super Mix	Fines/Super Mix	Other Organics
	38	Other Organics	Other Organics	

Mapping of Material Categories

Class	No.	2011 Categories	2005 Material Categories Mapped	1998 Material Categories Mapped
C&D	39	Wood – Treated	Wood – Treated	Wood – Treated
	40	Wood – Untreated	Wood – Untreated	Wood – Untreated
	41	Asphalt Pavement, Brick, Rock, and Concrete	Demolition/Renovation/Construciton Debris	Demolition/Renovation/Construciton Debris
	42	Asphalt Roofing		
	43	Drywall/Gypsum Board		
	44	Carpet and Carpet Padding		
	45	Remainder/Composite C&D		
DURABLE	46	Electrical and Household Appliances	Electrical and Household Appliances	Electrical and Household Appliances
	47	Central Processing Units/Peripherals	Central Processing Units/Peripherals	Electrical and Household Appliances
	48	Computer Monitors/T.V.s	Computer Monitors/T.V.s	
	49	Cell Phones and Chargers	Cell Phones and Chargers	
	50	Other Durables	Other Durables	Other Durables
HHW	51	Automotive Products	Automotive Products	Automotive Products
	52	Paints and Solvents	Paints and Solvents	Paints and Solvents
	53	Pesticides, Herbicides, Fungicides	Pesticides, Herbicides, Fungicides	Pesticides, Herbicides, Fungicides
	54	Household Cleaners	Household Cleaners	Household Cleaners
	55	Lead Acid Batteries	Lead Acid Batteries	Lead Acid Batteries
	56	Other Batteries	Other Batteries	Other Batteries
	57	Mercury Containing Products	Mercury Containing Products	Light Bulbs
	58	Sharps	Sharps	Sharps
	59	Other HHW	Other HHW	Other HHW
	60	Prescription Medications		
OTHER	61	Other Inorganics	Other Inorganics	Other Inorganics
	62	Other	Other	Other

APPENDIX B

RESULTS BY HOST FACILITY

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DES MOINES COUNTY REGIONAL SOLID WASTE COMMISSION

MidAtlantic Solid Waste Consultants
Cascadia Consulting Group
Foth Infrastructure & Environment

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Des Moines County Regional Solid Waste Commission 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**27.7%**	**23.7%**	**31.7%**
Compostable Paper	6.2%	5.0%	7.3%
High Grade Office Paper	0.9%	0.6%	1.2%
Magazines/Catalogs	1.0%	0.8%	1.3%
Mixed Recyclable Paper	4.6%	3.8%	5.5%
Newsprint	2.4%	1.7%	3.1%
Non-Recyclable Paper	4.7%	1.5%	7.9%
OCC and Kraft Paper	7.5%	5.5%	9.5%
Aseptic/Gable Top Containers	0.4%	0.2%	0.6%
Metal	**4.4%**	**3.5%**	**5.3%**
Aluminum Beverage Containers	0.1%	0.0%	0.1%
Aluminum IA Deposit Beverage Containers	0.3%	0.2%	0.4%
Ferrous Food and Beverage Containers	1.0%	0.8%	1.1%
Other Aluminum Containers	0.4%	0.3%	0.4%
Other Ferrous Scrap Metals	1.9%	1.2%	2.7%
Other Non-Ferrous Scrap Metals	0.8%	0.4%	1.2%
Glass	**2.5%**	**1.4%**	**3.6%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.0%	0.0%	0.0%
Clear Glass	0.7%	0.5%	0.8%
Glass Deposit Containers	1.2%	0.3%	2.1%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	0.5%	0.3%	0.7%
Organic	**25.5%**	**22.2%**	**28.7%**
Yard Waste	2.7%	1.5%	3.9%
Food Waste	16.0%	13.4%	18.7%
Textiles and Leather	4.4%	2.4%	6.3%
Diapers	1.7%	1.2%	2.2%
Rubber	0.7%	0.4%	1.0%
C&D	**13.3%**	**7.7%**	**18.8%**
Wood – Untreated	5.0%	1.4%	8.6%
Wood – Treated	4.2%	1.4%	6.9%
Asphalt Pavement, Brick, Rock, and Concrete	0.4%	0.1%	0.8%
Asphalt Roofing	0.0%	0.0%	0.1%
Drywall/Gypsum Board	2.2%	0.0%	5.0%
Carpet and Carpet Padding	1.4%	0.0%	2.8%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**14.7%**	**11.8%**	**17.6%**
#1 PET IA Deposit Beverage Containers	0.5%	0.1%	1.0%
#1 PET Beverage Containers	0.5%	0.4%	0.6%
#2 HDPE Containers Natural	0.4%	0.3%	0.5%
#2 HDPE Containers Colored	0.5%	0.4%	0.6%
Retail Shopping Bags	0.5%	0.4%	0.5%
Other Film Plastic	6.6%	3.7%	9.6%
Other #1 PET Containers	0.4%	0.3%	0.5%
Plastic Containers #3-#7	0.7%	0.5%	0.9%
Other plastic Containers	0.5%	0.4%	0.6%
Expanded Polystyrene	1.5%	0.8%	2.3%
Other Plastic Products	2.5%	1.9%	3.2%
Durable	**1.9%**	**0.9%**	**2.8%**
Cell Phones and Chargers	0.1%	0.0%	0.1%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.3%	0.0%	0.6%
Electrical and Household Appliances	1.5%	0.6%	2.4%
HHMS	**0.5%**	**0.3%**	**0.8%**
Automotive Products	0.2%	0.0%	0.4%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.1%	0.1%
Paints and Solvents	0.2%	0.0%	0.3%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**9.5%**	**6.6%**	**12.5%**
Other Organics	3.1%	2.1%	4.1%
Other Inorganics	0.2%	0.1%	0.3%
Other C&D	1.2%	0.3%	2.0%
Other Durables	1.2%	0.0%	3.1%
Other HHM	0.0%	0.0%	0.0%
Fines	3.6%	1.5%	5.7%
Other	0.2%	0.0%	0.4%
Totals	**100.0%**		
Sample Count	**50**	**Conf.**	**90%**

Des Moines County Regional Solid Waste Commission 2011 Residential Waste Compostion

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**22.5%**	**18.8%**	**26.1%**
Compostable Paper	6.9%	5.5%	8.2%
High Grade Office Paper	0.5%	0.2%	0.8%
Magazines/Catalogs	1.6%	1.1%	2.1%
Mixed Recyclable Paper	6.0%	4.9%	7.2%
Newsprint	3.0%	1.8%	4.2%
Non-Recyclable Paper	2.2%	1.7%	2.7%
OCC and Kraft Paper	2.1%	1.4%	2.9%
Aseptic/Gable Top Containers	0.2%	0.1%	0.3%
Metal	**4.9%**	**4.1%**	**5.7%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.3%	0.2%	0.4%
Ferrous Food and Beverage Containers	1.4%	1.1%	1.7%
Other Aluminum Containers	0.5%	0.4%	0.6%
Other Ferrous Scrap Metals	1.8%	0.8%	2.8%
Other Non-Ferrous Scrap Metals	1.0%	0.5%	1.5%
Glass	**2.8%**	**2.0%**	**3.6%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.0%	0.0%	0.0%
Clear Glass	1.3%	0.9%	1.6%
Glass Deposit Containers	0.8%	0.4%	1.2%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	0.6%	0.3%	0.9%
Organic	**33.7%**	**28.5%**	**39.0%**
Yard Waste	4.6%	2.0%	7.1%
Food Waste	17.5%	14.4%	20.7%
Textiles and Leather	7.5%	3.1%	12.0%
Diapers	3.5%	2.4%	4.6%
Rubber	0.6%	0.1%	1.1%
C&D	**8.4%**	**1.8%**	**15.0%**
Wood – Untreated	1.0%	0.1%	1.9%
Wood – Treated	4.7%	0.0%	9.3%
Asphalt Pavement, Brick, Rock, and Concrete	0.5%	0.0%	1.0%
Asphalt Roofing	0.1%	0.0%	0.2%
Drywall/Gypsum Board	0.8%	0.0%	1.7%
Carpet and Carpet Padding	1.3%	0.0%	2.9%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**13.0%**	**11.0%**	**14.9%**
#1 PET IA Deposit Beverage Containers	0.3%	0.2%	0.3%
#1 PET Beverage Containers	0.7%	0.5%	0.9%
#2 HDPE Containers Natural	0.4%	0.3%	0.5%
#2 HDPE Containers Colored	0.6%	0.5%	0.8%
Retail Shopping Bags	0.7%	0.6%	0.9%
Other Film Plastic	4.0%	3.1%	4.8%
Other #1 PET Containers	0.5%	0.4%	0.7%
Plastic Containers #3-#7	0.9%	0.6%	1.2%
Other plastic Containers	0.7%	0.5%	0.8%
Expanded Polystyrene	0.7%	0.5%	1.0%
Other Plastic Products	3.4%	2.3%	4.5%
Durable	**1.9%**	**0.9%**	**2.9%**
Cell Phones and Chargers	0.0%	0.0%	0.1%
Central Processing Units/Peripherals	0.0%	0.0%	0.1%
Computer Monitors/T.V.s	0.6%	0.0%	1.3%
Electrical and Household Appliances	1.2%	0.4%	2.1%
HHMS	**0.6%**	**0.3%**	**0.8%**
Automotive Products	0.1%	0.0%	0.2%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.1%	0.2%
Paints and Solvents	0.2%	0.0%	0.5%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**12.3%**	**7.3%**	**17.3%**
Other Organics	4.8%	2.9%	6.7%
Other Inorganics	0.3%	0.0%	0.5%
Other C&D	1.0%	0.0%	2.2%
Other Durables	2.9%	0.0%	7.6%
Other HHM	0.0%	0.0%	0.1%
Fines	3.1%	1.3%	4.8%
Other	0.3%	0.0%	0.7%
Totals	**100.0%**		
Sample Count	**21**	**Conf.**	**90%**

Des Moines County Regional Solid Waste Commission 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**31.4%**	**25.1%**	**37.7%**
Compostable Paper	5.7%	4.0%	7.4%
High Grade Office Paper	1.2%	0.7%	1.7%
Magazines/Catalogs	0.6%	0.4%	0.9%
Mixed Recyclable Paper	3.7%	2.5%	4.9%
Newsprint	2.0%	1.2%	2.7%
Non-Recyclable Paper	6.4%	1.0%	11.9%
OCC and Kraft Paper	11.3%	8.0%	14.7%
Aseptic/Gable Top Containers	0.5%	0.1%	0.9%
Metal	**4.1%**	**2.6%**	**5.5%**
Aluminum Beverage Containers	0.1%	0.0%	0.2%
Aluminum IA Deposit Beverage Containers	0.3%	0.2%	0.5%
Ferrous Food and Beverage Containers	0.7%	0.4%	0.9%
Other Aluminum Containers	0.3%	0.1%	0.4%
Other Ferrous Scrap Metals	2.1%	0.9%	3.2%
Other Non-Ferrous Scrap Metals	0.6%	0.0%	1.3%
Glass	**2.3%**	**0.6%**	**4.1%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.0%	0.0%	0.0%
Clear Glass	0.3%	0.2%	0.4%
Glass Deposit Containers	1.5%	0.0%	3.1%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	0.5%	0.2%	0.7%
Organic	**19.6%**	**15.5%**	**23.7%**
Yard Waste	1.3%	0.3%	2.4%
Food Waste	15.0%	11.0%	19.0%
Textiles and Leather	2.1%	1.0%	3.2%
Diapers	0.4%	0.2%	0.7%
Rubber	0.8%	0.3%	1.2%
C&D	**16.7%**	**8.4%**	**25.0%**
Wood – Untreated	7.8%	1.7%	14.0%
Wood – Treated	3.8%	0.4%	7.2%
Asphalt Pavement, Brick, Rock, and Concrete	0.4%	0.0%	0.8%
Asphalt Roofing	0.0%	0.0%	0.1%
Drywall/Gypsum Board	3.2%	0.0%	7.9%
Carpet and Carpet Padding	1.4%	0.0%	3.5%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**15.9%**	**11.1%**	**20.8%**
#1 PET IA Deposit Beverage Containers	0.7%	0.0%	1.5%
#1 PET Beverage Containers	0.4%	0.3%	0.5%
#2 HDPE Containers Natural	0.4%	0.2%	0.5%
#2 HDPE Containers Colored	0.4%	0.3%	0.6%
Retail Shopping Bags	0.3%	0.2%	0.3%
Other Film Plastic	8.5%	3.5%	13.6%
Other #1 PET Containers	0.2%	0.1%	0.4%
Plastic Containers #3-#7	0.5%	0.3%	0.8%
Other plastic Containers	0.4%	0.3%	0.6%
Expanded Polystyrene	2.1%	0.8%	3.4%
Other Plastic Products	1.9%	1.1%	2.7%
Durable	**1.9%**	**0.4%**	**3.3%**
Cell Phones and Chargers	0.1%	0.0%	0.1%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.1%	0.0%	0.3%
Electrical and Household Appliances	1.7%	0.3%	3.1%
HHMS	**0.5%**	**0.2%**	**0.9%**
Automotive Products	0.3%	0.0%	0.6%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.1%	0.0%	0.3%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**7.5%**	**4.0%**	**11.1%**
Other Organics	1.9%	0.9%	3.0%
Other Inorganics	0.2%	0.0%	0.3%
Other C&D	1.3%	0.2%	2.4%
Other Durables	0.0%	0.0%	0.0%
Other HHM	0.0%	0.0%	0.0%
Fines	4.0%	0.6%	7.4%
Other	0.2%	0.0%	0.4%
Totals	**100.0%**		
Sample Count	**29**	**Conf.**	**90%**

Des Moines County Regional Solid Waste Commission 2011 Solid Waste Compostion

Material	Estimated Percent	Material	Estimated Percent
Paper	**21.1%**	**Plastic**	**11.2%**
Compostable Paper	4.7%	#1 PET IA Deposit Beverage Containers	0.4%
High Grade Office Paper	0.7%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	0.8%	#2 HDPE Containers Natural	0.3%
Mixed Recyclable Paper	3.5%	#2 HDPE Containers Colored	0.4%
Newsprint	1.8%	Retail Shopping Bags	0.4%
Non-Recyclable Paper	3.6%	Other Film Plastic	5.1%
OCC and Kraft Paper	5.7%	Other #1 PET Containers	0.3%
Aseptic/Gable Top Containers	0.3%	Plastic Containers #3-#7	0.5%
		Other plastic Containers	0.4%
Metal	**3.4%**	Expanded Polystyrene	1.2%
Aluminum Beverage Containers	0.0%	Other Plastic Products	1.9%
Aluminum IA Deposit Beverage Containers	0.2%		
Ferrous Food and Beverage Containers	0.7%	**Durable**	**1.4%**
Other Aluminum Containers	0.3%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	1.5%	Central Processing Units/Peripherals	0.0%
Other Non-Ferrous Scrap Metals	0.6%	Computer Monitors/T.V.s	0.2%
		Electrical and Household Appliances	1.1%
Glass	**1.9%**		
Blue Glass	0.0%	**HHMS**	**0.4%**
Brown Glass	0.0%	Automotive Products	0.2%
Clear Glass	0.5%	Household Cleaners	0.0%
Glass Deposit Containers	0.9%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.4%	Other Batteries	0.1%
		Paints and Solvents	0.1%
Organic	**19.4%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	2.0%	Sharps	0.0%
Food Waste	12.2%	Prescription Medications	0.0%
Textiles and Leather	3.3%		
Diapers	1.3%	**Other**	**8.6%**
Rubber	0.5%	Other Organics	2.4%
		Other Inorganics	0.2%
C&D	**32.5%**	Other C&D	0.9%
Wood – Untreated	3.8%	Other Durables	0.9%
Wood – Treated	3.2%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	0.3%	Fines	2.7%
Asphalt Roofing	0.0%	Other	0.2%
Drywall/Gypsum Board	1.7%	Special Waste	1.3%
Carpet and Carpet Padding	1.1%		
Mixed C&D	22.4%	**Totals**	**100.0%**

OTTUMWA-WAPELLO SOLID WASTE COMMISSION

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Ottumwa-Wapello Solid Waste Commission 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**22.3%**	**19.1%**	**25.5%**
Compostable Paper	6.3%	5.2%	7.3%
High Grade Office Paper	0.6%	0.3%	0.9%
Magazines/Catalogs	2.1%	1.4%	2.8%
Mixed Recyclable Paper	4.7%	2.7%	6.8%
Newsprint	2.9%	1.8%	4.0%
Non-Recyclable Paper	1.6%	1.2%	2.1%
OCC and Kraft Paper	3.8%	2.3%	5.4%
Aseptic/Gable Top Containers	0.2%	0.1%	0.4%
Metal	**6.6%**	**4.3%**	**8.8%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.2%
Ferrous Food and Beverage Containers	0.7%	0.5%	0.9%
Other Aluminum Containers	0.1%	0.1%	0.1%
Other Ferrous Scrap Metals	3.5%	1.6%	5.3%
Other Non-Ferrous Scrap Metals	2.1%	0.7%	3.5%
Glass	**1.3%**	**0.9%**	**1.7%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.1%
Clear Glass	0.4%	0.3%	0.6%
Glass Deposit Containers	0.3%	0.1%	0.5%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	0.5%	0.2%	0.7%
Organic	**24.5%**	**21.1%**	**27.8%**
Yard Waste	2.2%	1.2%	3.2%
Food Waste	15.6%	12.5%	18.7%
Textiles and Leather	3.6%	2.6%	4.5%
Diapers	1.7%	1.1%	2.2%
Rubber	1.4%	0.6%	2.3%
C&D	**16.2%**	**12.4%**	**20.0%**
Wood – Untreated	4.2%	2.3%	6.0%
Wood – Treated	7.0%	4.2%	9.8%
Asphalt Pavement, Brick, Rock, and Concrete	0.5%	0.1%	0.9%
Asphalt Roofing	1.0%	0.0%	2.3%
Drywall/Gypsum Board	1.5%	0.0%	3.0%
Carpet and Carpet Padding	2.1%	0.4%	3.7%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**13.1%**	**11.5%**	**14.7%**
#1 PET IA Deposit Beverage Containers	0.2%	0.1%	0.3%
#1 PET Beverage Containers	0.4%	0.3%	0.5%
#2 HDPE Containers Natural	0.3%	0.2%	0.4%
#2 HDPE Containers Colored	0.7%	0.5%	0.9%
Retail Shopping Bags	0.5%	0.4%	0.6%
Other Film Plastic	4.0%	3.4%	4.7%
Other #1 PET Containers	0.2%	0.2%	0.3%
Plastic Containers #3-#7	0.7%	0.5%	0.8%
Other plastic Containers	0.2%	0.1%	0.3%
Expanded Polystyrene	0.9%	0.5%	1.3%
Other Plastic Products	5.0%	3.5%	6.5%
Durable	**2.5%**	**1.1%**	**3.9%**
Cell Phones and Chargers	0.1%	0.0%	0.1%
Central Processing Units/Peripherals	0.2%	0.0%	0.5%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	2.2%	0.8%	3.5%
HHMS	**0.2%**	**0.2%**	**0.3%**
Automotive Products	0.1%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.1%	0.0%	0.1%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**13.4%**	**10.2%**	**16.5%**
Other Organics	3.4%	2.3%	4.6%
Other Inorganics	0.2%	0.1%	0.3%
Other C&D	1.3%	0.4%	2.2%
Other Durables	5.2%	2.6%	7.8%
Other HHM	0.0%	0.0%	0.1%
Fines	2.3%	1.9%	2.8%
Other	0.9%	0.0%	2.2%
Totals	**100.0%**		
Sample Count	**50**	**Conf.**	**90%**

Ottumwa-Wapello Solid Waste Commission 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**21.0%**	**18.1%**	**23.9%**
Compostable Paper	6.6%	5.3%	7.9%
High Grade Office Paper	0.7%	0.2%	1.1%
Magazines/Catalogs	2.5%	1.4%	3.6%
Mixed Recyclable Paper	4.1%	3.3%	4.9%
Newsprint	2.5%	1.6%	3.3%
Non-Recyclable Paper	1.6%	1.1%	2.1%
OCC and Kraft Paper	2.9%	1.4%	4.4%
Aseptic/Gable Top Containers	0.2%	0.1%	0.2%
Metal	**4.7%**	**2.3%**	**7.0%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.3%
Ferrous Food and Beverage Containers	0.6%	0.5%	0.8%
Other Aluminum Containers	0.2%	0.1%	0.2%
Other Ferrous Scrap Metals	2.2%	0.8%	3.6%
Other Non-Ferrous Scrap Metals	1.5%	0.0%	3.5%
Glass	**1.6%**	**1.1%**	**2.0%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.2%
Clear Glass	0.6%	0.4%	0.8%
Glass Deposit Containers	0.3%	0.0%	0.6%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	0.5%	0.3%	0.7%
Organic	**27.9%**	**23.1%**	**32.8%**
Yard Waste	2.8%	1.2%	4.3%
Food Waste	17.1%	13.0%	21.3%
Textiles and Leather	4.5%	3.2%	5.8%
Diapers	2.8%	1.8%	3.7%
Rubber	0.8%	0.4%	1.1%
C&D	**12.8%**	**8.5%**	**17.0%**
Wood – Untreated	1.9%	0.8%	3.0%
Wood – Treated	6.1%	3.4%	8.7%
Asphalt Pavement, Brick, Rock, and Concrete	0.3%	0.0%	0.7%
Asphalt Roofing	0.1%	0.0%	0.2%
Drywall/Gypsum Board	1.1%	0.0%	2.6%
Carpet and Carpet Padding	3.3%	0.4%	6.2%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**13.4%**	**11.7%**	**15.1%**
#1 PET IA Deposit Beverage Containers	0.3%	0.2%	0.4%
#1 PET Beverage Containers	0.5%	0.3%	0.6%
#2 HDPE Containers Natural	0.2%	0.2%	0.3%
#2 HDPE Containers Colored	0.7%	0.5%	0.9%
Retail Shopping Bags	0.7%	0.5%	0.8%
Other Film Plastic	4.4%	3.7%	5.2%
Other #1 PET Containers	0.3%	0.2%	0.4%
Plastic Containers #3-#7	0.9%	0.7%	1.1%
Other plastic Containers	0.1%	0.1%	0.1%
Expanded Polystyrene	0.6%	0.4%	0.8%
Other Plastic Products	4.7%	2.9%	6.5%
Durable	**3.1%**	**1.0%**	**5.1%**
Cell Phones and Chargers	0.1%	0.0%	0.2%
Central Processing Units/Peripherals	0.2%	0.0%	0.3%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	2.8%	0.7%	4.9%
HHMS	**0.3%**	**0.2%**	**0.4%**
Automotive Products	0.1%	0.0%	0.2%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.1%	0.0%	0.2%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**15.3%**	**11.2%**	**19.5%**
Other Organics	3.5%	2.3%	4.7%
Other Inorganics	0.2%	0.1%	0.4%
Other C&D	1.2%	0.0%	2.4%
Other Durables	7.4%	3.0%	11.7%
Other HHM	0.0%	0.0%	0.1%
Fines	2.5%	2.0%	3.1%
Other	0.4%	0.0%	0.8%
Totals	**100.0%**		
Sample Count	**28**	**Conf.**	**90%**

Ottumwa-Wapello Solid Waste Commission 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**23.9%**	**17.6%**	**30.3%**
Compostable Paper	5.9%	4.1%	7.6%
High Grade Office Paper	0.5%	0.0%	1.1%
Magazines/Catalogs	1.6%	0.7%	2.5%
Mixed Recyclable Paper	5.5%	1.0%	10.1%
Newsprint	3.4%	1.1%	5.8%
Non-Recyclable Paper	1.7%	0.8%	2.6%
OCC and Kraft Paper	5.0%	2.0%	7.9%
Aseptic/Gable Top Containers	0.3%	0.0%	0.6%
Metal	**9.0%**	**4.9%**	**13.0%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.1%	0.1%	0.1%
Ferrous Food and Beverage Containers	0.8%	0.3%	1.2%
Other Aluminum Containers	0.1%	0.0%	0.1%
Other Ferrous Scrap Metals	5.1%	1.3%	8.9%
Other Non-Ferrous Scrap Metals	2.9%	1.2%	4.7%
Glass	**1.0%**	**0.3%**	**1.6%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.0%	0.0%	0.0%
Clear Glass	0.2%	0.1%	0.4%
Glass Deposit Containers	0.3%	0.1%	0.6%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	0.4%	0.0%	0.8%
Organic	**20.1%**	**15.6%**	**24.5%**
Yard Waste	1.5%	0.1%	2.8%
Food Waste	13.7%	8.9%	18.4%
Textiles and Leather	2.4%	0.9%	3.8%
Diapers	0.3%	0.0%	0.5%
Rubber	2.3%	0.4%	4.2%
C&D	**20.6%**	**13.9%**	**27.2%**
Wood – Untreated	7.0%	3.0%	11.1%
Wood – Treated	8.2%	2.8%	13.6%
Asphalt Pavement, Brick, Rock, and Concrete	0.7%	0.0%	1.5%
Asphalt Roofing	2.2%	0.0%	5.2%
Drywall/Gypsum Board	1.9%	0.0%	4.7%
Carpet and Carpet Padding	0.5%	0.0%	1.2%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**12.7%**	**9.8%**	**15.6%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.4%	0.2%	0.6%
#2 HDPE Containers Natural	0.3%	0.1%	0.5%
#2 HDPE Containers Colored	0.6%	0.3%	1.0%
Retail Shopping Bags	0.3%	0.2%	0.4%
Other Film Plastic	3.5%	2.3%	4.8%
Other #1 PET Containers	0.1%	0.1%	0.1%
Plastic Containers #3-#7	0.4%	0.2%	0.5%
Other plastic Containers	0.3%	0.1%	0.6%
Expanded Polystyrene	1.2%	0.3%	2.1%
Other Plastic Products	5.4%	2.9%	7.9%
Durable	**1.8%**	**0.1%**	**3.5%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.4%	0.0%	1.0%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	1.4%	0.0%	3.0%
HHMS	**0.2%**	**0.1%**	**0.3%**
Automotive Products	0.1%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.1%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**10.9%**	**6.0%**	**15.8%**
Other Organics	3.3%	1.1%	5.5%
Other Inorganics	0.1%	0.0%	0.3%
Other C&D	1.4%	0.0%	2.8%
Other Durables	2.3%	0.2%	4.4%
Other HHM	0.0%	0.0%	0.0%
Fines	2.0%	1.2%	2.8%
Other	1.7%	0.0%	4.4%
Totals	**100.0%**		
Sample Count	**22**	**Conf.**	**90%**

Ottumwa-Wapello Solid Waste Commission 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**18.9%**	**Plastic**	**11.1%**
Compostable Paper	5.3%	#1 PET IA Deposit Beverage Containers	0.2%
High Grade Office Paper	0.5%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	1.8%	#2 HDPE Containers Natural	0.2%
Mixed Recyclable Paper	4.0%	#2 HDPE Containers Colored	0.6%
Newsprint	2.5%	Retail Shopping Bags	0.4%
Non-Recyclable Paper	1.4%	Other Film Plastic	3.4%
OCC and Kraft Paper	3.2%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.2%	Plastic Containers #3-#7	0.6%
		Other plastic Containers	0.2%
Metal	**5.6%**	Expanded Polystyrene	0.7%
Aluminum Beverage Containers	0.0%	Other Plastic Products	4.3%
Aluminum IA Deposit Beverage Containers	0.1%		
Ferrous Food and Beverage Containers	0.6%	**Durable**	**2.1%**
Other Aluminum Containers	0.1%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	2.9%	Central Processing Units/Peripherals	0.2%
Other Non-Ferrous Scrap Metals	1.8%	Computer Monitors/T.V.s	0.0%
		Electrical and Household Appliances	1.9%
Glass	**1.1%**		
Blue Glass	0.0%	**HHMS**	**0.2%**
Brown Glass	0.1%	Automotive Products	0.1%
Clear Glass	0.4%	Household Cleaners	0.0%
Glass Deposit Containers	0.3%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.4%	Other Batteries	0.1%
		Paints and Solvents	0.0%
Organic	**20.8%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	1.9%	Sharps	0.0%
Food Waste	13.3%	Prescription Medications	0.0%
Textiles and Leather	3.0%		
Diapers	1.4%	**Other**	**16.9%**
Rubber	1.2%	Other Organics	2.9%
		Other Inorganics	0.2%
C&D	**23.2%**	Other C&D	1.1%
Wood – Untreated	3.5%	Other Durables	4.4%
Wood – Treated	5.9%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	0.4%	Fines	2.0%
Asphalt Roofing	0.9%	Other	0.8%
Drywall/Gypsum Board	1.2%	Special Waste	5.5%
Carpet and Carpet Padding	1.8%		
Mixed C&D	9.5%	**Totals**	**100%**

SOUTH CENTRAL IOWA SOLID WASTE AGENCY

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South Central Iowa Solid Waste Agency 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**25.5%**	**22.2%**	**28.9%**
Compostable Paper	4.3%	3.3%	5.2%
High Grade Office Paper	0.8%	0.2%	1.3%
Magazines/Catalogs	1.3%	0.9%	1.7%
Mixed Recyclable Paper	4.4%	3.2%	5.6%
Newsprint	1.7%	1.3%	2.2%
Non-Recyclable Paper	3.6%	1.8%	5.3%
OCC and Kraft Paper	9.4%	6.4%	12.3%
Aseptic/Gable Top Containers	0.2%	0.1%	0.2%
Metal	**5.3%**	**3.8%**	**6.8%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.2%
Ferrous Food and Beverage Containers	0.5%	0.4%	0.7%
Other Aluminum Containers	0.1%	0.1%	0.2%
Other Ferrous Scrap Metals	2.9%	1.9%	4.0%
Other Non-Ferrous Scrap Metals	1.5%	0.5%	2.5%
Glass	**1.9%**	**0.9%**	**2.9%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.0%	0.0%	0.1%
Clear Glass	0.5%	0.3%	0.6%
Glass Deposit Containers	0.4%	0.2%	0.5%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	1.0%	0.1%	2.0%
Organic	**24.4%**	**20.7%**	**28.0%**
Yard Waste	3.2%	1.9%	4.4%
Food Waste	12.5%	9.3%	15.6%
Textiles and Leather	5.4%	3.7%	7.0%
Diapers	1.9%	1.3%	2.5%
Rubber	1.4%	0.8%	2.1%
C&D	**13.0%**	**9.2%**	**16.7%**
Wood – Untreated	6.1%	3.5%	8.6%
Wood – Treated	3.9%	2.4%	5.4%
Asphalt Pavement, Brick, Rock, and Concrete	0.5%	0.0%	1.0%
Asphalt Roofing	0.8%	0.0%	1.7%
Drywall/Gypsum Board	0.4%	0.0%	0.9%
Carpet and Carpet Padding	1.4%	0.2%	2.6%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**15.6%**	**13.1%**	**18.0%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.5%	0.4%	0.6%
#2 HDPE Containers Natural	0.2%	0.2%	0.3%
#2 HDPE Containers Colored	0.3%	0.2%	0.4%
Retail Shopping Bags	0.3%	0.3%	0.4%
Other Film Plastic	5.4%	4.0%	6.9%
Other #1 PET Containers	0.2%	0.2%	0.3%
Plastic Containers #3-#7	0.6%	0.5%	0.7%
Other plastic Containers	0.5%	0.3%	0.7%
Expanded Polystyrene	0.4%	0.3%	0.5%
Other Plastic Products	7.0%	5.3%	8.7%
Durable	**1.8%**	**1.0%**	**2.6%**
Cell Phones and Chargers	0.0%	0.0%	0.1%
Central Processing Units/Peripherals	0.3%	0.0%	0.8%
Computer Monitors/T.V.s	0.2%	0.0%	0.5%
Electrical and Household Appliances	1.2%	0.6%	1.9%
HHMS	**0.2%**	**0.1%**	**0.4%**
Automotive Products	0.0%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.1%
Other Batteries	0.1%	0.0%	0.2%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**12.4%**	**8.8%**	**15.9%**
Other Organics	1.7%	1.0%	2.4%
Other Inorganics	1.2%	0.3%	2.1%
Other C&D	2.4%	0.3%	4.6%
Other Durables	2.8%	1.3%	4.3%
Other HHM	0.1%	0.0%	0.2%
Fines	3.5%	1.9%	5.1%
Other	0.7%	0.0%	1.7%
Totals	**100.0%**		
Sample Count	**50**	**Conf.**	**90%**

South Central Iowa Solid Waste Agency 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**20.8%**	**17.9%**	**23.7%**
Compostable Paper	4.9%	3.8%	6.1%
High Grade Office Paper	0.3%	0.0%	0.6%
Magazines/Catalogs	2.0%	1.2%	2.8%
Mixed Recyclable Paper	4.7%	3.9%	5.5%
Newsprint	2.9%	2.0%	3.8%
Non-Recyclable Paper	1.4%	1.0%	1.9%
OCC and Kraft Paper	4.3%	3.2%	5.4%
Aseptic/Gable Top Containers	0.3%	0.1%	0.4%
Metal	**5.3%**	**3.5%**	**7.2%**
Aluminum Beverage Containers	0.0%	0.0%	0.1%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.3%
Ferrous Food and Beverage Containers	0.9%	0.6%	1.2%
Other Aluminum Containers	0.2%	0.1%	0.3%
Other Ferrous Scrap Metals	2.3%	1.3%	3.3%
Other Non-Ferrous Scrap Metals	1.6%	0.4%	2.8%
Glass	**1.8%**	**1.3%**	**2.3%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.1%
Clear Glass	0.8%	0.6%	1.0%
Glass Deposit Containers	0.6%	0.2%	0.9%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	0.3%	0.2%	0.5%
Organic	**33.5%**	**29.7%**	**37.2%**
Yard Waste	5.6%	3.2%	8.0%
Food Waste	14.6%	10.7%	18.6%
Textiles and Leather	8.8%	5.7%	11.9%
Diapers	2.8%	1.8%	3.7%
Rubber	1.7%	0.8%	2.6%
C&D	**8.9%**	**5.7%**	**12.0%**
Wood – Untreated	1.9%	0.4%	3.4%
Wood – Treated	4.9%	2.9%	6.9%
Asphalt Pavement, Brick, Rock, and Concrete	0.8%	0.0%	1.9%
Asphalt Roofing	0.0%	0.0%	0.0%
Drywall/Gypsum Board	0.4%	0.0%	1.1%
Carpet and Carpet Padding	0.8%	0.0%	1.6%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**14.7%**	**12.8%**	**16.7%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.6%	0.5%	0.8%
#2 HDPE Containers Natural	0.4%	0.3%	0.5%
#2 HDPE Containers Colored	0.5%	0.4%	0.6%
Retail Shopping Bags	0.6%	0.4%	0.7%
Other Film Plastic	3.4%	2.7%	4.2%
Other #1 PET Containers	0.3%	0.2%	0.4%
Plastic Containers #3-#7	0.8%	0.6%	0.9%
Other plastic Containers	0.6%	0.4%	0.8%
Expanded Polystyrene	0.4%	0.3%	0.6%
Other Plastic Products	7.0%	4.8%	9.2%
Durable	**2.5%**	**1.1%**	**3.8%**
Cell Phones and Chargers	0.0%	0.0%	0.1%
Central Processing Units/Peripherals	0.5%	0.0%	1.3%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	2.0%	0.8%	3.1%
HHMS	**0.4%**	**0.1%**	**0.7%**
Automotive Products	0.1%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.1%	0.0%	0.2%
Other Batteries	0.2%	0.0%	0.4%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.1%
Other	**12.2%**	**9.1%**	**15.2%**
Other Organics	2.5%	1.3%	3.6%
Other Inorganics	1.9%	0.2%	3.6%
Other C&D	0.6%	0.1%	1.0%
Other Durables	3.0%	0.7%	5.4%
Other HHM	0.2%	0.0%	0.4%
Fines	3.9%	1.9%	5.9%
Other	0.2%	0.0%	0.3%
Totals	**100.0%**		
Sample Count	**23**	**Conf.**	**90%**

South Central Iowa Solid Waste Agency 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound	Estimated Tons
Paper	**29.8%**	**24.0% -**	**35.6%**	**8,141**
Compostable Paper	3.6%	2.1% -	5.2%	993
High Grade Office Paper	1.2%	0.2% -	2.2%	325
Magazines/Catalogs	0.6%	0.3% -	1.0%	175
Mixed Recyclable Paper	4.2%	2.0% -	6.4%	1,144
Newsprint	0.7%	0.3% -	1.0%	181
Non-Recyclable Paper	5.5%	2.2% -	8.8%	1,504
OCC and Kraft Paper	13.9%	8.4% -	19.5%	3,806
Aseptic/Gable Top Containers	0.0%	0.0% -	0.1%	13
Metal	**5.2%**	**2.9% -**	**7.5%**	**1,425**
Aluminum Beverage Containers	0.0%	0.0% -	0.0%	4
Aluminum IA Deposit Beverage Containers	0.1%	0.1% -	0.1%	27
Ferrous Food and Beverage Containers	0.2%	0.1% -	0.3%	53
Other Aluminum Containers	0.1%	0.0% -	0.1%	23
Other Ferrous Scrap Metals	3.5%	1.7% -	5.3%	949
Other Non-Ferrous Scrap Metals	1.4%	0.0% -	2.9%	370
Glass	**2.0%**	**0.1% -**	**3.8%**	**533**
Blue Glass	0.0%	0.0% -	0.0%	0
Brown Glass	0.0%	0.0% -	0.0%	1
Clear Glass	0.1%	0.1% -	0.2%	39
Glass Deposit Containers	0.1%	0.0% -	0.2%	39
Green Glass	0.0%	0.0% -	0.0%	0
Other Mixed Cullet	1.7%	0.0% -	3.5%	454
Organic	**16.2%**	**10.1% -**	**22.3%**	**4,425**
Yard Waste	1.0%	0.0% -	1.9%	269
Food Waste	10.5%	5.7% -	15.4%	2,877
Textiles and Leather	2.3%	0.8% -	3.8%	633
Diapers	1.1%	0.4% -	1.9%	314
Rubber	1.2%	0.3% -	2.2%	332
C&D	**16.7%**	**10.2% -**	**23.1%**	**4,551**
Wood – Untreated	9.8%	5.2% -	14.4%	2,679
Wood – Treated	3.0%	0.8% -	5.2%	809
Asphalt Pavement, Brick, Rock, and Concrete	0.1%	0.0% -	0.4%	39
Asphalt Roofing	1.4%	0.0% -	3.2%	388
Drywall/Gypsum Board	0.4%	0.0% -	1.1%	109
Carpet and Carpet Padding	1.9%	0.0% -	4.0%	527

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**16.4%**	**12.1% -**	**20.7%**
#1 PET IA Deposit Beverage Containers	0.1%	0.0% -	0.2%
#1 PET Beverage Containers	0.3%	0.2% -	0.4%
#2 HDPE Containers Natural	0.1%	0.1% -	0.2%
#2 HDPE Containers Colored	0.2%	0.1% -	0.2%
Retail Shopping Bags	0.1%	0.1% -	0.2%
Other Film Plastic	7.2%	4.6% -	9.8%
Other #1 PET Containers	0.1%	0.1% -	0.2%
Plastic Containers #3-#7	0.4%	0.2% -	0.6%
Other plastic Containers	0.4%	0.1% -	0.7%
Expanded Polystyrene	0.3%	0.2% -	0.5%
Other Plastic Products	7.0%	4.4% -	9.6%
Durable	**1.2%**	**0.3% -**	**2.1%**
Cell Phones and Chargers	0.0%	0.0% -	0.0%
Central Processing Units/Peripherals	0.2%	0.0% -	0.6%
Computer Monitors/T.V.s	0.4%	0.0% -	1.0%
Electrical and Household Appliances	0.6%	0.0% -	1.2%
HHMS	**0.1%**	**0.0% -**	**0.1%**
Automotive Products	0.0%	0.0% -	0.1%
Household Cleaners	0.0%	0.0% -	0.0%
Lead Acid Batteries	0.0%	0.0% -	0.0%
Mercury Container Products	0.0%	0.0% -	0.0%
Other Batteries	0.0%	0.0% -	0.0%
Paints and Solvents	0.0%	0.0% -	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0% -	0.0%
Sharps	0.0%	0.0% -	0.0%
Prescription Medications	0.0%	0.0% -	0.0%
Other	**12.6%**	**6.4% -**	**18.7%**
Other Organics	1.0%	0.2% -	1.8%
Other Inorganics	0.5%	0.0% -	1.3%
Other C&D	4.1%	0.0% -	8.2%
Other Durables	2.5%	0.6% -	4.4%
Other HHM	0.0%	0.0% -	0.0%
Fines	3.2%	0.8% -	5.6%
Other	1.2%	0.0% -	3.1%
Totals	**100.0%**		
Sample Count	**27**	**Conf.**	**90%**

South Central Iowa Solid Waste Agency 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**18.7%**	**Plastic**	**11.4%**
Compostable Paper	3.1%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.6%	#1 PET Beverage Containers	0.3%
Magazines/Catalogs	0.9%	#2 HDPE Containers Natural	0.2%
Mixed Recyclable Paper	3.2%	#2 HDPE Containers Colored	0.2%
Newsprint	1.3%	Retail Shopping Bags	0.2%
Non-Recyclable Paper	2.6%	Other Film Plastic	4.0%
OCC and Kraft Paper	6.9%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.1%	Plastic Containers #3-#7	0.4%
		Other plastic Containers	0.4%
Metal	**3.9%**	Expanded Polystyrene	0.3%
Aluminum Beverage Containers	0.0%	Other Plastic Products	5.1%
Aluminum IA Deposit Beverage Containers	0.1%		
Ferrous Food and Beverage Containers	0.4%	**Durable**	**1.3%**
Other Aluminum Containers	0.1%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	2.1%	Central Processing Units/Peripherals	0.3%
Other Non-Ferrous Scrap Metals	1.1%	Computer Monitors/T.V.s	0.1%
		Electrical and Household Appliances	0.9%
Glass	**1.4%**		
Blue Glass	0.0%	**HHMS**	**0.2%**
Brown Glass	0.0%	Automotive Products	0.0%
Clear Glass	0.3%	Household Cleaners	0.0%
Glass Deposit Containers	0.3%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.8%	Other Batteries	0.1%
		Paints and Solvents	0.0%
Organic	**17.9%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	2.3%	Sharps	0.0%
Food Waste	9.2%	Prescription Medications	0.0%
Textiles and Leather	3.9%		
Diapers	1.4%	**Other**	**11.5%**
Rubber	1.1%	Other Organics	1.2%
		Other Inorganics	0.8%
C&D	**33.7%**	Other C&D	1.8%
Wood – Untreated	4.4%	Other Durables	2.0%
Wood – Treated	2.8%	Other HHM	0.1%
Asphalt Pavement, Brick, Rock, and Concrete	0.3%	Fines	2.6%
Asphalt Roofing	0.6%	Other	0.5%
Drywall/Gypsum Board	0.3%	Special Waste	2.4%
Carpet and Carpet Padding	1.0%		
Mixed C&D	24.2%	**Totals**	**100%**

METRO WASTE AUTHORITY

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Metro Waste Authority 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**25.2%**	**21.7%**	**28.7%**
Compostable Paper	6.8%	5.3%	8.3%
High Grade Office Paper	1.2%	0.6%	1.8%
Magazines/Catalogs	1.3%	0.9%	1.7%
Mixed Recyclable Paper	3.1%	2.5%	3.7%
Newsprint	1.4%	0.9%	1.9%
Non-Recyclable Paper	1.3%	1.0%	1.6%
OCC and Kraft Paper	9.8%	6.6%	13.0%
Aseptic/Gable Top Containers	0.3%	0.2%	0.5%
Metal	**5.2%**	**2.5%**	**7.9%**
Aluminum Beverage Containers	0.1%	0.0%	0.1%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.3%
Ferrous Food and Beverage Containers	0.6%	0.4%	0.9%
Other Aluminum Containers	0.3%	0.1%	0.5%
Other Ferrous Scrap Metals	1.8%	0.9%	2.6%
Other Non-Ferrous Scrap Metals	2.2%	0.0%	4.8%
Glass	**1.3%**	**1.0%**	**1.6%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.2%
Clear Glass	0.5%	0.3%	0.6%
Glass Deposit Containers	0.2%	0.1%	0.3%
Green Glass	0.1%	0.0%	0.1%
Other Mixed Cullet	0.5%	0.3%	0.7%
Organic	**25.1%**	**21.9%**	**28.3%**
Yard Waste	5.2%	4.0%	6.3%
Food Waste	13.1%	10.2%	16.0%
Textiles and Leather	3.7%	2.6%	4.8%
Diapers	2.2%	1.5%	2.8%
Rubber	1.0%	0.1%	1.9%
C&D	**14.5%**	**10.0%**	**18.9%**
Wood – Untreated	7.8%	4.1%	11.5%
Wood – Treated	2.3%	1.2%	3.3%
Asphalt Pavement, Brick, Rock, and Concrete	0.6%	0.3%	0.9%
Asphalt Roofing	1.1%	0.0%	2.8%
Drywall/Gypsum Board	1.0%	0.0%	2.0%
Carpet and Carpet Padding	1.7%	0.5%	2.8%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**17.7%**	**14.3%**	**21.2%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.1%
#1 PET Beverage Containers	0.5%	0.4%	0.6%
#2 HDPE Containers Natural	0.2%	0.2%	0.3%
#2 HDPE Containers Colored	0.4%	0.2%	0.5%
Retail Shopping Bags	0.2%	0.1%	0.2%
Other Film Plastic	6.5%	5.3%	7.7%
Other #1 PET Containers	0.3%	0.2%	0.4%
Plastic Containers #3-#7	0.6%	0.4%	0.7%
Other plastic Containers	1.8%	0.0%	3.8%
Expanded Polystyrene	2.1%	0.0%	4.8%
Other Plastic Products	5.2%	3.1%	7.3%
Durable	**2.6%**	**0.8%**	**4.4%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.4%	0.0%	0.8%
Computer Monitors/T.V.s	0.2%	0.0%	0.6%
Electrical and Household Appliances	2.0%	0.6%	3.4%
HHMS	**0.2%**	**0.0%**	**0.3%**
Automotive Products	0.1%	0.0%	0.2%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.0%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**8.2%**	**6.7%**	**9.7%**
Other Organics	3.0%	2.3%	3.6%
Other Inorganics	0.1%	0.0%	0.2%
Other C&D	0.2%	0.1%	0.3%
Other Durables	1.0%	0.0%	2.1%
Other HHM	0.0%	0.0%	0.0%
Fines	3.5%	2.7%	4.3%
Other	0.4%	0.0%	1.2%
Totals	**100.0%**		
Sample Count	**50**	**Conf.**	**90%**

Metro Waste Authority 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound		Upper Bound
Paper	**19.6%**	**17.4%**	**-**	**21.8%**
Compostable Paper	7.1%	6.1%	-	8.2%
High Grade Office Paper	0.5%	0.2%	-	0.7%
Magazines/Catalogs	1.6%	1.1%	-	2.0%
Mixed Recyclable Paper	3.8%	3.1%	-	4.5%
Newsprint	1.5%	1.2%	-	1.8%
Non-Recyclable Paper	1.5%	1.0%	-	1.9%
OCC and Kraft Paper	3.4%	2.4%	-	4.4%
Aseptic/Gable Top Containers	0.2%	0.1%	-	0.3%
Metal	**4.6%**	**2.9%**	**-**	**6.4%**
Aluminum Beverage Containers	0.1%	0.0%	-	0.1%
Aluminum IA Deposit Beverage Containers	0.3%	0.2%	-	0.5%
Ferrous Food and Beverage Containers	0.8%	0.6%	-	0.9%
Other Aluminum Containers	0.3%	0.1%	-	0.5%
Other Ferrous Scrap Metals	2.3%	0.6%	-	4.0%
Other Non-Ferrous Scrap Metals	0.9%	0.5%	-	1.3%
Glass	**1.9%**	**1.5%**	**-**	**2.3%**
Blue Glass	0.0%	0.0%	-	0.0%
Brown Glass	0.1%	0.0%	-	0.2%
Clear Glass	0.6%	0.4%	-	0.8%
Glass Deposit Containers	0.4%	0.2%	-	0.5%
Green Glass	0.0%	0.0%	-	0.1%
Other Mixed Cullet	0.8%	0.5%	-	1.1%
Organic	**33.3%**	**29.3%**	**-**	**37.3%**
Yard Waste	9.9%	7.7%	-	12.1%
Food Waste	13.9%	10.5%	-	17.3%
Textiles and Leather	5.2%	4.1%	-	6.3%
Diapers	3.8%	2.6%	-	5.0%
Rubber	0.5%	0.0%	-	1.1%
C&D	**9.9%**	**5.5%**	**-**	**14.2%**
Wood – Untreated	3.0%	1.6%	-	4.4%
Wood – Treated	3.1%	1.3%	-	4.9%
Asphalt Pavement, Brick, Rock, and Concrete	1.1%	0.5%	-	1.8%
Asphalt Roofing	0.3%	0.0%	-	0.7%
Drywall/Gypsum Board	0.4%	0.0%	-	0.9%
Carpet and Carpet Padding	2.0%	0.5%	-	3.5%

Material	Estimated Percent	Lower Bound		Upper Bound
Plastic	**14.9%**	**12.9%**	**-**	**17.0%**
#1 PET IA Deposit Beverage Containers	0.1%	0.0%	-	0.1%
#1 PET Beverage Containers	0.7%	0.6%	-	0.8%
#2 HDPE Containers Natural	0.2%	0.2%	-	0.3%
#2 HDPE Containers Colored	0.5%	0.4%	-	0.7%
Retail Shopping Bags	0.3%	0.1%	-	0.5%
Other Film Plastic	6.7%	5.5%	-	7.9%
Other #1 PET Containers	0.4%	0.3%	-	0.5%
Plastic Containers #3-#7	0.8%	0.5%	-	1.0%
Other plastic Containers	0.8%	0.4%	-	1.2%
Expanded Polystyrene	0.7%	0.2%	-	1.1%
Other Plastic Products	3.8%	2.9%	-	4.7%
Durable	**3.4%**	**0.3%**	**-**	**6.4%**
Cell Phones and Chargers	0.0%	0.0%	-	0.0%
Central Processing Units/Peripherals	0.8%	0.0%	-	1.9%
Computer Monitors/T.V.s	0.0%	0.0%	-	0.0%
Electrical and Household Appliances	2.5%	0.1%	-	4.9%
HHMS	**0.3%**	**0.0%**	**-**	**0.7%**
Automotive Products	0.2%	0.0%	-	0.6%
Household Cleaners	0.0%	0.0%	-	0.0%
Lead Acid Batteries	0.0%	0.0%	-	0.0%
Mercury Container Products	0.0%	0.0%	-	0.0%
Other Batteries	0.0%	0.0%	-	0.1%
Paints and Solvents	0.0%	0.0%	-	0.1%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	-	0.0%
Sharps	0.0%	0.0%	-	0.0%
Prescription Medications	0.0%	0.0%	-	0.0%
Other	**12.2%**	**9.8%**	**-**	**14.7%**
Other Organics	5.3%	4.2%	-	6.4%
Other Inorganics	0.1%	0.0%	-	0.3%
Other C&D	0.2%	0.0%	-	0.3%
Other Durables	2.2%	0.0%	-	4.9%
Other HHM	0.0%	0.0%	-	0.0%
Fines	4.4%	3.9%	-	4.9%
Other	0.0%	0.0%	-	0.0%
Totals	**100.0%**			
Sample Count	**22**	**Conf.**		**90%**

Metro Waste Authority 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**29.6%**	**23.5%**	**35.7%**
Compostable Paper	6.6%	4.0%	9.1%
High Grade Office Paper	1.7%	0.7%	2.8%
Magazines/Catalogs	1.0%	0.4%	1.7%
Mixed Recyclable Paper	2.6%	1.7%	3.5%
Newsprint	1.3%	0.5%	2.2%
Non-Recyclable Paper	1.2%	0.7%	1.7%
OCC and Kraft Paper	14.8%	9.2%	20.5%
Aseptic/Gable Top Containers	0.4%	0.1%	0.7%
Metal	**5.6%**	**1.0%**	**10.3%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.2%
Ferrous Food and Beverage Containers	0.5%	0.1%	1.0%
Other Aluminum Containers	0.3%	0.0%	0.6%
Other Ferrous Scrap Metals	1.4%	0.6%	2.1%
Other Non-Ferrous Scrap Metals	3.2%	0.0%	7.9%
Glass	**0.9%**	**0.4%**	**1.3%**
Blue Glass	0.0%	0.0%	0.1%
Brown Glass	0.1%	0.0%	0.1%
Clear Glass	0.4%	0.2%	0.6%
Glass Deposit Containers	0.0%	0.0%	0.0%
Green Glass	0.1%	0.0%	0.1%
Other Mixed Cullet	0.3%	0.0%	0.5%
Organic	**18.7%**	**13.9%**	**23.5%**
Yard Waste	1.4%	0.3%	2.5%
Food Waste	12.5%	8.1%	17.0%
Textiles and Leather	2.5%	0.8%	4.2%
Diapers	0.9%	0.3%	1.5%
Rubber	1.3%	0.0%	2.9%
C&D	**18.1%**	**10.9%**	**25.3%**
Wood – Untreated	11.6%	5.2%	18.1%
Wood – Treated	1.6%	0.4%	2.8%
Asphalt Pavement, Brick, Rock, and Concrete	0.2%	0.0%	0.5%
Asphalt Roofing	1.8%	0.0%	4.7%
Drywall/Gypsum Board	1.5%	0.0%	3.3%
Carpet and Carpet Padding	1.5%	0.0%	3.1%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**20.0%**	**14.1%**	**25.8%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.3%	0.1%	0.5%
#2 HDPE Containers Natural	0.2%	0.1%	0.4%
#2 HDPE Containers Colored	0.2%	0.1%	0.3%
Retail Shopping Bags	0.1%	0.0%	0.1%
Other Film Plastic	6.4%	4.5%	8.2%
Other #1 PET Containers	0.2%	0.1%	0.4%
Plastic Containers #3-#7	0.4%	0.3%	0.6%
Other plastic Containers	2.5%	0.0%	6.2%
Expanded Polystyrene	3.3%	0.0%	8.0%
Other Plastic Products	6.3%	2.6%	9.9%
Durable	**2.0%**	**0.0%**	**4.0%**
Cell Phones and Chargers	0.0%	0.0%	0.1%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.4%	0.0%	1.0%
Electrical and Household Appliances	1.6%	0.0%	3.3%
HHMS	**0.1%**	**0.0%**	**0.1%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**5.1%**	**3.2%**	**6.9%**
Other Organics	1.1%	0.5%	1.7%
Other Inorganics	0.1%	0.0%	0.2%
Other C&D	0.2%	0.0%	0.4%
Other Durables	0.0%	0.0%	0.0%
Other HHM	0.0%	0.0%	0.0%
Fines	2.8%	1.4%	4.2%
Other	0.8%	0.0%	2.1%
Totals	**100.0%**		
Sample Count	**28**	**Conf.**	**90%**

Metro Waste Authority 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**19.9%**	**Plastic**	**14.0%**
Compostable Paper	5.4%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.9%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	1.0%	#2 HDPE Containers Natural	0.2%
Mixed Recyclable Paper	2.5%	#2 HDPE Containers Colored	0.3%
Newsprint	1.1%	Retail Shopping Bags	0.1%
Non-Recyclable Paper	1.0%	Other Film Plastic	5.1%
OCC and Kraft Paper	7.7%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.3%	Plastic Containers #3-#7	0.4%
		Other plastic Containers	1.4%
Metal	**4.1%**	Expanded Polystyrene	1.7%
Aluminum Beverage Containers	0.0%	Other Plastic Products	4.1%
Aluminum IA Deposit Beverage Containers	0.2%		
Ferrous Food and Beverage Containers	0.5%	**Durable**	**2.0%**
Other Aluminum Containers	0.2%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	1.4%	Central Processing Units/Peripherals	0.3%
Other Non-Ferrous Scrap Metals	1.7%	Computer Monitors/T.V.s	0.2%
		Electrical and Household Appliances	1.6%
Glass	**1.0%**		
Blue Glass	0.0%	**HHMS**	**0.1%**
Brown Glass	0.1%	Automotive Products	0.1%
Clear Glass	0.4%	Household Cleaners	0.0%
Glass Deposit Containers	0.1%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.4%	Other Batteries	0.0%
		Paints and Solvents	0.0%
Organic	**19.8%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	4.1%	Sharps	0.0%
Food Waste	10.4%	Prescription Medications	0.0%
Textiles and Leather	2.9%		
Diapers	1.7%	**Other**	**7.1%**
Rubber	0.8%	Other Organics	2.3%
		Other Inorganics	0.1%
C&D	**31.9%**	Other C&D	0.1%
Wood – Untreated	6.2%	Other Durables	0.8%
Wood – Treated	1.8%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	0.5%	Fines	2.8%
Asphalt Roofing	0.9%	Other	0.3%
Drywall/Gypsum Board	0.8%	Special Waste	0.6%
Carpet and Carpet Padding	1.3%		
Mixed C&D	20.5%	**Totals**	**100%**

CARROLL COUNTY SOLID WASTE COMMISSION

MidAtlantic Solid Waste Consultants
Cascadia Consulting Group
Foth Infrastructure & Environment

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Carroll County Solid Waste Commission 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**23.7%**	**20.3%** -	**27.1%**
Compostable Paper	4.6%	3.7% -	5.4%
High Grade Office Paper	1.0%	0.5% -	1.4%
Magazines/Catalogs	1.3%	0.9% -	1.6%
Mixed Recyclable Paper	4.4%	3.4% -	5.4%
Newsprint	1.9%	1.3% -	2.5%
Non-Recyclable Paper	3.0%	1.8% -	4.3%
OCC and Kraft Paper	7.5%	5.7% -	9.3%
Aseptic/Gable Top Containers	0.1%	0.1% -	0.1%
Metal	**3.5%**	**2.7%** -	**4.4%**
Aluminum Beverage Containers	0.0%	0.0% -	0.0%
Aluminum IA Deposit Beverage Containers	0.1%	0.1% -	0.2%
Ferrous Food and Beverage Containers	0.8%	0.5% -	1.1%
Other Aluminum Containers	0.2%	0.1% -	0.2%
Other Ferrous Scrap Metals	1.9%	1.2% -	2.6%
Other Non-Ferrous Scrap Metals	0.5%	0.2% -	0.9%
Glass	**1.5%**	**1.1%** -	**1.9%**
Blue Glass	0.0%	0.0% -	0.0%
Brown Glass	0.1%	0.0% -	0.2%
Clear Glass	0.4%	0.3% -	0.6%
Glass Deposit Containers	0.4%	0.2% -	0.6%
Green Glass	0.0%	0.0% -	0.0%
Other Mixed Cullet	0.6%	0.4% -	0.8%
Organic	**21.2%**	**17.5%** -	**24.9%**
Yard Waste	2.6%	1.4% -	3.9%
Food Waste	10.8%	8.3% -	13.3%
Textiles and Leather	3.7%	2.3% -	5.1%
Diapers	3.2%	2.0% -	4.4%
Rubber	0.9%	0.5% -	1.2%
C&D	**15.5%**	**10.1%** -	**20.9%**
Wood – Untreated	4.4%	2.5% -	6.3%
Wood – Treated	7.6%	3.1% -	12.2%
Asphalt Pavement, Brick, Rock, and Concrete	1.3%	0.4% -	2.2%
Asphalt Roofing	0.5%	0.0% -	1.1%
Drywall/Gypsum Board	0.4%	0.2% -	0.7%
Carpet and Carpet Padding	1.3%	0.2% -	2.3%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**12.6%**	**11.1%** -	**14.0%**
#1 PET IA Deposit Beverage Containers	0.2%	0.1% -	0.3%
#1 PET Beverage Containers	0.5%	0.4% -	0.6%
#2 HDPE Containers Natural	0.3%	0.2% -	0.5%
#2 HDPE Containers Colored	0.5%	0.3% -	0.6%
Retail Shopping Bags	0.2%	0.1% -	0.3%
Other Film Plastic	4.2%	3.6% -	4.8%
Other #1 PET Containers	0.3%	0.2% -	0.3%
Plastic Containers #3-#7	0.7%	0.5% -	0.9%
Other plastic Containers	0.6%	0.4% -	0.9%
Expanded Polystyrene	1.2%	1.0% -	1.4%
Other Plastic Products	3.9%	2.8% -	5.0%
Durable	**3.2%**	**1.5%** -	**4.9%**
Cell Phones and Chargers	0.1%	0.0% -	0.1%
Central Processing Units/Peripherals	0.7%	0.0% -	1.4%
Computer Monitors/T.V.s	0.5%	0.0% -	1.4%
Electrical and Household Appliances	1.9%	0.4% -	3.3%
HHMS	**0.8%**	**0.2%** -	**1.4%**
Automotive Products	0.4%	0.0% -	0.9%
Household Cleaners	0.0%	0.0% -	0.1%
Lead Acid Batteries	0.0%	0.0% -	0.0%
Mercury Container Products	0.0%	0.0% -	0.0%
Other Batteries	0.1%	0.0% -	0.2%
Paints and Solvents	0.2%	0.0% -	0.5%
Pesticides, Herbicides, Fungicides	0.0%	0.0% -	0.0%
Sharps	0.0%	0.0% -	0.0%
Prescription Medications	0.0%	0.0% -	0.0%
Other	**18.0%**	**12.5%** -	**23.5%**
Other Organics	9.2%	4.2% -	14.2%
Other Inorganics	0.2%	0.1% -	0.3%
Other C&D	0.8%	0.0% -	1.5%
Other Durables	3.3%	0.8% -	5.8%
Other HHM	0.1%	0.0% -	0.2%
Fines	2.4%	1.9% -	2.8%
Other	2.1%	0.0% -	4.7%
Totals	**100.0%**		
Sample Count	**50**	**Conf.**	**90%**

Carroll County Solid Waste Commission 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**21.0%**	**16.9%**	**25.1%**
Compostable Paper	3.8%	2.8%	4.9%
High Grade Office Paper	0.5%	0.1%	0.9%
Magazines/Catalogs	1.2%	0.7%	1.6%
Mixed Recyclable Paper	4.7%	3.1%	6.3%
Newsprint	2.3%	1.2%	3.3%
Non-Recyclable Paper	3.3%	1.6%	5.1%
OCC and Kraft Paper	5.0%	3.6%	6.5%
Aseptic/Gable Top Containers	0.1%	0.1%	0.2%
Metal	**4.4%**	**2.9%**	**5.9%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.2%
Ferrous Food and Beverage Containers	0.5%	0.4%	0.7%
Other Aluminum Containers	0.2%	0.2%	0.3%
Other Ferrous Scrap Metals	2.7%	1.4%	3.9%
Other Non-Ferrous Scrap Metals	0.8%	0.2%	1.5%
Glass	**1.8%**	**1.2%**	**2.5%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.2%	0.0%	0.3%
Clear Glass	0.4%	0.3%	0.6%
Glass Deposit Containers	0.5%	0.2%	0.7%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	0.8%	0.4%	1.1%
Organic	**22.3%**	**16.8%**	**27.8%**
Yard Waste	3.6%	1.5%	5.7%
Food Waste	10.0%	6.7%	13.2%
Textiles and Leather	4.5%	2.9%	6.0%
Diapers	3.7%	2.0%	5.3%
Rubber	0.5%	0.3%	0.8%
C&D	**16.8%**	**9.7%**	**23.9%**
Wood – Untreated	5.0%	2.1%	8.0%
Wood – Treated	6.6%	1.7%	11.5%
Asphalt Pavement, Brick, Rock, and Concrete	1.8%	0.1%	3.4%
Asphalt Roofing	1.0%	0.0%	2.1%
Drywall/Gypsum Board	0.1%	0.0%	0.3%
Carpet and Carpet Padding	2.3%	0.1%	4.5%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**12.7%**	**10.9%**	**14.4%**
#1 PET IA Deposit Beverage Containers	0.3%	0.1%	0.4%
#1 PET Beverage Containers	0.5%	0.3%	0.6%
#2 HDPE Containers Natural	0.3%	0.2%	0.4%
#2 HDPE Containers Colored	0.5%	0.3%	0.6%
Retail Shopping Bags	0.2%	0.1%	0.3%
Other Film Plastic	3.6%	2.8%	4.4%
Other #1 PET Containers	0.3%	0.2%	0.4%
Plastic Containers #3-#7	0.7%	0.4%	1.0%
Other plastic Containers	0.8%	0.3%	1.3%
Expanded Polystyrene	1.3%	1.1%	1.6%
Other Plastic Products	4.1%	2.8%	5.4%
Durable	**5.8%**	**2.4%**	**9.3%**
Cell Phones and Chargers	0.1%	0.0%	0.2%
Central Processing Units/Peripherals	1.3%	0.0%	2.8%
Computer Monitors/T.V.s	1.1%	0.0%	2.9%
Electrical and Household Appliances	3.3%	0.5%	6.2%
HHMS	**1.0%**	**0.0%**	**2.0%**
Automotive Products	0.7%	0.0%	1.7%
Household Cleaners	0.1%	0.0%	0.1%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.1%	0.2%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.1%
Other	**14.2%**	**9.4%**	**19.0%**
Other Organics	4.1%	2.2%	6.1%
Other Inorganics	0.2%	0.1%	0.3%
Other C&D	1.4%	0.0%	3.0%
Other Durables	6.0%	1.0%	11.0%
Other HHM	0.0%	0.0%	0.1%
Fines	2.4%	1.7%	3.0%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**		
Sample Count	**24**	**Conf.**	**90%**

Carroll County Solid Waste Commission 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**26.4%**	**21.0%**	**31.8%**
Compostable Paper	5.3%	3.9%	6.6%
High Grade Office Paper	1.3%	0.6%	2.1%
Magazines/Catalogs	1.4%	0.9%	1.9%
Mixed Recyclable Paper	4.1%	3.0%	5.3%
Newsprint	1.5%	0.9%	2.1%
Non-Recyclable Paper	2.7%	1.0%	4.5%
OCC and Kraft Paper	9.9%	6.7%	13.1%
Aseptic/Gable Top Containers	0.1%	0.0%	0.2%
Metal	**2.7%**	**1.8%**	**3.5%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.1%	0.1%	0.2%
Ferrous Food and Beverage Containers	1.0%	0.5%	1.6%
Other Aluminum Containers	0.1%	0.1%	0.1%
Other Ferrous Scrap Metals	1.2%	0.8%	1.5%
Other Non-Ferrous Scrap Metals	0.2%	0.1%	0.4%
Glass	**1.1%**	**0.7%**	**1.6%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.0%	0.0%	0.1%
Clear Glass	0.4%	0.2%	0.6%
Glass Deposit Containers	0.3%	0.1%	0.5%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	0.4%	0.2%	0.6%
Organic	**20.2%**	**15.1%**	**25.3%**
Yard Waste	1.7%	0.4%	3.0%
Food Waste	11.7%	7.9%	15.4%
Textiles and Leather	3.0%	0.7%	5.3%
Diapers	2.7%	0.9%	4.5%
Rubber	1.2%	0.5%	1.8%
C&D	**14.2%**	**6.0%**	**22.5%**
Wood – Untreated	3.8%	1.5%	6.1%
Wood – Treated	8.7%	1.1%	16.2%
Asphalt Pavement, Brick, Rock, and Concrete	0.8%	0.0%	1.6%
Asphalt Roofing	0.0%	0.0%	0.0%
Drywall/Gypsum Board	0.7%	0.2%	1.3%
Carpet and Carpet Padding	0.2%	0.0%	0.5%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**12.5%**	**10.1%**	**14.8%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.5%	0.3%	0.6%
#2 HDPE Containers Natural	0.4%	0.2%	0.6%
#2 HDPE Containers Colored	0.5%	0.3%	0.6%
Retail Shopping Bags	0.1%	0.0%	0.2%
Other Film Plastic	4.8%	3.8%	5.7%
Other #1 PET Containers	0.2%	0.1%	0.3%
Plastic Containers #3-#7	0.7%	0.5%	1.0%
Other plastic Containers	0.5%	0.2%	0.8%
Expanded Polystyrene	1.1%	0.8%	1.3%
Other Plastic Products	3.6%	1.9%	5.3%
Durable	**0.6%**	**0.1%**	**1.1%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.1%	0.0%	0.3%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	0.4%	0.0%	0.9%
HHMS	**0.7%**	**0.1%**	**1.3%**
Automotive Products	0.2%	0.0%	0.4%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.2%
Paints and Solvents	0.4%	0.0%	1.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**21.7%**	**11.8%**	**31.6%**
Other Organics	14.1%	4.5%	23.8%
Other Inorganics	0.2%	0.0%	0.4%
Other C&D	0.1%	0.0%	0.2%
Other Durables	0.6%	0.0%	1.6%
Other HHM	0.1%	0.0%	0.3%
Fines	2.4%	1.7%	3.0%
Other	4.2%	0.0%	9.3%
Totals	**100.0%**		
Sample Count	**26**	**Conf.**	**90%**

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Carroll County Solid Waste Commission 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**21.2%**	**Plastic**	**11.2%**
Compostable Paper	4.1%	#1 PET IA Deposit Beverage Containers	0.2%
High Grade Office Paper	0.8%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	1.2%	#2 HDPE Containers Natural	0.3%
Mixed Recyclable Paper	3.9%	#2 HDPE Containers Colored	0.4%
Newsprint	1.7%	Retail Shopping Bags	0.2%
Non-Recyclable Paper	2.7%	Other Film Plastic	3.8%
OCC and Kraft Paper	6.7%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.1%	Plastic Containers #3-#7	0.6%
		Other plastic Containers	0.6%
Metal	**3.2%**	Expanded Polystyrene	1.1%
Aluminum Beverage Containers	0.0%	Other Plastic Products	3.5%
Aluminum IA Deposit Beverage Containers	0.1%		
Ferrous Food and Beverage Containers	0.7%	**Durable**	**2.8%**
Other Aluminum Containers	0.1%	Cell Phones and Chargers	0.1%
Other Ferrous Scrap Metals	1.7%	Central Processing Units/Peripherals	0.6%
Other Non-Ferrous Scrap Metals	0.5%	Computer Monitors/T.V.s	0.5%
		Electrical and Household Appliances	1.7%
Glass	**1.3%**		
Blue Glass	0.0%	**HHMS**	**0.7%**
Brown Glass	0.1%	Automotive Products	0.4%
Clear Glass	0.4%	Household Cleaners	0.0%
Glass Deposit Containers	0.3%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.5%	Other Batteries	0.1%
		Paints and Solvents	0.2%
Organic	**18.9%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	2.3%	Sharps	0.0%
Food Waste	9.7%	Prescription Medications	0.0%
Textiles and Leather	3.3%		
Diapers	2.9%	**Other**	**17.1%**
Rubber	0.8%	Other Organics	8.2%
		Other Inorganics	0.2%
C&D	**23.5%**	Other C&D	0.7%
Wood – Untreated	3.9%	Other Durables	2.9%
Wood – Treated	6.8%	Other HHM	0.1%
Asphalt Pavement, Brick, Rock, and Concrete	1.1%	Fines	2.1%
Asphalt Roofing	0.4%	Other	1.9%
Drywall/Gypsum Board	0.4%	Special Waste	1.0%
Carpet and Carpet Padding	1.1%		
Mixed C&D	9.7%	**Totals**	**100%**

NORTHWEST IOWA AREA SOLID WASTE AGENCY

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Northwest Iowa Area Solid Waste Agency 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**32.3%**	**28.8%**	**35.8%**
Compostable Paper	5.1%	4.2%	6.1%
High Grade Office Paper	0.7%	0.4%	1.0%
Magazines/Catalogs	2.3%	1.6%	3.0%
Mixed Recyclable Paper	8.0%	7.0%	9.1%
Newsprint	2.6%	2.1%	3.0%
Non-Recyclable Paper	5.6%	2.5%	8.6%
OCC and Kraft Paper	7.9%	5.7%	10.1%
Aseptic/Gable Top Containers	0.1%	0.1%	0.2%
Metal	**4.3%**	**3.4%**	**5.3%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.4%	0.3%	0.5%
Ferrous Food and Beverage Containers	0.8%	0.6%	1.0%
Other Aluminum Containers	0.2%	0.1%	0.3%
Other Ferrous Scrap Metals	2.1%	1.4%	2.8%
Other Non-Ferrous Scrap Metals	0.8%	0.6%	1.1%
Glass	**2.4%**	**1.4%**	**3.3%**
Blue Glass	0.1%	0.0%	0.1%
Brown Glass	0.1%	0.1%	0.2%
Clear Glass	1.0%	0.7%	1.2%
Glass Deposit Containers	0.3%	0.2%	0.4%
Green Glass	0.1%	0.0%	0.1%
Other Mixed Cullet	0.9%	0.0%	1.7%
Organic	**25.7%**	**23.0%**	**28.4%**
Yard Waste	3.1%	2.2%	4.0%
Food Waste	16.0%	13.7%	18.3%
Textiles and Leather	3.0%	2.3%	3.8%
Diapers	2.6%	1.8%	3.5%
Rubber	0.9%	0.6%	1.3%
C&D	**9.6%**	**6.7%**	**12.6%**
Wood – Untreated	2.9%	1.5%	4.2%
Wood – Treated	1.7%	0.8%	2.5%
Asphalt Pavement, Brick, Rock, and Concrete	1.7%	0.4%	3.0%
Asphalt Roofing	0.8%	0.0%	1.7%
Drywall/Gypsum Board	0.2%	0.0%	0.3%
Carpet and Carpet Padding	2.4%	0.5%	4.4%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**15.1%**	**13.8%**	**16.5%**
#1 PET IA Deposit Beverage Containers	0.2%	0.2%	0.3%
#1 PET Beverage Containers	0.6%	0.5%	0.7%
#2 HDPE Containers Natural	0.4%	0.4%	0.5%
#2 HDPE Containers Colored	0.8%	0.7%	1.0%
Retail Shopping Bags	0.4%	0.3%	0.5%
Other Film Plastic	6.7%	5.9%	7.6%
Other #1 PET Containers	0.3%	0.2%	0.3%
Plastic Containers #3-#7	1.2%	0.9%	1.5%
Other plastic Containers	0.4%	0.2%	0.5%
Expanded Polystyrene	1.3%	0.4%	2.3%
Other Plastic Products	2.7%	2.0%	3.4%
Durable	**1.8%**	**0.9%**	**2.6%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.1%	0.0%	0.3%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	1.6%	0.8%	2.5%
HHMS	**0.5%**	**0.2%**	**0.8%**
Automotive Products	0.1%	0.0%	0.4%
Household Cleaners	0.1%	0.0%	0.1%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.1%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.2%	0.0%	0.3%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.1%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**8.2%**	**6.4%**	**10.0%**
Other Organics	2.8%	2.1%	3.6%
Other Inorganics	0.1%	0.0%	0.1%
Other C&D	1.7%	0.5%	2.9%
Other Durables	0.7%	0.0%	1.6%
Other HHM	0.0%	0.0%	0.0%
Fines	2.7%	2.3%	3.2%
Other	0.2%	0.0%	0.5%
Totals	**100.0%**		
Sample Count	**52**	**Conf.**	**90%**

Northwest Iowa Area Solid Waste Agency 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**26.2%**	**23.5%**	**29.0%**
Compostable Paper	5.1%	4.3%	5.9%
High Grade Office Paper	0.6%	0.3%	0.8%
Magazines/Catalogs	3.0%	1.9%	4.0%
Mixed Recyclable Paper	9.1%	8.0%	10.2%
Newsprint	3.0%	2.6%	3.5%
Non-Recyclable Paper	0.9%	0.7%	1.2%
OCC and Kraft Paper	4.4%	3.1%	5.7%
Aseptic/Gable Top Containers	0.1%	0.1%	0.2%
Metal	**4.6%**	**3.6%**	**5.6%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.5%	0.3%	0.7%
Ferrous Food and Beverage Containers	1.1%	0.8%	1.4%
Other Aluminum Containers	0.1%	0.1%	0.2%
Other Ferrous Scrap Metals	1.8%	1.0%	2.6%
Other Non-Ferrous Scrap Metals	1.1%	0.7%	1.5%
Glass	**2.5%**	**2.0%**	**3.0%**
Blue Glass	0.1%	0.0%	0.2%
Brown Glass	0.2%	0.1%	0.3%
Clear Glass	1.4%	1.1%	1.7%
Glass Deposit Containers	0.4%	0.3%	0.6%
Green Glass	0.1%	0.0%	0.1%
Other Mixed Cullet	0.3%	0.1%	0.5%
Organic	**31.4%**	**28.4%**	**34.5%**
Yard Waste	4.4%	3.0%	5.7%
Food Waste	18.6%	16.5%	20.6%
Textiles and Leather	3.7%	2.7%	4.7%
Diapers	3.7%	2.3%	5.0%
Rubber	1.1%	0.6%	1.6%
C&D	**8.4%**	**5.1%**	**11.8%**
Wood – Untreated	1.2%	0.8%	1.7%
Wood – Treated	1.8%	0.9%	2.7%
Asphalt Pavement, Brick, Rock, and Concrete	1.0%	0.1%	2.0%
Asphalt Roofing	0.1%	0.0%	0.2%
Drywall/Gypsum Board	0.3%	0.1%	0.6%
Carpet and Carpet Padding	4.0%	0.8%	7.2%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**14.3%**	**13.0%**	**15.7%**
#1 PET IA Deposit Beverage Containers	0.3%	0.2%	0.4%
#1 PET Beverage Containers	0.8%	0.6%	0.9%
#2 HDPE Containers Natural	0.6%	0.4%	0.7%
#2 HDPE Containers Colored	1.0%	0.8%	1.2%
Retail Shopping Bags	0.4%	0.3%	0.6%
Other Film Plastic	6.0%	5.4%	6.7%
Other #1 PET Containers	0.4%	0.2%	0.5%
Plastic Containers #3-#7	1.3%	1.0%	1.6%
Other plastic Containers	0.5%	0.3%	0.7%
Expanded Polystyrene	0.9%	0.5%	1.3%
Other Plastic Products	2.1%	1.4%	2.8%
Durable	**2.0%**	**0.9%**	**3.1%**
Cell Phones and Chargers	0.0%	0.0%	0.1%
Central Processing Units/Peripherals	0.2%	0.0%	0.4%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	1.8%	0.8%	2.9%
HHMS	**0.5%**	**0.1%**	**0.9%**
Automotive Products	0.2%	0.0%	0.6%
Household Cleaners	0.1%	0.0%	0.1%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.1%	0.1%
Paints and Solvents	0.1%	0.0%	0.2%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**10.0%**	**7.3%**	**12.6%**
Other Organics	3.6%	2.6%	4.7%
Other Inorganics	0.1%	0.0%	0.2%
Other C&D	1.9%	0.0%	3.7%
Other Durables	1.1%	0.0%	2.7%
Other HHM	0.0%	0.0%	0.0%
Fines	3.3%	2.7%	3.8%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**		
Sample Count	**31**	**Conf.**	**90%**

Northwest Iowa Area Solid Waste Agency 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**41.6%**	**33.8%**	**49.3%**
Compostable Paper	5.1%	3.0%	7.2%
High Grade Office Paper	0.9%	0.4%	1.5%
Magazines/Catalogs	1.3%	0.4%	2.3%
Mixed Recyclable Paper	6.4%	4.3%	8.4%
Newsprint	1.9%	1.0%	2.8%
Non-Recyclable Paper	12.6%	5.0%	20.2%
OCC and Kraft Paper	13.2%	7.9%	18.4%
Aseptic/Gable Top Containers	0.2%	0.0%	0.3%
Metal	**3.9%**	**2.2%**	**5.6%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.3%
Ferrous Food and Beverage Containers	0.4%	0.2%	0.5%
Other Aluminum Containers	0.2%	0.1%	0.4%
Other Ferrous Scrap Metals	2.6%	1.2%	3.9%
Other Non-Ferrous Scrap Metals	0.5%	0.2%	0.9%
Glass	**2.2%**	**0.0%**	**4.4%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.1%
Clear Glass	0.3%	0.1%	0.5%
Glass Deposit Containers	0.1%	0.0%	0.1%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	1.7%	0.0%	3.9%
Organic	**17.0%**	**11.9%**	**22.2%**
Yard Waste	1.2%	0.3%	2.0%
Food Waste	12.2%	7.3%	17.1%
Textiles and Leather	2.0%	0.8%	3.2%
Diapers	1.1%	0.5%	1.7%
Rubber	0.6%	0.3%	1.0%
C&D	**11.5%**	**6.1%**	**16.9%**
Wood – Untreated	5.3%	2.1%	8.6%
Wood – Treated	1.4%	0.0%	3.1%
Asphalt Pavement, Brick, Rock, and Concrete	2.7%	0.0%	5.6%
Asphalt Roofing	1.8%	0.0%	4.0%
Drywall/Gypsum Board	0.0%	0.0%	0.0%
Carpet and Carpet Padding	0.1%	0.0%	0.3%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**16.4%**	**13.8%**	**18.9%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.4%	0.2%	0.5%
#2 HDPE Containers Natural	0.3%	0.2%	0.4%
#2 HDPE Containers Colored	0.6%	0.4%	0.9%
Retail Shopping Bags	0.3%	0.2%	0.4%
Other Film Plastic	7.8%	5.8%	9.8%
Other #1 PET Containers	0.1%	0.1%	0.2%
Plastic Containers #3-#7	1.0%	0.4%	1.5%
Other plastic Containers	0.2%	0.1%	0.3%
Expanded Polystyrene	2.0%	0.0%	4.2%
Other Plastic Products	3.6%	2.1%	5.1%
Durable	**1.4%**	**0.1%**	**2.7%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	1.4%	0.1%	2.7%
HHMS	**0.6%**	**0.0%**	**1.2%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.1%	0.0%	0.1%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.1%	0.0%	0.2%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.3%	0.0%	0.6%
Pesticides, Herbicides, Fungicides	0.1%	0.0%	0.2%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.1%
Other	**5.5%**	**3.6%**	**7.3%**
Other Organics	1.6%	0.6%	2.6%
Other Inorganics	0.0%	0.0%	0.0%
Other C&D	1.5%	0.4%	2.6%
Other Durables	0.0%	0.0%	0.0%
Other HHM	0.0%	0.0%	0.0%
Fines	1.9%	1.2%	2.6%
Other	0.4%	0.0%	1.1%
Totals	**100.0%**		
Sample Count	**21**	**Conf.**	**90%**

Northwest Iowa Area Solid Waste Agency 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**18.0%**	**Plastic**	**8.4%**
Compostable Paper	2.9%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.4%	#1 PET Beverage Containers	0.3%
Magazines/Catalogs	1.3%	#2 HDPE Containers Natural	0.2%
Mixed Recyclable Paper	4.5%	#2 HDPE Containers Colored	0.5%
Newsprint	1.4%	Retail Shopping Bags	0.2%
Non-Recyclable Paper	3.1%	Other Film Plastic	3.8%
OCC and Kraft Paper	4.4%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.1%	Plastic Containers #3-#7	0.7%
		Other plastic Containers	0.2%
Metal	**2.4%**	Expanded Polystyrene	0.7%
Aluminum Beverage Containers	0.0%	Other Plastic Products	1.5%
Aluminum IA Deposit Beverage Containers	0.2%		
Ferrous Food and Beverage Containers	0.4%	**Durable**	**1.0%**
Other Aluminum Containers	0.1%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	1.2%	Central Processing Units/Peripherals	0.1%
Other Non-Ferrous Scrap Metals	0.5%	Computer Monitors/T.V.s	0.0%
		Electrical and Household Appliances	0.9%
Glass	**1.3%**		
Blue Glass	0.0%	**HHMS**	**0.3%**
Brown Glass	0.1%	Automotive Products	0.1%
Clear Glass	0.5%	Household Cleaners	0.0%
Glass Deposit Containers	0.2%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.5%	Other Batteries	0.0%
		Paints and Solvents	0.1%
Organic	**14.3%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	1.7%	Sharps	0.0%
Food Waste	8.9%	Prescription Medications	0.0%
Textiles and Leather	1.7%		
Diapers	1.5%	**Other**	**18.0%**
Rubber	0.5%	Other Organics	1.6%
		Other Inorganics	0.0%
C&D	**36.3%**	Other C&D	1.0%
Wood – Untreated	1.6%	Other Durables	0.4%
Wood – Treated	0.9%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	1.0%	Fines	1.5%
Asphalt Roofing	0.4%	Other	0.1%
Drywall/Gypsum Board	0.1%	Special Waste	13.4%
Carpet and Carpet Padding	1.4%		
Mixed C&D	30.9%	**Totals**	**100%**

IOWA CITY LANDFILL

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Iowa City Landfill 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**27.5%**	**24.0%**	**30.9%**
Compostable Paper	6.4%	5.2%	7.6%
High Grade Office Paper	0.4%	0.2%	0.5%
Magazines/Catalogs	0.8%	0.3%	1.2%
Mixed Recyclable Paper	3.7%	2.9%	4.5%
Newsprint	1.7%	1.1%	2.4%
Non-Recyclable Paper	4.3%	1.0%	7.6%
OCC and Kraft Paper	10.1%	7.9%	12.3%
Aseptic/Gable Top Containers	0.1%	0.1%	0.2%
Metal	**4.5%**	**2.9%**	**6.1%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.1%	0.1%	0.2%
Ferrous Food and Beverage Containers	0.5%	0.3%	0.6%
Other Aluminum Containers	0.3%	0.2%	0.4%
Other Ferrous Scrap Metals	3.0%	1.6%	4.5%
Other Non-Ferrous Scrap Metals	0.6%	0.2%	1.0%
Glass	**1.7%**	**1.0%**	**2.4%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.3%	0.0%	0.5%
Clear Glass	0.6%	0.4%	0.8%
Glass Deposit Containers	0.0%	0.0%	0.1%
Green Glass	0.1%	0.0%	0.2%
Other Mixed Cullet	0.7%	0.1%	1.3%
Organic	**25.4%**	**21.4%**	**29.5%**
Yard Waste	3.5%	1.5%	5.5%
Food Waste	14.8%	11.6%	18.0%
Textiles and Leather	3.9%	2.3%	5.5%
Diapers	2.5%	1.6%	3.4%
Rubber	0.7%	0.3%	1.1%
C&D	**8.7%**	**5.7%**	**11.6%**
Wood – Untreated	2.5%	1.3%	3.7%
Wood – Treated	3.7%	2.2%	5.2%
Asphalt Pavement, Brick, Rock, and Concrete	0.1%	0.0%	0.3%
Asphalt Roofing	0.3%	0.0%	0.7%
Drywall/Gypsum Board	0.8%	0.0%	1.8%
Carpet and Carpet Padding	1.2%	0.0%	2.3%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**21.3%**	**17.5%**	**25.1%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.1%
#1 PET Beverage Containers	0.4%	0.3%	0.5%
#2 HDPE Containers Natural	0.3%	0.2%	0.4%
#2 HDPE Containers Colored	0.3%	0.2%	0.3%
Retail Shopping Bags	0.3%	0.2%	0.5%
Other Film Plastic	9.3%	6.0%	12.6%
Other #1 PET Containers	0.2%	0.1%	0.3%
Plastic Containers #3-#7	0.7%	0.6%	0.9%
Other plastic Containers	0.5%	0.2%	0.8%
Expanded Polystyrene	0.7%	0.4%	1.1%
Other Plastic Products	8.4%	5.8%	11.0%
Durable	**1.0%**	**0.2%**	**1.8%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.3%	0.0%	0.8%
Electrical and Household Appliances	0.7%	0.0%	1.3%
HHMS	**0.1%**	**0.1%**	**0.2%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.0%	0.0%	0.0%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.1%
Other	**9.8%**	**7.3%**	**12.2%**
Other Organics	1.6%	1.1%	2.2%
Other Inorganics	0.4%	0.0%	1.1%
Other C&D	2.0%	0.8%	3.3%
Other Durables	2.7%	1.0%	4.5%
Other HHM	0.1%	0.0%	0.2%
Fines	2.4%	1.4%	3.3%
Other	0.4%	0.1%	0.8%
Totals	**100.0%**		
Sample Count	**54**	**Conf.**	**90%**

Iowa City Landfill 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**18.5%**	**14.8%**	**22.3%**
Compostable Paper	5.1%	3.7%	6.4%
High Grade Office Paper	0.5%	0.2%	0.7%
Magazines/Catalogs	1.6%	0.4%	2.8%
Mixed Recyclable Paper	4.3%	3.1%	5.4%
Newsprint	1.8%	0.9%	2.6%
Non-Recyclable Paper	0.6%	0.4%	0.8%
OCC and Kraft Paper	4.6%	3.0%	6.3%
Aseptic/Gable Top Containers	0.1%	0.1%	0.2%
Metal	**8.5%**	**4.6%**	**12.4%**
Aluminum Beverage Containers	0.0%	0.0%	0.1%
Aluminum IA Deposit Beverage Containers	0.3%	0.1%	0.5%
Ferrous Food and Beverage Containers	0.5%	0.3%	0.7%
Other Aluminum Containers	0.3%	0.2%	0.5%
Other Ferrous Scrap Metals	7.1%	3.0%	11.1%
Other Non-Ferrous Scrap Metals	0.2%	0.1%	0.4%
Glass	**3.3%**	**1.4%**	**5.2%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.3%	0.1%	0.4%
Clear Glass	0.8%	0.4%	1.2%
Glass Deposit Containers	0.1%	0.0%	0.1%
Green Glass	0.2%	0.0%	0.5%
Other Mixed Cullet	1.9%	0.0%	3.7%
Organic	**29.7%**	**22.2%**	**37.2%**
Yard Waste	7.3%	2.3%	12.4%
Food Waste	12.3%	8.7%	15.9%
Textiles and Leather	5.8%	3.5%	8.2%
Diapers	4.0%	2.3%	5.7%
Rubber	0.2%	0.1%	0.3%
C&D	**12.2%**	**5.3%**	**19.1%**
Wood – Untreated	2.4%	0.5%	4.4%
Wood – Treated	4.9%	2.1%	7.7%
Asphalt Pavement, Brick, Rock, and Concrete	0.4%	0.0%	0.7%
Asphalt Roofing	0.0%	0.0%	0.1%
Drywall/Gypsum Board	1.5%	0.0%	3.8%
Carpet and Carpet Padding	3.0%	0.0%	6.5%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**14.8%**	**12.5%**	**17.1%**
#1 PET IA Deposit Beverage Containers	0.1%	0.0%	0.2%
#1 PET Beverage Containers	0.5%	0.3%	0.6%
#2 HDPE Containers Natural	0.2%	0.1%	0.3%
#2 HDPE Containers Colored	0.3%	0.2%	0.4%
Retail Shopping Bags	0.5%	0.3%	0.6%
Other Film Plastic	4.1%	3.1%	5.0%
Other #1 PET Containers	0.2%	0.1%	0.3%
Plastic Containers #3-#7	0.8%	0.6%	1.1%
Other plastic Containers	0.4%	0.2%	0.6%
Expanded Polystyrene	0.5%	0.3%	0.7%
Other Plastic Products	7.2%	5.3%	9.1%
Durable	**0.4%**	**0.2%**	**0.6%**
Cell Phones and Chargers	0.1%	0.0%	0.1%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	0.3%	0.1%	0.5%
HHMS	**0.2%**	**0.1%**	**0.3%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.1%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.1%
Prescription Medications	0.0%	0.0%	0.1%
Other	**12.5%**	**8.4%**	**16.6%**
Other Organics	2.9%	1.7%	4.2%
Other Inorganics	0.1%	0.0%	0.1%
Other C&D	2.6%	0.6%	4.7%
Other Durables	4.4%	0.2%	8.5%
Other HHM	0.1%	0.0%	0.1%
Fines	2.4%	1.3%	3.5%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**		
Sample Count	**17**	**Conf.**	**90%**

Iowa City Landfill 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**32.1%**	**27.3%**	**37.0%**
Compostable Paper	7.1%	5.4%	8.8%
High Grade Office Paper	0.3%	0.1%	0.5%
Magazines/Catalogs	0.3%	0.2%	0.5%
Mixed Recyclable Paper	3.4%	2.3%	4.4%
Newsprint	1.7%	0.9%	2.5%
Non-Recyclable Paper	6.2%	1.1%	11.3%
OCC and Kraft Paper	12.9%	9.7%	16.1%
Aseptic/Gable Top Containers	0.1%	0.1%	0.2%
Metal	**2.5%**	**1.2%**	**3.7%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.1%	0.0%	0.1%
Ferrous Food and Beverage Containers	0.4%	0.2%	0.7%
Other Aluminum Containers	0.3%	0.2%	0.4%
Other Ferrous Scrap Metals	0.9%	0.2%	1.6%
Other Non-Ferrous Scrap Metals	0.8%	0.2%	1.4%
Glass	**0.9%**	**0.6%**	**1.3%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.3%	0.0%	0.6%
Clear Glass	0.5%	0.3%	0.6%
Glass Deposit Containers	0.0%	0.0%	0.0%
Green Glass	0.1%	0.0%	0.2%
Other Mixed Cullet	0.1%	0.0%	0.1%
Organic	**23.3%**	**18.6%**	**27.9%**
Yard Waste	1.6%	0.0%	3.1%
Food Waste	16.1%	11.7%	20.5%
Textiles and Leather	2.9%	0.8%	5.0%
Diapers	1.7%	0.6%	2.7%
Rubber	1.0%	0.4%	1.6%
C&D	**6.9%**	**4.2%**	**9.6%**
Wood – Untreated	2.6%	1.0%	4.1%
Wood – Treated	3.1%	1.4%	4.9%
Asphalt Pavement, Brick, Rock, and Concrete	0.0%	0.0%	0.1%
Asphalt Roofing	0.5%	0.0%	1.1%
Drywall/Gypsum Board	0.5%	0.0%	1.2%
Carpet and Carpet Padding	0.2%	0.0%	0.5%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**24.6%**	**19.0%**	**30.3%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.1%
#1 PET Beverage Containers	0.3%	0.2%	0.4%
#2 HDPE Containers Natural	0.4%	0.2%	0.5%
#2 HDPE Containers Colored	0.2%	0.1%	0.3%
Retail Shopping Bags	0.3%	0.0%	0.5%
Other Film Plastic	12.1%	7.1%	17.0%
Other #1 PET Containers	0.2%	0.1%	0.3%
Plastic Containers #3-#7	0.7%	0.5%	0.9%
Other plastic Containers	0.6%	0.1%	1.0%
Expanded Polystyrene	0.8%	0.3%	1.4%
Other Plastic Products	9.0%	5.1%	12.9%
Durable	**1.3%**	**0.1%**	**2.5%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.5%	0.0%	1.2%
Electrical and Household Appliances	0.8%	0.0%	1.8%
HHMS	**0.1%**	**0.0%**	**0.1%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.0%	0.0%	0.0%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.1%
Other	**8.3%**	**5.2%**	**11.5%**
Other Organics	1.0%	0.4%	1.5%
Other Inorganics	0.6%	0.0%	1.6%
Other C&D	1.7%	0.1%	3.4%
Other Durables	1.9%	0.4%	3.4%
Other HHM	0.1%	0.0%	0.3%
Fines	2.3%	1.0%	3.6%
Other	0.7%	0.1%	1.3%
Totals	**100.0%**		
Sample Count	**37**	**Conf.**	**90%**

Iowa City Landfill 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**27.3%**	**Plastic**	**21.1%**
Compostable Paper	6.4%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.3%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	0.8%	#2 HDPE Containers Natural	0.3%
Mixed Recyclable Paper	3.7%	#2 HDPE Containers Colored	0.3%
Newsprint	1.7%	Retail Shopping Bags	0.3%
Non-Recyclable Paper	4.3%	Other Film Plastic	9.3%
OCC and Kraft Paper	10.0%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.1%	Plastic Containers #3-#7	0.7%
		Other plastic Containers	0.5%
Metal	**4.5%**	Expanded Polystyrene	0.7%
Aluminum Beverage Containers	0.0%	Other Plastic Products	8.3%
Aluminum IA Deposit Beverage Containers	0.1%		
Ferrous Food and Beverage Containers	0.5%	**Durable**	**1.0%**
Other Aluminum Containers	0.3%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	3.0%	Central Processing Units/Peripherals	0.0%
Other Non-Ferrous Scrap Metals	0.6%	Computer Monitors/T.V.s	0.3%
		Electrical and Household Appliances	0.7%
Glass	**1.7%**		
Blue Glass	0.0%	**HHMS**	**0.1%**
Brown Glass	0.3%	Automotive Products	0.0%
Clear Glass	0.6%	Household Cleaners	0.0%
Glass Deposit Containers	0.0%	Lead Acid Batteries	0.0%
Green Glass	0.1%	Mercury Container Products	0.0%
Other Mixed Cullet	0.7%	Other Batteries	0.0%
		Paints and Solvents	0.0%
Organic	**25.3%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	3.5%	Sharps	0.0%
Food Waste	14.7%	Prescription Medications	0.0%
Textiles and Leather	3.9%		
Diapers	2.5%	**Other**	**10.3%**
Rubber	0.7%	Other Organics	1.6%
		Other Inorganics	0.4%
C&D	**8.6%**	Other C&D	2.0%
Wood – Untreated	2.5%	Other Durables	2.7%
Wood – Treated	3.7%	Other HHM	0.1%
Asphalt Pavement, Brick, Rock, and Concrete	0.1%	Fines	2.3%
Asphalt Roofing	0.3%	Other	0.4%
Drywall/Gypsum Board	0.8%	Special Waste	0.6%
Carpet and Carpet Padding	1.2%		
Mixed C&D	N/A	**Totals**	**100.0%**

* Iowa City Landfill does not handle or charge for C&D waste as a separate material from MSW.

DUBUQUE METROPOLITAN AREA SOLID WASTE AGENCY

MidAtlantic Solid Waste Consultants
Cascadia Consulting Group
Foth Infrastructure & Environment

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Dubuque Metropolitan Area Solid Waste Agency Municipal Solid Waste

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**21.2%**	**18.1%**	**24.3%**
Compostable Paper	5.8%	4.9%	6.8%
High Grade Office Paper	0.5%	0.2%	0.8%
Magazines/Catalogs	0.9%	0.5%	1.2%
Mixed Recyclable Paper	2.7%	2.2%	3.2%
Newsprint	1.0%	0.8%	1.3%
Non-Recyclable Paper	2.2%	0.4%	4.1%
OCC and Kraft Paper	7.8%	5.6%	10.0%
Aseptic/Gable Top Containers	0.2%	0.1%	0.2%
Metal	**5.9%**	**4.1%**	**7.7%**
Aluminum Beverage Containers	0.0%	0.0%	0.0%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.2%
Ferrous Food and Beverage Containers	1.1%	0.1%	2.1%
Other Aluminum Containers	0.2%	0.2%	0.3%
Other Ferrous Scrap Metals	2.9%	1.6%	4.1%
Other Non-Ferrous Scrap Metals	1.5%	0.4%	2.6%
Glass	**1.3%**	**1.0%**	**1.5%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.2%
Clear Glass	0.5%	0.4%	0.7%
Glass Deposit Containers	0.1%	0.0%	0.3%
Green Glass	0.0%	0.0%	0.1%
Other Mixed Cullet	0.5%	0.2%	0.7%
Organic	**27.8%**	**23.7%**	**31.9%**
Yard Waste	3.9%	2.3%	5.5%
Food Waste	14.2%	11.3%	17.1%
Textiles and Leather	4.8%	3.5%	6.1%
Diapers	4.2%	2.9%	5.5%
Rubber	0.7%	0.4%	1.0%
C&D	**15.9%**	**11.3%**	**20.4%**
Wood – Untreated	2.4%	0.9%	4.0%
Wood – Treated	6.1%	4.0%	8.2%
Asphalt Pavement, Brick, Rock, and Concrete	1.7%	0.3%	3.2%
Asphalt Roofing	1.0%	0.0%	2.3%
Drywall/Gypsum Board	1.3%	0.0%	2.7%
Carpet and Carpet Padding	3.2%	0.3%	6.2%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**13.0%**	**11.5%**	**14.5%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.1%
#1 PET Beverage Containers	0.4%	0.3%	0.5%
#2 HDPE Containers Natural	0.2%	0.1%	0.3%
#2 HDPE Containers Colored	0.2%	0.2%	0.3%
Retail Shopping Bags	0.3%	0.3%	0.4%
Other Film Plastic	5.3%	4.3%	6.2%
Other #1 PET Containers	0.2%	0.2%	0.3%
Plastic Containers #3-#7	0.6%	0.5%	0.7%
Other plastic Containers	0.5%	0.3%	0.7%
Expanded Polystyrene	1.4%	0.5%	2.3%
Other Plastic Products	3.7%	2.8%	4.5%
Durable	**2.0%**	**0.7%**	**3.3%**
Cell Phones and Chargers	0.0%	0.0%	0.1%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.7%	0.0%	1.6%
Electrical and Household Appliances	1.3%	0.7%	1.9%
HHMS	**0.2%**	**0.1%**	**0.4%**
Automotive Products	0.1%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.1%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.1%	0.0%	0.2%
Other	**12.7%**	**9.6%**	**15.8%**
Other Organics	3.4%	1.4%	5.4%
Other Inorganics	0.3%	0.1%	0.6%
Other C&D	2.0%	0.3%	3.6%
Other Durables	4.5%	2.2%	6.8%
Other HHM	0.0%	0.0%	0.1%
Fines	2.5%	1.7%	3.3%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**		
Sample Count	**54**	**Conf.**	**90%**

Dubuque Metropolitan Area Solid Waste Agency Residential Waste

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**16.2%**	**12.4%**	**20.1%**
Compostable Paper	5.6%	3.9%	7.4%
High Grade Office Paper	0.3%	0.1%	0.4%
Magazines/Catalogs	1.4%	0.5%	2.4%
Mixed Recyclable Paper	3.6%	2.4%	4.8%
Newsprint	1.3%	0.8%	1.8%
Non-Recyclable Paper	1.0%	0.7%	1.3%
OCC and Kraft Paper	2.9%	0.2%	5.7%
Aseptic/Gable Top Containers	0.1%	0.1%	0.1%
Metal	**6.0%**	**2.9%**	**9.1%**
Aluminum Beverage Containers	0.0%	0.0%	0.1%
Aluminum IA Deposit Beverage Containers	0.2%	0.1%	0.4%
Ferrous Food and Beverage Containers	0.5%	0.3%	0.7%
Other Aluminum Containers	0.3%	0.2%	0.4%
Other Ferrous Scrap Metals	4.5%	1.4%	7.6%
Other Non-Ferrous Scrap Metals	0.4%	0.1%	0.7%
Glass	**2.1%**	**1.4%**	**2.7%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.2%
Clear Glass	0.9%	0.5%	1.4%
Glass Deposit Containers	0.0%	0.0%	0.0%
Green Glass	0.1%	0.0%	0.2%
Other Mixed Cullet	0.9%	0.2%	1.6%
Organic	**32.5%**	**25.4%**	**39.6%**
Yard Waste	2.9%	1.2%	4.6%
Food Waste	14.3%	9.9%	18.8%
Textiles and Leather	7.8%	4.4%	11.1%
Diapers	7.0%	4.5%	9.4%
Rubber	0.5%	0.1%	0.9%
C&D	**15.1%**	**7.0%**	**23.2%**
Wood – Untreated	1.3%	0.0%	3.0%
Wood – Treated	6.9%	3.1%	10.6%
Asphalt Pavement, Brick, Rock, and Concrete	4.2%	0.0%	8.6%
Asphalt Roofing	0.0%	0.0%	0.0%
Drywall/Gypsum Board	0.1%	0.0%	0.1%
Carpet and Carpet Padding	2.6%	0.0%	5.6%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**11.8%**	**9.7%**	**13.8%**
#1 PET IA Deposit Beverage Containers	0.1%	0.0%	0.1%
#1 PET Beverage Containers	0.5%	0.3%	0.7%
#2 HDPE Containers Natural	0.2%	0.1%	0.3%
#2 HDPE Containers Colored	0.2%	0.1%	0.3%
Retail Shopping Bags	0.5%	0.3%	0.7%
Other Film Plastic	4.1%	3.1%	5.1%
Other #1 PET Containers	0.3%	0.2%	0.4%
Plastic Containers #3-#7	0.7%	0.4%	0.9%
Other plastic Containers	0.5%	0.3%	0.8%
Expanded Polystyrene	1.2%	0.0%	2.4%
Other Plastic Products	3.5%	2.1%	4.9%
Durable	**2.3%**	**1.0%**	**3.6%**
Cell Phones and Chargers	0.1%	0.0%	0.2%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	0.0%	0.0%	0.0%
Electrical and Household Appliances	2.2%	1.0%	3.5%
HHMS	**0.2%**	**0.1%**	**0.4%**
Automotive Products	0.0%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.2%	0.1%	0.3%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**13.8%**	**7.9%**	**19.6%**
Other Organics	5.5%	0.4%	10.6%
Other Inorganics	0.1%	0.0%	0.3%
Other C&D	0.2%	0.0%	0.4%
Other Durables	5.6%	1.1%	10.2%
Other HHM	0.0%	0.0%	0.0%
Fines	2.3%	1.4%	3.3%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**	**Conf.**	**90%**
Sample Count	**16**		

Dubuque Metropolitan Area Solid Waste Agency Industrial/Commercial/Institutional Waste

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**23.5%**	**19.3%**	**27.7%**
Compostable Paper	5.9%	4.8%	7.1%
High Grade Office Paper	0.6%	0.2%	1.0%
Magazines/Catalogs	0.6%	0.3%	0.8%
Mixed Recyclable Paper	2.3%	1.8%	2.7%
Newsprint	0.9%	0.6%	1.2%
Non-Recyclable Paper	2.8%	0.1%	5.5%
OCC and Kraft Paper	10.1%	7.1%	13.1%
Aseptic/Gable Top Containers	0.2%	0.1%	0.3%
Metal	**5.9%**	**3.6%**	**8.1%**
Aluminum Beverage Containers	0.0%	0.0%	0.1%
Aluminum IA Deposit Beverage Containers	0.1%	0.1%	0.2%
Ferrous Food and Beverage Containers	1.4%	0.0%	2.8%
Other Aluminum Containers	0.2%	0.1%	0.2%
Other Ferrous Scrap Metals	2.1%	1.0%	3.3%
Other Non-Ferrous Scrap Metals	2.0%	0.4%	3.7%
Glass	**0.9%**	**0.6%**	**1.2%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.1%	0.0%	0.2%
Clear Glass	0.3%	0.2%	0.4%
Glass Deposit Containers	0.2%	0.0%	0.4%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	0.3%	0.2%	0.4%
Organic	**25.6%**	**20.6%**	**30.6%**
Yard Waste	4.4%	2.2%	6.6%
Food Waste	14.1%	10.4%	17.9%
Textiles and Leather	3.4%	2.2%	4.5%
Diapers	2.9%	1.4%	4.4%
Rubber	0.8%	0.4%	1.2%
C&D	**16.2%**	**10.7%**	**21.8%**
Wood – Untreated	2.9%	0.8%	5.0%
Wood – Treated	5.8%	3.2%	8.3%
Asphalt Pavement, Brick, Rock, and Concrete	0.6%	0.0%	1.2%
Asphalt Roofing	1.5%	0.0%	3.3%
Drywall/Gypsum Board	1.9%	0.0%	3.9%
Carpet and Carpet Padding	3.5%	0.0%	7.6%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**13.6%**	**11.5%**	**15.6%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.4%	0.3%	0.5%
#2 HDPE Containers Natural	0.2%	0.1%	0.3%
#2 HDPE Containers Colored	0.2%	0.2%	0.3%
Retail Shopping Bags	0.3%	0.2%	0.3%
Other Film Plastic	5.8%	4.6%	7.1%
Other #1 PET Containers	0.2%	0.1%	0.3%
Plastic Containers #3-#7	0.5%	0.4%	0.6%
Other plastic Containers	0.5%	0.3%	0.7%
Expanded Polystyrene	1.5%	0.4%	2.7%
Other Plastic Products	3.8%	2.7%	4.8%
Durable	**1.9%**	**0.1%**	**3.7%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	0.0%	0.0%	0.0%
Computer Monitors/T.V.s	1.1%	0.0%	2.3%
Electrical and Household Appliances	0.8%	0.2%	1.5%
HHMS	**0.2%**	**0.1%**	**0.4%**
Automotive Products	0.1%	0.0%	0.1%
Household Cleaners	0.0%	0.0%	0.1%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.0%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.1%	0.0%	0.3%
Other	**12.2%**	**8.6%**	**15.8%**
Other Organics	2.4%	0.7%	4.1%
Other Inorganics	0.4%	0.0%	0.8%
Other C&D	2.8%	0.4%	5.2%
Other Durables	4.0%	1.3%	6.6%
Other HHM	0.1%	0.0%	0.1%
Fines	2.6%	1.5%	3.7%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**		
Sample Count	**38**		

Dubuque Metropolitan Area Solid Waste Agency Solid Waste

Material	Estimated Percent	Material	Estimated Percent
Paper	**18.3%**	**Plastic**	**11.3%**
Compostable Paper	5.1%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.4%	#1 PET Beverage Containers	0.4%
Magazines/Catalogs	0.7%	#2 HDPE Containers Natural	0.2%
Mixed Recyclable Paper	2.3%	#2 HDPE Containers Colored	0.2%
Newsprint	0.9%	Retail Shopping Bags	0.3%
Non-Recyclable Paper	1.9%	Other Film Plastic	4.6%
OCC and Kraft Paper	6.8%	Other #1 PET Containers	0.2%
Aseptic/Gable Top Containers	0.1%	Plastic Containers #3-#7	0.5%
		Other plastic Containers	0.4%
Metal	**5.1%**	Expanded Polystyrene	1.2%
Aluminum Beverage Containers	0.0%	Other Plastic Products	3.2%
Aluminum IA Deposit Beverage Containers	0.1%		
Ferrous Food and Beverage Containers	1.0%	**Durable**	**1.8%**
Other Aluminum Containers	0.2%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	2.5%	Central Processing Units/Peripherals	0.0%
Other Non-Ferrous Scrap Metals	1.3%	Computer Monitors/T.V.s	0.6%
		Electrical and Household Appliances	1.1%
Glass	**1.1%**		
Blue Glass	0.0%	**HHMS**	**0.2%**
Brown Glass	0.1%	Automotive Products	0.0%
Clear Glass	0.4%	Household Cleaners	0.0%
Glass Deposit Containers	0.1%	Lead Acid Batteries	0.0%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.4%	Other Batteries	0.1%
		Paints and Solvents	0.0%
Organic	**24.1%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	3.4%	Sharps	0.0%
Food Waste	12.3%	Prescription Medications	0.1%
Textiles and Leather	4.1%		
Diapers	3.6%	**Other**	**15.8%**
Rubber	0.6%	Other Organics	2.9%
		Other Inorganics	0.3%
C&D	**22.3%**	Other C&D	1.7%
Wood – Untreated	2.1%	Other Durables	3.9%
Wood – Treated	5.3%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	1.5%	Fines	2.2%
Asphalt Roofing	0.9%	Other	0.0%
Drywall/Gypsum Board	1.2%	Special Waste	4.8%
Carpet and Carpet Padding	2.8%		
Mixed C&D	8.6%	**Totals**	**100%**

WASTE COMMISSION OF SCOTT COUNTY

MidAtlantic Solid Waste Consultants
Cascadia Consulting Group
Foth Infrastructure & Environment

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Waste Commission of Scott County 2011 Municipal Solid Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**23.4%**	**21.0%**	**25.8%**
Compostable Paper	5.0%	4.3%	5.7%
High Grade Office Paper	0.9%	0.6%	1.2%
Magazines/Catalogs	1.3%	0.8%	1.9%
Mixed Recyclable Paper	4.2%	3.4%	4.9%
Newsprint	1.6%	1.3%	2.0%
Non-Recyclable Paper	1.5%	1.0%	2.1%
OCC and Kraft Paper	8.6%	6.6%	10.5%
Aseptic/Gable Top Containers	0.3%	0.1%	0.5%
Metal	**3.9%**	**3.1%**	**4.6%**
Aluminum Beverage Containers	0.2%	0.1%	0.2%
Aluminum IA Deposit Beverage Containers	0.1%	0.1%	0.1%
Ferrous Food and Beverage Containers	0.9%	0.7%	1.1%
Other Aluminum Containers	0.3%	0.2%	0.3%
Other Ferrous Scrap Metals	1.5%	0.8%	2.1%
Other Non-Ferrous Scrap Metals	1.0%	0.6%	1.4%
Glass	**1.5%**	**0.9%**	**2.0%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.3%	0.0%	0.6%
Clear Glass	0.6%	0.4%	0.8%
Glass Deposit Containers	0.1%	0.0%	0.4%
Green Glass	0.1%	0.0%	0.1%
Other Mixed Cullet	0.3%	0.2%	0.4%
Organic	**28.6%**	**25.3%**	**32.0%**
Yard Waste	8.9%	6.4%	11.3%
Food Waste	9.2%	7.4%	11.1%
Textiles and Leather	5.9%	4.6%	7.2%
Diapers	2.6%	1.9%	3.3%
Rubber	2.0%	0.7%	3.4%
C&D	**13.3%**	**9.5%**	**17.1%**
Wood – Untreated	2.5%	0.7%	4.3%
Wood – Treated	6.4%	3.8%	9.1%
Asphalt Pavement, Brick, Rock, and Concrete	0.6%	0.2%	1.0%
Asphalt Roofing	0.1%	0.0%	0.2%
Drywall/Gypsum Board	1.2%	0.0%	2.6%
Carpet and Carpet Padding	2.4%	1.2%	3.7%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**14.5%**	**12.9%**	**16.0%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.6%	0.5%	0.7%
#2 HDPE Containers Natural	0.3%	0.2%	0.3%
#2 HDPE Containers Colored	0.4%	0.3%	0.5%
Retail Shopping Bags	0.5%	0.4%	0.5%
Other Film Plastic	4.9%	4.1%	5.6%
Other #1 PET Containers	0.2%	0.2%	0.3%
Plastic Containers #3-#7	1.0%	0.8%	1.2%
Other plastic Containers	0.5%	0.4%	0.7%
Expanded Polystyrene	0.6%	0.4%	0.7%
Other Plastic Products	5.4%	4.2%	6.7%
Durable	**3.3%**	**1.6%**	**4.9%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	1.4%	0.0%	2.9%
Computer Monitors/T.V.s	0.4%	0.0%	1.1%
Electrical and Household Appliances	1.4%	0.7%	2.1%
HHMS	**0.2%**	**0.0%**	**0.4%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.1%	0.0%	0.3%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.0%	0.0%	0.1%
Paints and Solvents	0.0%	0.0%	0.1%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**11.4%**	**9.3%**	**13.6%**
Other Organics	4.0%	2.8%	5.2%
Other Inorganics	0.1%	0.0%	0.2%
Other C&D	1.9%	0.6%	3.1%
Other Durables	2.8%	0.8%	4.8%
Other HHM	0.0%	0.0%	0.0%
Fines	2.6%	2.1%	3.0%
Other	0.0%	0.0%	0.1%
Totals	**100.0%**		
Sample Count	**50**	**Conf.**	**90%**

Waste Commission of Scott County 2011 Residential Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**21.4%**	**18.9% -**	**23.8%**
Compostable Paper	5.9%	5.0% -	6.8%
High Grade Office Paper	1.0%	0.6% -	1.4%
Magazines/Catalogs	1.3%	0.9% -	1.7%
Mixed Recyclable Paper	4.7%	3.8% -	5.7%
Newsprint	1.9%	1.4% -	2.3%
Non-Recyclable Paper	1.4%	1.2% -	1.7%
OCC and Kraft Paper	4.9%	2.7% -	7.2%
Aseptic/Gable Top Containers	0.1%	0.1% -	0.2%
Metal	**3.6%**	**2.8% -**	**4.5%**
Aluminum Beverage Containers	0.2%	0.1% -	0.2%
Aluminum IA Deposit Beverage Containers	0.1%	0.1% -	0.2%
Ferrous Food and Beverage Containers	0.9%	0.7% -	1.1%
Other Aluminum Containers	0.3%	0.2% -	0.4%
Other Ferrous Scrap Metals	1.5%	0.7% -	2.3%
Other Non-Ferrous Scrap Metals	0.6%	0.3% -	0.9%
Glass	**1.5%**	**0.9% -**	**2.0%**
Blue Glass	0.0%	0.0% -	0.0%
Brown Glass	0.1%	0.1% -	0.2%
Clear Glass	0.6%	0.3% -	0.9%
Glass Deposit Containers	0.2%	0.0% -	0.5%
Green Glass	0.1%	0.0% -	0.1%
Other Mixed Cullet	0.4%	0.3% -	0.6%
Organic	**32.0%**	**27.8% -**	**36.3%**
Yard Waste	11.1%	7.8% -	14.4%
Food Waste	9.5%	7.9% -	11.2%
Textiles and Leather	7.2%	5.4% -	9.0%
Diapers	3.3%	2.3% -	4.3%
Rubber	0.9%	0.6% -	1.2%
C&D	**11.1%**	**7.2% -**	**15.0%**
Wood – Untreated	0.7%	0.1% -	1.4%
Wood – Treated	7.1%	3.4% -	10.7%
Asphalt Pavement, Brick, Rock, and Concrete	0.5%	0.1% -	0.9%
Asphalt Roofing	0.2%	0.0% -	0.4%
Drywall/Gypsum Board	0.0%	0.0% -	0.0%
Carpet and Carpet Padding	2.6%	1.1% -	4.2%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**15.7%**	**13.9% -**	**17.6%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1% -	0.2%
#1 PET Beverage Containers	0.7%	0.5% -	0.8%
#2 HDPE Containers Natural	0.3%	0.2% -	0.3%
#2 HDPE Containers Colored	0.5%	0.3% -	0.6%
Retail Shopping Bags	0.6%	0.5% -	0.7%
Other Film Plastic	5.2%	4.5% -	5.9%
Other #1 PET Containers	0.3%	0.2% -	0.4%
Plastic Containers #3-#7	1.3%	1.1% -	1.5%
Other plastic Containers	0.7%	0.5% -	0.8%
Expanded Polystyrene	0.5%	0.4% -	0.7%
Other Plastic Products	5.6%	4.0% -	7.1%
Durable	**2.5%**	**0.8% -**	**4.3%**
Cell Phones and Chargers	0.0%	0.0% -	0.0%
Central Processing Units/Peripherals	1.0%	0.0% -	2.6%
Computer Monitors/T.V.s	0.0%	0.0% -	0.0%
Electrical and Household Appliances	1.5%	0.7% -	2.4%
HHMS	**0.3%**	**0.0% -**	**0.5%**
Automotive Products	0.0%	0.0% -	0.0%
Household Cleaners	0.0%	0.0% -	0.0%
Lead Acid Batteries	0.1%	0.0% -	0.4%
Mercury Container Products	0.0%	0.0% -	0.0%
Other Batteries	0.1%	0.0% -	0.1%
Paints and Solvents	0.0%	0.0% -	0.1%
Pesticides, Herbicides, Fungicides	0.0%	0.0% -	0.0%
Sharps	0.0%	0.0% -	0.0%
Prescription Medications	0.0%	0.0% -	0.0%
Other	**11.8%**	**9.3% -**	**14.4%**
Other Organics	4.6%	3.5% -	5.7%
Other Inorganics	0.1%	0.0% -	0.3%
Other C&D	2.1%	0.4% -	3.7%
Other Durables	2.1%	0.0% -	4.5%
Other HHM	0.0%	0.0% -	0.0%
Fines	2.8%	2.4% -	3.3%
Other	0.1%	0.0% -	0.2%
Totals	**100.0%**		
Sample Count	**31**	**Conf.**	**90%**

Waste Commission of Scott County 2011 Industrial/Commercial/Institutional Waste Composition

Material	Estimated Percent	Lower Bound	Upper Bound
Paper	**27.4%**	**22.2%**	**32.7%**
Compostable Paper	3.1%	2.1%	4.2%
High Grade Office Paper	0.5%	0.3%	0.8%
Magazines/Catalogs	1.3%	0.0%	2.8%
Mixed Recyclable Paper	3.1%	1.7%	4.4%
Newsprint	1.2%	0.5%	1.8%
Non-Recyclable Paper	1.8%	0.2%	3.3%
OCC and Kraft Paper	16.0%	12.3%	19.6%
Aseptic/Gable Top Containers	0.5%	0.0%	1.1%
Metal	**4.3%**	**2.8%**	**5.9%**
Aluminum Beverage Containers	0.1%	0.0%	0.2%
Aluminum IA Deposit Beverage Containers	0.0%	0.0%	0.1%
Ferrous Food and Beverage Containers	0.8%	0.4%	1.3%
Other Aluminum Containers	0.2%	0.1%	0.3%
Other Ferrous Scrap Metals	1.5%	0.4%	2.6%
Other Non-Ferrous Scrap Metals	1.7%	0.6%	2.8%
Glass	**1.5%**	**0.3%**	**2.6%**
Blue Glass	0.0%	0.0%	0.0%
Brown Glass	0.7%	0.0%	1.6%
Clear Glass	0.6%	0.3%	0.9%
Glass Deposit Containers	0.0%	0.0%	0.0%
Green Glass	0.0%	0.0%	0.0%
Other Mixed Cullet	0.1%	0.0%	0.2%
Organic	**21.7%**	**16.3%**	**27.1%**
Yard Waste	4.3%	0.8%	7.8%
Food Waste	8.6%	4.2%	13.1%
Textiles and Leather	3.3%	1.8%	4.8%
Diapers	1.1%	0.3%	1.9%
Rubber	4.4%	0.5%	8.4%
C&D	**17.9%**	**9.4%**	**26.4%**
Wood – Untreated	6.2%	0.9%	11.5%
Wood – Treated	5.1%	2.2%	8.0%
Asphalt Pavement, Brick, Rock, and Concrete	0.9%	0.0%	1.9%
Asphalt Roofing	0.0%	0.0%	0.0%
Drywall/Gypsum Board	3.7%	0.0%	8.0%
Carpet and Carpet Padding	2.0%	0.0%	4.0%

Material	Estimated Percent	Lower Bound	Upper Bound
Plastic	**11.9%**	**9.1%**	**14.7%**
#1 PET IA Deposit Beverage Containers	0.1%	0.1%	0.2%
#1 PET Beverage Containers	0.4%	0.3%	0.5%
#2 HDPE Containers Natural	0.3%	0.1%	0.5%
#2 HDPE Containers Colored	0.3%	0.1%	0.4%
Retail Shopping Bags	0.1%	0.1%	0.2%
Other Film Plastic	4.2%	2.3%	6.0%
Other #1 PET Containers	0.1%	0.0%	0.2%
Plastic Containers #3-#7	0.4%	0.2%	0.6%
Other plastic Containers	0.3%	0.2%	0.4%
Expanded Polystyrene	0.6%	0.1%	1.1%
Other Plastic Products	5.1%	3.1%	7.1%
Durable	**4.7%**	**1.4%**	**8.1%**
Cell Phones and Chargers	0.0%	0.0%	0.0%
Central Processing Units/Peripherals	2.4%	0.0%	5.0%
Computer Monitors/T.V.s	1.2%	0.0%	3.3%
Electrical and Household Appliances	1.1%	0.0%	2.5%
HHMS	**0.0%**	**0.0%**	**0.0%**
Automotive Products	0.0%	0.0%	0.0%
Household Cleaners	0.0%	0.0%	0.0%
Lead Acid Batteries	0.0%	0.0%	0.0%
Mercury Container Products	0.0%	0.0%	0.0%
Other Batteries	0.0%	0.0%	0.0%
Paints and Solvents	0.0%	0.0%	0.0%
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%
Sharps	0.0%	0.0%	0.0%
Prescription Medications	0.0%	0.0%	0.0%
Other	**10.6%**	**6.6%**	**14.5%**
Other Organics	2.8%	0.0%	5.7%
Other Inorganics	0.1%	0.0%	0.2%
Other C&D	1.4%	0.0%	2.9%
Other Durables	4.3%	0.9%	7.7%
Other HHM	0.0%	0.0%	0.0%
Fines	2.0%	1.1%	3.0%
Other	0.0%	0.0%	0.0%
Totals	**100.0%**		
Sample Count	**19**	**Conf.**	**90%**

Waste Commission of Scott County 2011 Solid Waste Composition

Material	Estimated Percent	Material	Estimated Percent
Paper	**12.5%**	**Plastic**	**7.7%**
Compostable Paper	2.7%	#1 PET IA Deposit Beverage Containers	0.1%
High Grade Office Paper	0.5%	#1 PET Beverage Containers	0.3%
Magazines/Catalogs	0.7%	#2 HDPE Containers Natural	0.1%
Mixed Recyclable Paper	2.2%	#2 HDPE Containers Colored	0.2%
Newsprint	0.9%	Retail Shopping Bags	0.2%
Non-Recyclable Paper	0.8%	Other Film Plastic	2.6%
OCC and Kraft Paper	4.6%	Other #1 PET Containers	0.1%
Aseptic/Gable Top Containers	0.1%	Plastic Containers #3-#7	0.5%
		Other plastic Containers	0.3%
Metal	**2.1%**	Expanded Polystyrene	0.3%
Aluminum Beverage Containers	0.1%	Other Plastic Products	2.9%
Aluminum IA Deposit Beverage Containers	0.1%		
Ferrous Food and Beverage Containers	0.5%	**Durable**	**1.7%**
Other Aluminum Containers	0.1%	Cell Phones and Chargers	0.0%
Other Ferrous Scrap Metals	0.8%	Central Processing Units/Peripherals	0.8%
Other Non-Ferrous Scrap Metals	0.5%	Computer Monitors/T.V.s	0.2%
		Electrical and Household Appliances	0.8%
Glass	**0.8%**		
Blue Glass	0.0%	**HHMS**	**0.1%**
Brown Glass	0.2%	Automotive Products	0.0%
Clear Glass	0.3%	Household Cleaners	0.0%
Glass Deposit Containers	0.1%	Lead Acid Batteries	0.1%
Green Glass	0.0%	Mercury Container Products	0.0%
Other Mixed Cullet	0.2%	Other Batteries	0.0%
		Paints and Solvents	0.0%
Organic	**15.3%**	Pesticides, Herbicides, Fungicides	0.0%
Yard Waste	4.7%	Sharps	0.0%
Food Waste	4.9%	Prescription Medications	0.0%
Textiles and Leather	3.2%		
Diapers	1.4%	**Other**	**29.4%**
Rubber	1.1%	Other Organics	2.1%
		Other Inorganics	0.1%
C&D	**30.3%**	Other C&D	1.0%
Wood – Untreated	1.4%	Other Durables	1.5%
Wood – Treated	3.4%	Other HHM	0.0%
Asphalt Pavement, Brick, Rock, and Concrete	0.3%	Fines	1.4%
Asphalt Roofing	0.1%	Other	0.0%
Drywall/Gypsum Board	0.6%	Special Waste	23.3%
Carpet and Carpet Padding	1.3%		
Mixed C&D	23.2%	**Totals**	**100%**

APPENDIX C

ANALYSIS OF MIXED WASTE SAMPLES

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APPENDIX C ANALYSIS OF MIXED WASTE SAMPLES

C-1. BACKGROUND

In the 2011 Study as well as the 2005 Study, it was acknowledged that many trucks delivering wastes to Iowa disposal facilities contain a mix of Residential and ICI wastes. For purposes of the two studies, Mixed loads were defined as loads that have less than 80 percent of either Residential or ICI.

In the 2011 Study, a new approach was investigated for dealing with mixed loads. While entire truckloads may indeed be mixed and fall below the 80 percent threshold, individual grab samples that are taken from the tipped load are usually no more than 300 pounds, and the amount from the grab sample that is actually sorted is roughly 200 pounds (average for the 2011 Study was 221 pounds).

In an effort to minimize the prevalence of Mixed waste as a separate generator sector, the Project Team's approach incorporated an additional step of qualitatively characterizing samples obtained from Mixed loads. Specifically, the Field Supervisor and Crew Chief were asked to make a qualitative evaluation of the grab sample based on visual clues contained in the sample, with the objective of assigning each Mixed grab sample to either the Residential or ICI generator sector. Visual clues included the size and type of trash bags contained in the grab sample (i.e., grocery and 13-gallon white kitchen bags are more prevalent in Residential waste; larger, heavy duty black or clear trash bags are more common in ICI waste, as well as the incidence of certain materials (Residential wastes are largely bagged material with some loose items, while ICI wastes can have more uncommon or specialized loose objects).

Table C-1 summarizes the qualitative assignments of mixed waste loads to either the Residential or ICI generator sector. As shown, after allocating Mixed samples to the Residential and ICI generator sectors, the sample distribution was found to be 46.3 percent residential and 53.7 percent ICI. This is consistent with the expected breakdown of Residential and ICI wastes in the municipal waste stream.

Table C-1 Summary of Samples and Assignment of Mixed Loads

	Residential	ICI	MIxed	Total
Incoming Truckloads	201	226	33	460
Percent of Incoming Loads	**43.7%**	**49.1%**	**7.2%**	**100%**
Qualitative Evaluation of Mixed Loads	12	21	N/A	33
Adjusted Sample Counts	213	247	0	460
Adjusted Percent of Incoming Samples	**46.3%**	**53.7%**	**0.0%**	**100%**

APPENDIX C

C-2. ANALYSIS

The Project Team obtained mixed samples at six of the nine host disposal facilities. In order to evaluate the accuracy of the professional field staff in assigning mixed grab samples to the Residential or ICI generator sector, the Project Team compared the unweighted composition of pure Residential and ICI loads against the composition of Mixed loads that were judged to be Residential or ICI by experienced field personnel. The results of this exercise are shown in Tables C-2 (for individual material categories) and C-3 (for material groups) below.

Table C-2 Comparison of Composition of Pure and Mixed Loads, Individual Material Categories

Generator Sector Reported by Driver	*Res*	*Mixed*	*ICI*	*Mixed*	
Generator Sector Assigned by Field Staff	*Res*	*Res*	*ICI*	*ICI*	
Material Category	**Comp %**	**Comp %**	**Comp %**	**Comp %**	**Expectation**
Compostable Paper	5.6%	6.2%	5.6%	5.2%	
High Grade Office Paper	0.5%	0.9%	0.9%	1.3%	Higher in ICI
Magazines/Catalogs	1.8%	1.9%	0.9%	1.0%	Higher in Residential
Mixed Recyclable Paper	5.1%	7.2%	3.5%	6.7%	
Newsprint	2.2%	4.0%	1.5%	2.3%	
Non-Recyclable Paper	1.5%	2.3%	4.7%	2.3%	
OCC and Kraft Paper	3.8%	6.0%	12.0%	10.5%	Higher in ICI
Aseptic/Gable Top Containers	0.2%	0.1%	0.3%	0.2%	
Aluminum Beverage Containers	0.0%	0.0%	0.0%	0.1%	
Aluminum IA Deposit Beverage Containers	0.3%	0.3%	0.1%	0.3%	
Ferrous Food and Beverage Containers	0.8%	0.9%	0.7%	0.9%	
Other Aluminum Containers	0.2%	0.4%	0.2%	0.2%	
Other Ferrous Scrap Metals	2.7%	2.3%	2.1%	2.4%	
Other Non-Ferrous Scrap Metals	0.9%	0.9%	1.6%	0.4%	
Blue Glass	0.0%	0.0%	0.0%	0.0%	Higher in Residential
Brown Glass	0.1%	0.0%	0.1%	0.0%	
Clear Glass	0.8%	0.9%	0.3%	0.4%	
Glass Deposit Containers	0.4%	0.6%	0.3%	0.2%	
Green Glass	0.1%	0.1%	0.0%	0.0%	
Other Mixed Cullet	0.7%	0.3%	0.5%	1.0%	
Yard Waste	6.1%	1.2%	2.2%	0.6%	Higher in Residential
Food Waste	14.2%	15.6%	13.1%	12.3%	
Textiles and Leather	6.0%	5.7%	2.4%	5.5%	
Diapers	3.6%	4.4%	1.3%	2.7%	Higher in Residential
Rubber	0.8%	1.0%	1.4%	0.8%	
Wood – Untreated	2.0%	2.9%	6.0%	7.4%	
Wood – Treated	5.2%	1.8%	4.5%	3.8%	
Asphalt Pavement, Brick, Rock, and Concrete	1.1%	1.0%	0.6%	1.0%	

Generator Sector Reported by Driver	*Res*	*Mixed*	*ICI*	*Mixed*	
Generator Sector Assigned by Field Staff	*Res*	*Res*	*ICI*	*ICI*	
Material Category	**Comp %**	**Comp %**	**Comp %**	**Comp %**	**Expectation**
Asphalt Roofing	0.1%	1.5%	1.1%	0.0%	
Drywall/Gypsum Board	0.5%	0.2%	1.6%	0.7%	
Carpet and Carpet Padding	2.6%	1.4%	1.2%	2.5%	
#1 PET IA Deposit Beverage Containers	0.2%	0.3%	0.2%	0.1%	
#1 PET Beverage Containers	0.6%	0.7%	0.4%	0.4%	
#2 HDPE Containers Natural	0.3%	0.3%	0.3%	0.3%	
#2 HDPE Containers Colored	0.6%	0.5%	0.3%	0.6%	
Retail Shopping Bags	0.5%	0.5%	0.2%	0.2%	Higher in Residential
Other Film Plastic	4.7%	5.2%	7.2%	5.2%	
Other #1 PET Containers	0.3%	0.3%	0.2%	0.2%	
Plastic Containers #3-#7	1.0%	0.8%	0.5%	1.1%	
Other plastic Containers	0.6%	0.5%	0.7%	0.4%	
Expanded Polystyrene	0.7%	1.1%	1.5%	0.8%	
Other Plastic Products	4.5%	4.9%	5.4%	3.3%	
Cell Phones and Chargers	0.0%	0.1%	0.0%	0.0%	
Central Processing Units/Peripherals	0.5%	0.9%	0.2%	1.3%	
Computer Monitors/T.V.s	0.2%	0.4%	0.5%	0.0%	
Electrical and Household Appliances	1.9%	4.4%	1.0%	1.7%	
Automotive Products	0.2%	0.0%	0.1%	0.2%	
Household Cleaners	0.0%	0.0%	0.0%	0.0%	
Lead Acid Batteries	0.0%	0.0%	0.0%	0.0%	
Mercury Container Products	0.0%	0.0%	0.0%	0.0%	
Other Batteries	0.1%	0.2%	0.0%	0.1%	
Paints and Solvents	0.1%	0.0%	0.1%	0.0%	
Pesticides, Herbicides, Fungicides	0.0%	0.0%	0.0%	0.0%	
Sharps	0.0%	0.0%	0.0%	0.0%	
Prescription Medications	0.0%	0.0%	0.0%	0.0%	
Other Organics	4.1%	2.6%	3.1%	3.0%	
Other Inorganics	0.4%	0.0%	0.3%	0.2%	
Other C&D	1.3%	0.5%	1.8%	0.7%	
Other Durables	3.9%	1.2%	1.8%	1.6%	
Other HHW	0.0%	0.0%	0.0%	0.0%	
Fines	3.1%	2.4%	2.7%	2.5%	
Other	0.1%	0.0%	0.7%	3.5%	
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Table C-3 Comparison of Composition of Pure and Mixed Loads, Material Groups

Generator Sector Reported by Driver	*Res*	*Mixed*	*ICI*	*Mixed*	
Generator Sector Assigned by Field Staff	*Res*	*Res*	*ICI*	*ICI*	
Material Category	**Comp %**	**Comp %**	**Comp %**	**Comp %**	**Expectation**
PAPER	20.8%	28.7%	29.2%	29.4%	Higher in ICI
METAL	5.0%	4.7%	4.8%	4.2%	
GLASS	2.1%	1.9%	1.3%	1.7%	Higher in Residential
ORGANIC	30.7%	27.9%	20.5%	21.9%	
C&D	11.5%	8.7%	15.0%	15.5%	Higher in ICI
PLASTIC	14.0%	15.1%	16.8%	12.6%	Higher in ICI
DURABLE	2.6%	5.8%	1.7%	2.9%	
HHMS	0.4%	0.3%	0.3%	0.3%	
OTHER	13.0%	6.8%	10.4%	11.4%	
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

The Project Team has reviewed the unweighted results of this analysis. In performing this review, we compared the Mixed composition with the Pure composition, and also compared the Residential composition with the ICI composition. Although these results are unweighted (i.e., every sample is given equal weighting, whether or not the sample was obtained at a disposal facility with a large or small contribution to Iowa's aggregate disposed waste stream), the Project team believes that the Residential and ICI composition percentages reasonably reflect expected differences, and the Mixed samples reasonably align with their assigned generator sector.

C-3. CONCLUSION

Based on the data above, and based on the success of the Project team at minimizing the number of Mixed loads obtained because of better stratification and unstream sampling, the body of this report combines Mixed samples into the Residential or ICI generator sector as assigned by the field data collection staff.