



MEMORANDUM

To: Cassidy Campbell - North Central Texas Council of Governments (NCTCOG)
Participating Cities (as defined in first paragraph)

From: Scott Pasternak - Burns & McDonnell
Eric Weiss - Burns & McDonnell

Subject: Garbage and Recycling Sorting Event Results

Date: March 18, 2021

Burns & McDonnell is pleased to provide the garbage and recycling composition results from samples provided by the following municipalities (Participating Cities) in the North Central Texas region during the sorting event held the week of October 26 – November 1, 2020:

- City of Arlington
- City of Dallas
- City of Denton
- City of Fort Worth
- City of Frisco
- City of Garland
- City of Grand Prairie
- City of Irving
- City of Weatherford

Thank you for your effort and participation to advance the work accomplished as part of the NCTCOG's Regional Recycling Survey and Educational Campaign. The composition from 50 garbage and 50 recycling samples received during the sorting event have been aggregated to calculate the regional composition profiles and regional capture rates. This memo describes the results for the region and results specific to each participating city. Compared to 2019, the capture rate of the region decreased and the overall contamination increased. However, the capture rate of key recyclable material categories (i.e. PET, HDPE, aluminum cans) increased causing an increase in the value of recyclable materials sold to market. Additionally, the percentage of problem materials in the recycling stream decreased between 2019 and 2020.

Points to Consider when Reviewing the Results

This memo presents results from the 2020 sorting event and provides an update to the 2018 and 2019 regional capture rate analysis. As you review this memo, Burns & McDonnell would like to emphasize that different methodologies were used for the capture rate analyses from year-to-year due to variations in available data. The 2019/2020 sorting events included both garbage and recycling samples, whereas the 2018 sorting event only included garbage and Burns & McDonnell derived recycling composition from multiple Material Recovery Facility (MRF) audits from cities in the region.

Also, the Participating City capture rate presented from the 2019 and 2020 studies are strictly based on data from the material provided by those cities during the sorting event (i.e. similar to the methodology of other studies conducted by the Recycling Partnership), whereas the regional capture rates are based on annual tonnage data extrapolated across the entire North Central Texas region. While both methodologies are sound, they produce different results because of the vastly different quantities of material considered and therefore should not be directly compared to each other. Table 1 presents the amount of material evaluated as part of each methodology.

Table 1: Overall Capture Rates

Capture Rate Methodology	Recycling	Garbage ¹	Capture Rate
2019 Participating Cities	3,526 pounds	1,604 pounds	69%
2019 Regional	411,223 tons	967,176 tons	30%
2020 Participating Cities	2,500 pounds	1,732 pounds	59%
2020 Regional	403,948 tons	1,004,157 tons	29%

1. Represents recyclable material categories in residential garbage stream.

2020 Garbage and Recycling Composition

This memorandum contains an attachment with the composition profile on a material-by-material basis and ranking analysis based on the October 2020 sorting event. The residential garbage samples include an average of 18 percent potentially recyclable material, consistent with 2019. Conversely, the residential recycling samples contained an average of 30.8 percent contamination, rising 2.8 percent from 2019 (contamination calculations exclude other ferrous and non-ferrous metals categories because they are accepted by some MRFs in the region).

Note that the contamination rate may be higher than a typical MRF audit due to the following differences:

- Changes in material categories.** Recyclable materials focused on the priority recycling list developed for the Regional Recycling Survey and Educational Campaign. Therefore, materials like rigid plastics and small, scrap metals were considered contamination, although they are often considered program recyclable materials in many recycling contracts. These materials can represent one to three percent of the material stream.
- Liquids.** There is some loss of liquids when material is transported from a household and processed at the MRF. For the 2019/2020 sorting event, all of this liquid was counted as contamination. When setouts with liquids are collected by a recycling truck, some may leak out when the material is compacted in the truck and other material may evaporate after arrival at the MRF. At MRFs, it is common to see “shrinkage” of one to three percent of the incoming to processed material.
- Sampling methodology.** The small number of samples can cause a single irregular load to skew a city’s average composition profile to show an inflated contamination rate that is not reflective of a city over time.

Based on these differences, only 75 percent of the nonrecyclable plastics, food waste, and other organics categories have been considered in our calculated contamination rate representing an adjusted contamination rate of 26 percent, which more closely aligns with the results of MRF audits in the region.

Review Regional Capture Rate

The following provides a comparison of the 2018, 2019 and 2020 regional capture rate figures to indicate how effectively the region’s curbside recycling program diverts each recyclable material category from disposal based on the methodology developed for the 2018 analysis. These figures are calculated by extrapolating the composition generated during the sorting event for garbage over the total residential garbage tons disposed annually and for recycling over the total tons sold to market in the region.

Table 3 shows the 2018, 2019 and 2020 regional capture rate in a side-by-side comparison. Please note that the regional capture rate figures are provided for comparison purposes only, as they are based on different methodologies between the 2018 and 2019/2020 sorting events due to variations in available data (i.e. the 2019/2020 sorting events hand-sorted recycling materials and the 2018 event relied on MRF audit data).

Table 2: Regional Capture Rate Comparison

Recyclable Material	2018 Regional Capture Rate	2019 Regional Capture Rate	2020 Regional Capture Rate	Year-over-Year Change ¹
Recyclable OCC	60%	59%	62%	4%
Mixed Paper	41%	34%	28%	-6%
Paper Subtotal	45%	41%	38%	-3%
PET Containers	22%	25%	27%	2%
HDPE Containers - Natural	28%	28%	34%	6%
HDPE Containers - Colored	30%	26%	26%	0%
#3-#7 Containers	14%	11%	13%	1%
Plastic Subtotal	22%	22%	24%	2%
Aluminum Used Beverage Containers	19%	26%	31%	5%
Ferrous Metal Food Containers	18%	14%	18%	4%
Metals Subtotal	18%	20%	24%	5%
Recyclable Glass	25%	34%	34%	-1%
Glass Subtotal	25%	34%	34%	-1%
Total	31%	30%	29%	-1%

1. Year-over-year change shows difference between 2019 and 2020 regional capture rate. Values may not calculate exactly due to rounding.

This overall decrease in regional capture rate may be attributed to the significant adjustments in the residential behavior patterns due to the COVID-19 pandemic. With social distancing policies and stay-at-home orders in effect intermittently throughout 2020, residents were increasingly working and attending school from home and generating less paper. This change in work and school patterns caused a decrease in the capture of mixed paper due to the acceleration of the transition to digital platforms (i.e. computers, tablets, etc.). Since mixed paper is such a large portion of the recycling stream, this reduction in the generation of mixed paper may have contributed to the decrease in the overall regional capture rate.

Review of Regional Material Value

The following provides a comparison between the historical five-year average commodity values in 2019 and 2020 and the percentage change between the two.

Table 3: Market Value of Recycled Materials¹

Recyclable Categories	Five-Year Average (2014-2019)	Five-Year Average (2015-2020)	Percent Change ²
OCC	\$98	\$93	-5.1%
Mixed Paper ³	\$32	\$20	-37.5%
PET	\$309	\$280	-9.4%
HDPE-N	\$718	\$721	0.4%
HDPE-C	\$407	\$343	-15.7%
Plastic #3-#7	\$35	\$40	14.3%
Aluminum	\$1,333	\$1,241	-6.9%
Steel/Tin	\$152	\$146	-3.9%

1. Source: www.recyclingmarkets.net
2. Percent change may not calculate exactly due to rounding
3. Mixed paper values reflect PS56 specification

The percentage change shows that the five-year averages of most of the material categories decreased due to the falling commodity values in between 2015 and 2018 in response to restricted international end-markets (i.e. China’s ban on importing waste). Table 5 shows the estimated value of recyclables sold to market based on the tonnage of recycled material multiplied against the five-year average market value from 2014-2019 and from 2015-2020, respectively. The historical five-year average pricing is used to provide a representative material value given the cyclical nature of the secondary commodity market.

Table 4: Recycled Material Value Comparison

Material Category	2019	2020	Difference
Paper	\$7,939,248	\$13,089,243	\$5,149,996
Plastic	\$20,612,994	\$17,567,042	-\$3,045,952
Metal	\$14,041,083	\$17,125,674	\$3,084,591
Total¹	\$42,593,324	\$47,781,959	\$5,188,635

1. Totals may not sum exactly due to rounding

Between 2019 and 2020, the value of the captured recycling material increased by \$5.1 million. As shown in Table 4, the average commodity value decreased for a majority of the materials. This indicates that the increased capture of high-value materials (i.e. cardboard, HDPE and aluminum cans) and decreased capture of low-value materials (i.e. mixed paper, magazines/glossy paper) had a significant positive impact on the value of material recycled in the region.

Conclusion

The results of the 2020 sorting event revealed both positive impacts and challenges related to the regional campaign. The capture rate of key materials including OCC, PET, HDPE, ferrous and non-ferrous metals improved between 2019 and 2020, and increased the value of total material recycled by \$5.1 million. Also, the percentage of problem materials decreased from 1.4 percent to 0.6 percent (see attached garbage and recycling composition results). However, the overall capture rate for the region decreased between 2019 and 2020 from 30 to 29 percent and the capture rate of the material delivered to the sorting site decreased from 69 to 59 percent. Additionally, the overall contamination rate of recycling material increased by about two percentage points.

The decrease in regional overall capture rate and increase in contamination may be attributed in part to the significant adjustments in the residential behavior patterns due to the COVID-19 pandemic in 2020. With social distancing policies and stay-at-home orders in effect intermittently throughout 2020, residents were increasingly working and attending school from home, generating less paper, putting more non-recyclable materials into the recycling stream, purchasing more items using e-commerce platforms and ordering home food delivery more often. This change in work and school patterns may have caused a decrease in the capture of mixed paper due to an acceleration in the transition to digital platforms (i.e. computers, tablets, etc.), and an increase improper recycling because residents were eating and working from home more often. Additionally, there was a noticeable increase in in the amount of e-commerce OCC due to increased purchasing using e-commerce platforms (i.e. Amazon).

Since mixed paper is such a large portion of the recycling stream, the reduction in generation and capture of mixed paper may have contributed to the reduction of the regional capture rate. However, since mixed paper is a lower value commodity compared to other materials that had increased in capture the overall value of recycling materials increased between 2019 and 2020. The increase in capture of strategic high-value materials may be attributed to the efforts of the regional campaign coordinating key messaging among Participating Cities.

Based on the results of the 2020 sorting event and comparison to the results of previous years' sorting events, Burns & McDonnell concludes that the regional campaign has established an effective foundation for communicating key recycling messaging to residents and increasing the capture rate of strategic materials in the region. Although there are ongoing challenges that have been identified (i.e. decreased overall capture rate, increased contamination), by increasing the capture of strategic and high value recycling materials though the sustained engagement with residents across the region, the campaign has proven effective at supporting the needs of both municipalities and recycling processors. As such, the campaign is well positioned to continue helping NCTCOG and its members realize the long-term benefits of an increasingly robust, safe and cost-effective recycling system in North Central Texas.

Please see the garbage and recycling composition results and ranking analysis on the attached pages and thank you again for your support to develop this regional effort. If you have any questions please do not hesitate reach out to Eric Weiss at ebweiss@burnsmcd.com or (737) 242-7830 and Scott Pasternak at spasternak@burnsmcd.com or (512) 872-7141.