

November 2, 2007

Via Federal Express

Mr. John Promise
Department of Environmental Resources
North Central Texas Council of Governments
616 Six Flags Drive, Centerpoint Two Building
Arlington, Texas 76011

Subject: Regional Recycling Rate Benchmarking Study – Final Report

Dear Mr. Promise:

R. W. Beck, Inc. is pleased to provide the North Central Texas Council of Governments (NCTCOG) with the final report for the Regional Recycling Rate Benchmarking Study.

The analysis and recommendations presented in this study would not be possible without the assistance of many organizations and individuals in the North Central Texas region. We would like to express our sincere appreciation to those who participated in the conduct of this study. It is particularly important to note the extensive participation from members of the Time to Recycle (TTR) Subcommittee, NCTCOG staff and many of the cities and private recycling processing companies in the region. This study should be considered a landmark effort within the State of Texas.

If you have any questions concerning the enclosed report please call me at (512) 651-6405. We look forward to future opportunities to continue assisting the NCTCOG with important solid waste management issues.

Sincerely,

R. W. BECK, INC.

Scott Pasternak
Senior Director

North Central Texas Council of Governments Regional Recycling Rate Benchmarking Study

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- Appendix A – Glossary of Terms
- Appendix B – Municipal Survey
- Appendix C – Processor Survey
- Appendix D – Recycling Rates Map

This report has been prepared for the use of the client for the specific purposes identified in the report. The conclusions, observations and recommendations contained herein attributed to R. W. Beck, Inc. (R. W. Beck) constitute the opinions of R. W. Beck. To the extent that statements, information and opinions provided by the client or others have been used in the preparation of this report, R. W. Beck has relied upon the same to be accurate, and for which no assurances are intended and no representations or warranties are made. R. W. Beck makes no certification and gives no assurances except as explicitly set forth in this report.

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Executive Summary

ES.1 Introduction

In June 2006, the North Central Texas Council of Governments (NCTCOG) retained R. W. Beck, Inc. (R. W. Beck) to conduct the Regional Recycling Rate Benchmarking Study (Study). The purpose of this Study is to develop recycling rates for the 16-county North Central Texas region. R. W. Beck has developed residential, ICI (industrial, commercial, and institutional) and overall recycling rates to serve as a benchmark to measure the success of future recycling initiatives.

ES.2 Background

Recycling programs have existed in North Central Texas since the 1970's and vary widely across the region. As success rates of programs in the region have varied, it is difficult to track the progress of initiatives to increase recycling. Because of this, the Time to Recycle (TTR) Subcommittee of the Resource Conservation Committee has identified the need to establish baseline residential, ICI, and overall recycling rates that are specific to the North Central Texas region. These recycling rates will provide public and private entities with a way to measure the success of future initiatives to increase recycling.¹

The NCTCOG received a solid waste management grant from the Texas Commission on Environmental Quality (TCEQ) to conduct the Regional Recycling Rate Benchmarking Study. In June 2006, the NCTCOG retained R.W. Beck to conduct the Private Processor Survey (processor survey) portion of this Study. At that time, NCTCOG staff took responsibility for the Municipal Recycling Survey (municipal survey) portion of the project. The NCTCOG was able to undertake this level of involvement in the project due to the extensive survey experience and expertise of a key NCTCOG staff member. However, during the conduct of the municipal survey, this staff member accepted a solid waste management position at one of the NCTCOG member cities and had to discontinue work on the municipal survey. In April 2007, the NCTCOG retained R. W. Beck to continue and finalize the municipal survey effort and integrate the results of the municipal and processor surveys in this report.

The challenges associated with developing regional recycling rates are significant. There are many methodologies that are available to calculate regional recycling rates. In order to ensure the validity of the analysis used in this study, R. W. Beck applied a methodology that is consistent with studies that have been done in other states. R. W. Beck also relied on the handbook "Measuring Recycling: A Guide for State and

¹ It should be noted that TCEQ's proposed statewide recycling goal is 40 percent, as identified in 30 TAC, Chapter 328, Subchapter B.

Local Governments” created by the Environmental Protection Agency (EPA) to guide the development of the methodology used in this Study. In addition, R. W. Beck recognized that the use of recycling terminology can vary across different studies. For this reason, R. W. Beck has provided a glossary that defines specific terms used in this report (e.g. processor, hauler, organic waste). This glossary of terms may be found in Appendix A.

ES.3 Report Organization

This report is organized into five sections, plus this Executive Summary. The sections of this report, as well as appendices, are listed below.

- Executive Summary
- Section 1 – Methodology
- Section 2 – Survey Execution and Response Rate
- Section 3 – Data Analysis
- Section 4 – Municipal Recycling Summary
- Section 5 – Lessons Learned, Key Findings and Recommendations
- Appendix A – Glossary of Terms
- Appendix B – Municipal Recycling Survey
- Appendix C – Private Processor Survey
- Appendix D – Regional Recycling Rate Map

ES.4 Methodology

Section 1 provides an overview of the methodology employed to develop the study. R. W. Beck, NCTCOG staff and the TTR subcommittee coordinated closely during all phases of the project to ensure that the methodology was developed in a sound and consistent manner. This methodology employed for this study is also consistent with the EPA handbook “Measuring Recycling: A Guide for State and Local Governments.”

ES.4.1 Survey Design

R. W. Beck and NCTCOG staff shared survey design responsibilities for the municipal and private processor surveys. NCTCOG staff was primarily responsible for the municipal survey and R. W. Beck took the lead on the processor survey. NCTCOG staff and R. W. Beck developed the surveys based on the EPA handbook “Measuring Recycling: A Guide for State and Local Governments.” R. W. Beck, NCTCOG staff, and the TTR subcommittee worked together to refine the municipal and processor surveys into final form. Copies of the two surveys are presented in Appendix B and Appendix C of this report.

R. W. Beck considered the issue of confidentiality in designing the processor survey. R. W. Beck made clear to participating processors that specific responses provided by survey respondents would remain confidential and that no individual processor's response would be provided to the NCTCOG. The goal of this assurance of confidentiality was to increase participation in the processor survey. In addition, R. W. Beck provided respondents with a copy of a confidentiality agreement that they could opt to sign and have signed by R. W. Beck. Virtually all of the processor survey participants opted to enter into the confidentiality agreement with R. W. Beck.

ES.4.2 Data Gathering

NCTCOG staff and R. W. Beck worked together to develop the list of municipalities and processors to include in the survey. NCTCOG distributed the initial surveys to the municipalities and processors that were included in the survey. NCTCOG staff was initially responsible for the follow-up effort for the municipal survey; however, this responsibility was transferred to R. W. Beck in April 2007. In addition, R. W. Beck was responsible for following up with non-responsive processors in an effort to increase the processor survey response rate.

ES.4.3 Analysis

R.W. Beck analyzed the data collected from the municipal and processor surveys. R.W. Beck compared recyclable tonnage totals to total regional municipal solid waste (MSW) generation to determine residential, ICI, and overall recycling rates within the North Central Texas region. In calculating total MSW disposal within the North Central Texas region, R. W. Beck excluded MSW that was imported into the region and included MSW that was generated in the region and then exported for disposal.

R. W. Beck took the necessary steps to ensure that recycling data was not double counted. Specifically, in calculating the regional recycling rates, R. W. Beck used the municipal survey as the source for residential recycling data. ICI recycling data collected from the municipal survey was not used in this analysis. Additionally, R. W. Beck used the processor survey as the source for ICI recycling data.

ES.5 Calculating the Regional Recycling Rate

R. W. Beck's first step in determining regional recycling rates was to develop a methodology for the calculation of these rates. R. W. Beck relied on the EPA handbook "Measuring Recycling: A Guide for State and Local Governments" as the guideline for developing this methodology. The EPA handbook uses the following formula to determine MSW recycling rates:

$$MSW \text{ Recycling Rate (\%)} = \frac{\text{Total MSW Recycled}}{\text{Total MSW Generated}} \times 100$$

ES.6 Survey Execution and Response Rate

Section 2 describes the specific strategies and efforts employed in conducting both the municipal and processor surveys. It also includes a discussion of the response rates for the municipal and processor surveys.

ES.6.1 Municipal Surveying

NCTCOG staff leveraged its internal database of municipal contacts in order to compile a list of municipalities to include in the survey. A total of 70 cities were selected to participate in the survey. By selecting the largest 70 cities in the North Central Texas region, all cities with a population greater than 7,000 were included. These 70 cities represent 87.6 percent of the total population in the North Central Texas region. Table ES-1 lists the cities that were included in the municipal survey.

Table ES-1
Cities Included in Municipal Survey

City Names			
Addison	Denton	Highland Village	Rockwall
Allen	Desoto	Hurst	Rowlett
Arlington	Duncanville	Irving	Sachse
Azle	Ennis	Keller	Saginaw
Balch Springs	Eules	Lancaster	Seagoville
Bedford	Farmers Branch	Lewisville	Southlake
Benbrook	Flower Mound	Little Elm	Stephenville
Burleson	Forest Hill	Mansfield	Terrell
Carrollton	Forney	McKinney	The Colony
Cedar Hill	Fort Worth	Mesquite	Trophy Club
Cleburne	Frisco	Midlothian	University Park
Colleyville	Garland	Mineral Wells	Watauga
Commerce	Glenn Heights	Murphy	Waxahachie
Coppell	Grand Prairie	North Richland Hills	Weatherford
Corinth	Grapevine	Plano	White Settlement
Corsicana	Greenville	Richardson	Wylie
Crowley	Haltom City	Richland Hills	
Dallas	Highland Park	River Oaks	

NCTCOG staff followed up with municipalities that did not meet the initial deadline in an effort to obtain their data. As a result of their follow up efforts, 44 of the 70 municipalities returned surveys to the NCTCOG. At the time that R. W. Beck undertook responsibility for the municipal surveying, only eight of the 44 responding

cities had submitted surveys containing complete data. R. W. Beck worked to obtain complete survey information from all cities, including those that had not responded.

R. W. Beck received a total of 64 municipal survey responses for a response rate of 91 percent. These responses represent 97 percent of the population of the cities included in the survey. Table ES-2 describes the survey response rate based on population.

Table ES-2
Municipal Surveying Response Rate

	Number of Cities	Population
Responses Received	64	5,032,122
Total Cities Surveyed	70	5,184,613
Response Rate (%)	91%	97%

Table ES-3 provides a detailed summary of the sources of these survey responses.

Table ES-3
Municipal Survey Response Detail Summary

Source of Response	Number of Cities	Percent of Total Cities	Population Represented	Percent of Population
Total Cities Surveyed	70	100%	5,184,613	100%
Responses Received by NCTCOG	8	11%	1,387,717	27%
Responses Received by R.W. Beck				
From city	24	34%	2,318,332	45%
From private hauler	23	33%	777,494	15%
From other source	8	11%	532,843	10%
Total R.W. Beck Responses	55	79%	3,628,669	70%
Total Survey Responses	64	91%	5,032,122	97%
Unresponsive				
Cities	3	4%	61,525	1%
Private haulers	3	4%	90,966	2%
Total Unresponsive Cities	6	9%	152,491	3%

ES.6.2 Private Processor Surveying

R. W. Beck and NCTCOG staff compiled a comprehensive list of processors within the 16-county North Central Texas region. This list included processors of primary MSW recyclables, other MSW recyclables, and construction and demolition (C&D) materials. At the outset of the survey, NCTCOG and R. W. Beck agreed to prioritize primary MSW processors for the processor survey. For the purposes of this Study, primary MSW processors were defined as private companies that haul or process one

or more of the following recyclable materials: food waste, glass, metals, paper, plastics, textiles, wood, and yard trimmings.

Initially, 65 primary MSW processors were identified by NCTCOG and R. W. Beck. This initial list of processors was refined to a final list of 55 processors. Since R. W. Beck placed priority on primary MSW processors, budgetary constraints prohibited R. W. Beck from surveying other MSW and C&D processors. These budgetary constraints were driven by the following factors:

- An initial low response rate to the survey of primary MSW recyclers, which caused additional project budget dollars to be allocated towards increasing the response rate of this survey; and
- No survey of this kind had been previously undertaken within the North Central Texas region.²

As of the initial deadline of September 2006, nine percent of the processors surveyed had submitted a survey response. In order to increase the survey response rate, R. W. Beck placed several hundred follow-up phone calls with previously unresponsive processors. These efforts led to a significant increase in the response rate between the initial survey deadline and the final survey deadline.

As of the final survey deadline, R. W. Beck had received 36 completed surveys for a survey completion rate of 65.5 percent. R. W. Beck would like to express appreciation for the companies that participated in the processor survey. These companies are not identified in this report because of the confidentiality agreement.

R. W. Beck included in the survey response rate both processors that completed surveys and processors that refused to participate in the survey. Therefore, there were 45 processors classified as having responded to the survey for a response rate of 81.8 percent. Table ES-4 provides a summary of responses to the processor survey.

Table ES-4
Private Processor Survey Responses

	Number of Processors	Percentage of Processors
Surveys Distributed	55	100.0%
Unresponsive Processors	10	18.2%
Survey Responses		
Surveys Completed	36	65.5%
Refused to Participate	9	16.4%
Total Response Rate	45	81.8%

² Updates of this initial survey should be more efficient. R. W. Beck would expect that a survey of C&D processors, in addition to the basic MSW survey, could be completed in the next survey round.

ES.7 Data Analysis

Section 3 describes how R. W. Beck utilized data collected in the municipal survey and the processor survey to calculate residential, ICI and overall recycling rates for the North Central Texas region. R. W. Beck describes the methodology for calculating residential and ICI disposal. In addition, R. W. Beck summarizes total residential and ICI recycling on a commodity-by-commodity basis.

ES.7.1 Disposal Data

R. W. Beck collected data from the 24 landfills in the North Central Texas region in order to calculate regional MSW disposal for the survey time period. However, in order to calculate residential and ICI recycling rates, R. W. Beck needed to determine how much of this disposal could be attributed to residential and how much could be attributed to ICI. R. W. Beck used data gathered from the municipal survey to determine how much of the regional MSW disposal to categorize as residential. R. W. Beck extrapolated the disposal data for the cities that did not submit disposal data in response to the municipal survey. ICI disposal data was not requested as part of the processor survey. In order to estimate total ICI disposal, R. W. Beck subtracted total residential disposal from total regional disposal.

R. W. Beck utilized disposal data from the 24 landfills within the North Central Texas region in order to determine total regional disposal. R. W. Beck obtained landfill disposal information from the annual report data that each facility is required to submit to the TCEQ. For the survey time period these landfills disposed of 8,854,867 tons.

However, in order to calculate the regional recycling rate, R. W. Beck needed to calculate how much of this disposal was generated in the North Central Texas region. Therefore, R. W. Beck contacted each landfill within the North Central Texas region to determine the amount of waste that was imported into that landfill from outside of the North Central Texas region. R. W. Beck contacted each landfill in counties adjacent to the 16-county North Central Texas region to determine if any North Central Texas waste was exported outside of the region. Landfill operators consider waste import and export information to be proprietary. In order to keep the import and export data of each landfill confidential, R. W. Beck has presented this information on an aggregated basis. A net total of 131,931 tons was imported into the region, which decreased the North Central Texas MSW disposal to 8,722,936 tons.

ES.7.1.1 Residential Disposal Data

Since not all cities were able to provide disposal data, there was a need to extrapolate data for the remaining cities. R. W. Beck would mention that the methodology employed in this section is primarily based on the methodology that R. W. Beck originally developed to complete the Metroplex Solid Waste Study in 2004. The purpose of this prior study was to understand the quantity of material being generated, disposed and recycled between residential and ICI sectors in the Dallas-Fort Worth Metroplex.

Of the 70 cities that were included in the municipal survey, 29 provided residential disposal data in response to the survey.³ R. W. Beck utilized data from these 29 cities to quantify disposal rates for these cities. The average disposal per single family resident for these 29 cities was 1,083 pounds for FY 2005. For those 41 cities that did not report residential disposal in response to the survey, R. W. Beck extrapolated residential disposal based on an average of 1,083 pounds of garbage per single family resident.

ES.7.1.2 ICI Disposal Data

For the purposes of this analysis, R. W. Beck assumed that all waste not accounted for in residential tonnage may be classified as ICI waste. In order to estimate total ICI disposal for the survey time period, R. W. Beck subtracted residential disposal from total North Central Texas MSW disposal. Based on this calculation, ICI disposal for the survey time period is 6,245,248 tons.

The purpose of the ICI disposal data extrapolation is to estimate the amount of ICI disposal that is generated in each of the 70 municipalities that were surveyed. As discussed in Section 2, 25 of the cities that responded to the survey were able to provide ICI disposal data. However, it is likely that the ICI disposal data reported by these cities understates actual disposal because many cities have an open market system for ICI refuse collection. R. W. Beck was able to confirm that six of these 25 cities have closed systems with one company exclusively collecting all of the ICI waste in the city. In order to determine ICI disposal for the remaining 64 cities, R. W. Beck extrapolated the remaining 5,809,340 tons of waste based on number of employees in each city.

³ These 29 cities represent 74.5 percent of the population of the North Central Texas cities that were included in the survey.

ES.7.2 Residential Recycling

Table ES-5 provides a summary by material of total residential recycling in the North Central Texas region. Based on the data collected in the municipal surveying, total North Central Texas residential recycling for the survey time period is 344,839 tons.

Table ES-5
Residential Recycling Materials Summary
September 2004 – August 2005

Material	Tons	% of Total
Primary MSW		
Metal	10,604	3.1%
Plastic	9,001	2.6%
Paper	136,368	39.5%
Yard Trimmings	148,761	43.1%
Glass	11,507	3.3%
Wood	545	0.2%
Food Waste	0	0.0%
Textiles	20	0.0%
Commingled/Other	25,627	7.4%
Other MSW		
Tires	1,110	0.3%
Consumer Electronics	199	0.1%
HHW	968	0.3%
Construction and Demolition	129	0.0%
Total Residential Recycling	344,839	100%

ES.7.3 ICI Recycling

Table ES-6 provides a summary by material of total ICI recycling in the North Central Texas region. Based on the data collected in the processor survey, ICI recycling in the North Central Texas region was 1,290,462 tons for the survey time period.

Table ES-6
ICI Recycling Materials Summary
September 2004 – August 2005

Material	Tons	% of Total
Primary MSW		
Metal	675,548	52.3%
Plastic	10,503	0.8%
Paper	511,374	39.6%
Yard Trimmings	34,701	2.7%
Glass	10,781	0.8%
Wood	1,040	0.1%
Food Waste	-	0.0%
Textiles	-	0.0%
Commingled/Other	17,270	2.3%
Other MSW		
Tires	-	0.0%
Consumer Electronics	50	0.0%
HHW	1	0.0%
Construction and Demolition	29,194	2.3%
Total ICI Recycling	1,290,462	100%

ES.7.4 Regional Recycling Rate

Based on the data collected from the municipal and processor surveys, R. W. Beck calculated an overall regional recycling rate of 15.8 percent. R. W. Beck would note that with a municipal survey response rate of 91 percent and a processor survey response rate of 81.8 percent, it is likely that this recycling rate does not account for all of the diversion activities that are currently taking place in the region. Table ES-7 summarizes R. W. Beck's calculation of the North Central Texas regional residential, ICI, and overall recycling rates.

Table ES-7
North Central Texas Regional Recycling Rates
September 2004 – August 2005

	Residential	ICI	Overall
Disposal	2,477,659	6,245,278	8,722,936
Recycling	344,839	1,290,462	1,635,301
Waste Generation	2,822,498	7,535,740	10,358,237
Regional Recycling Rate	12.2%	17.1%	15.8%

ES.8 Municipal Recycling Summary

Section 4 summarizes the recycling data obtained from the 70 cities surveyed. For each city that responded to the survey, R. W. Beck summarized the recycling and disposal data provided in the survey response. For those cities that did not respond, R.W. Beck described the efforts undertaken in order to obtain a completed survey.

R. W. Beck calculated the residential recycling rates for each municipality. However, R. W. Beck calculated ICI recycling rates for only the 13 cities that provided commercial recycling data in response to the survey. Additionally, R. W. Beck only calculated an overall recycling rate for those cities that provided both residential and ICI recycling data. Traditionally, most cities' recycling programs in the North Central Texas region have focused on the residential waste stream. However, R. W. Beck has included each city's ICI disposal amount in the discussion of recycling rates in order to show the potential diversion opportunities that exist in the ICI waste stream.

Table ES-8 provides a summary of the residential recycling rates based on data that was reported by the cities in response to the municipal survey. The cities are listed alphabetically within ranges. Section 4 includes more detailed tables that provide information concerning recycling rates by City and residential recycling and disposal per household.

Table ES-8
2004-05 Reported Residential Recycling Rates by Municipality
(Communities listed alphabetically within ranges)

0.1% to 4.9% Reported Recycling Rate		5.0% to 9.9% Reported Recycling Rate	
Corsicana		Azle	McKinney
Farmers Branch		Carrollton	Midlothian
Seagoville		Cedar Hill	North Richland Hills
		Corinth	Richardson
		Dallas	Richland Hills
		DeSoto	Rockwall
		Eules	Rowlett
		Flower Mound	Sachse
		Keller	Saginaw
		Lewisville	Wylie
		Mansfield	
10.0% to 14.9% Reported Recycling Rate		15.0% to 19.9% Reported Recycling Rate	
Bedford	Grand Prairie	Addison	
Coppell	Grapevine	Arlington	
Colleyville	Hurst	Benbrook	
Crowley	Irving	Cleburne	
Duncanville	Murphy	Little Elm	
Forney	The Colony	University Park	
20.0% to 24.9% Reported Recycling Rate		25.0% to 29.9% Reported Recycling Rate	
Fort Worth		Allen	Highland Park
		Burleson	Highland Village
		Frisco	
30.0% to 34.9% Reported Recycling Rate		35.0% and Greater Reported Recycling Rate	
Denton	Garland	Mesquite	Plano

R. W. Beck calculated recycling rates for the 52 cities listed in Table ES-8 but was unable to calculate recycling rates for the remaining 18 cities. The following details the reasons that R. W. Beck was unable to calculate a recycling rate for these cities:

- **Cities that have a residential recycling program in place, but records of tonnages are not kept:**
 - Glenn Heights
 - Trophy Club

- Watauga
- **Cities that did not have residential recycling programs in place during the survey time period.**
 - Commerce
 - Forest Hill
 - Lancaster
 - Mineral Wells
 - River Oaks
 - Southlake
 - Stephenville
 - Terrell
 - White Settlement
- **Cities that did not respond to the survey.**
 - Balch Springs
 - Ennis
 - Weatherford
- **Cities that agreed to participate in the survey but their private haulers were unresponsive to data requests.**
 - Greenville
 - Haltom City
 - Waxahachie

ES.9 Lessons Learned, Key Findings and Recommendations

Since this is the first study of its kind performed in the North Central Texas region, it is important to provide an understanding of how efforts to develop the Study progressed and a discussion of lessons learned, key findings and recommendations. Section 5 evaluates how the process could be improved in the future, especially in cases where data limitations exist. This section also provides a brief analysis of the various recycling rates in the North Central Texas region.

ES.9.1 Comparison of Survey Response Rate to Other Select Surveys

To gauge the success of the survey efforts for the North Central Texas region, R. W. Beck compared the results from this Study to other states that have been conducting

statewide recycling studies for a number of years. Based on these other states' experiences, there are two key drivers to high survey response rates: (1) years of surveying; and (2) incentives to respond to the survey. As years of surveying increase, processors become more familiar with the goals of the survey and display more willingness to respond. The greatest driver in achieving the highest possible survey response rate is providing processors with financial or legal incentives to complete the survey. However, these incentives do not currently exist in Texas. Table ES-9 compares survey response rates across a number of governmental entities.

Table ES-9
Comparison of Survey Completion Rates

Governmental Entity	Survey Completion Rate	Years of Surveying	Financial or Legal Incentive for Companies to Respond?
State of Washington	98%	20	Yes
State of Massachusetts	65%	7	No
NCTCOG ^[1]	80%	1	No

[1] R. W. Beck calculated a blended response rate by combining the processor completion rate with the municipal survey response rate. A total of 36 out of 55 processors completed the survey, and a total of 63 of 70 municipalities completed the municipal survey. R. W. Beck divided the total number of completed surveys by the total number of surveyed entities to calculate the blended response rate: $(36+64)/(55+70) = 80\%$

ES.9.1.1 Survey Response Rate Key Findings and Recommendations

- The 81.8 percent ICI and 91 percent municipal response rate should be considered a success.** Also, the ICI survey completion rate of 65.5 is relatively similar to the State of Massachusetts, which has been conducting its survey for a longer time period.
- The best opportunity to increase the response rate to the survey will be to continue administering the survey on a consistent basis.** By administering the survey every two years, processors and municipalities will begin to expect the need to complete the survey. A two year update will also provide the opportunity to benchmark recycling progress on a consistent basis.⁴

ES.9.2 Survey Response Rate from Private Processors

As expected, obtaining survey responses from private processors was a challenge. However, the 65.5 percent completion rate from the private processors reflects that a clear majority of companies were willing to participate. Nevertheless, other survey respondents were unwilling or unable to complete the survey for the following reasons:

⁴ The TCEQ has recommended that this survey be updated annually and that the Study be updated every other year. While there are many potential benefits to conducting the survey on an annual basis, the costs associated with this effort would be significant for the NCTCOG. Because of this, R. W. Beck would recommend updating the survey and the Study every 2 years.

- Non-responsiveness to repeated phone calls and site visits;
- Unfulfilled promises to complete surveys;
- Too busy;
- Data quality concerns (lack of scales, lack of ability to estimate tonnage);
- Not interested unless required by law; and
- Protesting government subsidization of public recycling.

ES.9.2.1 Private Processor Survey Key Findings and Recommendations

1. **Confidentiality was critical in ensuring a high survey completion rate from the private processors.** As such, R. W. Beck would recommend that NCTCOG utilize a third-party surveyor for the conduct of future surveys.
2. **Providing a benefit to survey respondents will encourage their participation in future surveys.** A potential benefit would be to provide each private processor with an electronic copy of the report.
3. **When conducting future recycling studies, R. W. Beck would recommend that the study include a limited survey of multiple types of businesses by industry sector.** The results of this survey effort could be cross referenced with the survey of the processors to better estimate an ICI recycling rate.
4. Based on discussions with NCTCOG staff and members of the TTR subcommittee, R. W. Beck identified processors that did not participate in Section 2.3 of this report as a way to encourage future participation.

ES.9.3 Survey Response Rate from Municipalities

The response rate from the municipalities was very strong. In fact, only six cities, which account for four percent of the surveyed population, did not participate in the survey. The remaining 64 cities, which comprise 97 percent of the surveyed population, did complete the survey directly or authorize NCTCOG to obtain the recycling data directly from their private haulers. While several of the private haulers were cooperative and responsive to the request for the recycling data, some of the companies were reluctant to provide the data. In many cases, the private haulers did provide the requested data, but it also appears that they are not providing program data to their cities. Going forward, cities whose private haulers did not provide the data should be able to make changes in their solid waste and recycling collection contracts to ensure that this data is provided to the city or made available for future surveys.

ES.9.3.1 Municipal Survey Key Findings and Recommendations

1. **To address the problem of cities having challenges with their haulers providing requested data, R. W. Beck would recommend that cities include provisions in their recycling contracts requiring their private hauler to provide recycling data to the city on a monthly basis and to the NCTCOG as needed.** It is our understanding that the TTR subcommittee has

considered a future NCTCOG priority implementation project, “Developing a Recycling Contract Negotiation Guidebook and Recycling Ordinances and Design Guidelines to Increase Recycling in the Region.” This project would provide an excellent forum to communicate language that should be included in future municipal recycling contracts.

ES.9.4 Overall Recycling Rate Results

Based on this survey, the recycling rate for the North Central Texas region was 15.8 percent. While this recycling rate is lower than rates typically published for other areas of the country, it is important to understand the following factors that contribute to the recycling rate differential:

- This survey did not extrapolate any recycling amounts based on private companies or municipalities that did not provide data. While the methodology for this is sound, it does result in an under-reporting of the quantity of material being recycled in the region since the results are based on actual reported data.
- Since this was the initial effort to calculate the recycling rate in the North Central Texas region, some companies and cities were reluctant to participate. It is likely that future surveys will build on the momentum established by this initial effort.
- While this survey did include some construction and demolition recycling data, it did not include a comprehensive survey of processors of this material and likely under reports the actual amount of this material that is being recycled.
- Tipping fees in the North Central Texas region are among the lowest in the country, which can minimize incentives to recycle.
- There are no mandated recycling goals in Texas or the North Central Texas region, as compared to other states (e.g. California) that require cities to meet very high recycling rates.

While the recycling rate in the North Central Texas region is not at the level as some other areas of the county, R. W. Beck believes that extensive opportunities do exist to increase recycling in the North Central Texas region. Results from the processor and municipal surveys provide specific detail concerning opportunities to increase recycling. Future versions of this survey should be benchmarked against the results of this survey to measure success.

ES.9.4.1 Overall Results Key Findings and Recommendations

1. **In order to make relevant “apples-to-apples” comparisons of future surveys to this initial survey, R. W. Beck would recommend that the NCTCOG maintain the same methodologies used in conducting this survey in future surveying efforts.**
2. **Based on the results of this Study, NCTCOG and its membership should collaborate to determine the best opportunities to improve recycling efforts in the region.** For example, NCTCOG should work in cooperation with cities and private processors (including but not limited to those processors that responded to

the processor survey) to promote recycling within North Central Texas through a public education campaign.

3. NCTCOG should utilize data gathered within this survey effort, as well as data gathered in future surveying efforts, to recommend the continued development of and changes to area recycling programs.
4. This survey should be updated every two years to monitor progress of improving area recycling programs.

ES.9.5 ICI Recycling Rate Results

The ICI waste stream comprises a very significant component of the MSW stream in North Central Texas. In fact, based on this survey, ICI disposal accounts for approximately 75 percent of the waste being disposed in the North Central Texas region. Based on waste characterization studies that R. W. Beck has completed for other clients in the United States, the allocation between ICI and residential waste is typically closer to 40 to 60 percent ICI waste. Therefore, having closer to 75 percent ICI waste further implies the importance of this part of the waste stream, especially with regard to developing programs to minimize ICI waste.

Approximately 1.3 million tons (equal to a 17.2 percent recycling rate) of material are being recycled on an annual basis. Metal (675,548 tons) and paper (511,374 tons) account for 91.9 percent of the ICI material being recycled. As discussed in Section 5.5, the ICI recycling rate for the North Central Texas region is lower than other areas of the county. However, low tipping fees, survey participation rates and incomplete construction and demolition material contribute to this lower recycling rate.

ES.9.5.1 ICI Recycling Results Key Findings and Recommendations

1. **Given that ICI waste comprises such a significant percentage of the waste stream, it is important to develop programs focused on minimizing ICI waste.** Along these lines, NCTCOG has developed goals that are focused on the ICI component of the waste stream. In addition, several North Central Texas cities and private companies have developed very successful ICI recycling programs.
2. R. W. Beck would recommend that NCTCOG, local governments and private companies continue and/or increase their ICI recycling efforts.

ES.9.6 Municipal Recycling Rate Results

As expected, there is a tremendous range in the recycling rates of the cities included in this survey. While the overall municipal recycling rate is 12.2 percent, a number of cities have higher recycling rates. In fact, nine of the cities had recycling rates greater than 25 percent.⁵ Another six cities achieved recycling rates that ranged from 15 to 25 percent.⁶

⁵ These cities include Allen, Burleson, Denton, Frisco, Garland, Highland Park, Highland Village, Mesquite, and Plano.

⁶ These cities include Benbrook, Little Elm, Addison, Cleburne, University Park and Fort Worth.

Another approach to measuring the success of a municipal recycling program is based on the quantity of material recycled on an annual per household basis. This analysis is specific to materials that would be included as a part of a typical recycling program, and excludes organic waste, such as yard waste. Based on extensive industry experience, R. W. Beck has an understanding of the quantity of material being recycled through other successful recycling programs in the United States. For a mature program, R. W. Beck would expect that it would be reasonable for a single-stream program to yield 700 pounds of material per household, and for a dual-stream program to yield 500 pounds of material per household. Of the surveyed cities in the North Central Texas region, only five cities are recycling at least 500 pounds annually per household.⁷

While this study did not include a review of any of the city's individual program, R.W. Beck does have a fundamental understanding of many of the recycling programs in the region based on previous projects for the NCTCOG or individual cities. Based on this experience, the following summarizes key characteristics of successful recycling programs in the North Central Texas region:

- The collection of organic waste represents a significant portion of the material being diverted for many cities. These cities often have a dedicated yard waste collection program and process material into mulch and/or compost.
- Paper, specifically mixed paper, comprises a very significant amount of material recycled for successful recycling programs.
- Several of the cities have successfully implemented single-stream recycling, which has contributed to their relatively high recycling rates.
- A consistent and well-funded public education program helps to ensure that residents know how to participate in the recycling program.

It is also important to mention that several of the cities in North Central Texas have implemented source reduction programs designed to minimize the quantity of material generated. For example, several cities limit or ban the quantity of yard waste that can be collected, requiring residents to mulch or compost at home. While these programs are preferable to recycling, they can not be easily quantified. This could directly decrease the recycling rates for cities such as Arlington, Dallas and Grand Prairie.

ES.9.6.1 Municipal Recycling Results Key Findings and Recommendations

1. **Many cities have developed successful recycling programs that are diverting significant quantities of material for recycling.** Key characteristics of these programs include a focus on collection of mixed paper and organics, utilizing single-stream programs and well-funded public education campaigns.
2. **Only five of the surveyed cities are recycling (excluding organic waste) more than 500 pounds per household annually. Given that many cities in the region have implemented curbside recycling programs, R. W. Beck**

⁷ These cities include Crowley, Frisco, Highland Village, Little Elm and Plano.

would recommend that cities assess options to increase diversion quantities from these existing programs. This assessment could include but not be limited to reviewing public education, collection and processing methods and financial rate pricing.

3. **Other cities that do not have as successful recycling programs could certainly further develop their programs to increase their recycling rates.** It appears that the successful municipal programs span a range of geographic and demographic features in the region, which implies that cities with lower recycling rates would not have an inherent challenge to developing a successful program.
4. Several cities in the region, such as Dallas with a change to single-stream collection and Southlake with a new recycling program, have implemented significant changes in their recycling programs since the survey time period. Future benchmarking studies will be able to evaluate the impacts that these cities, and possibly others, may achieve based on program changes.

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Section 1

Methodology

1.1 Overview

This section provides an overview of the methodology employed to develop the Regional Recycling Rate Benchmarking Study. R. W. Beck, NCTCOG staff and the TTR subcommittee coordinated closely during all phases of the project to ensure that the methodology would be developed in a sound and consistent manner. This methodology employed for this study is also consistent with the EPA handbook “Measuring Recycling: A Guide for State and Local Governments.”

1.2 Survey Design

The following subsections discuss the design of the municipal and processor surveys. Subsequent sections of this report discuss the execution of surveys and the analysis of survey results.

1.2.1 Municipal Survey

NCTCOG staff designed the municipal recycling survey based on the EPA handbook “Measuring Recycling: A Guide for State and Local Governments.” R. W. Beck, NCTCOG staff, and the TTR subcommittee worked together to refine the survey instrument into its final form. A copy of the municipal survey is presented in Appendix B of this report.

NCTCOG staff designed the municipal survey to provide detailed insight into municipal recycling. The first page of the survey requested respondent information. On this first page, the survey respondent also indicated if their municipality contracted for hauling of garbage and recycling. If the respondent did not have access to the data requested on the survey, they had the option to authorize NCTCOG staff to request information directly from the hauler on the city’s behalf.

The next six pages of the municipal survey requested residential and ICI recycling data on a commodity-by-commodity basis. Data collected on the municipal survey included the following types of recyclables:

- Primary MSW (residential and ICI);
- Other MSW (residential and ICI, where applicable); and
- C&D material.

In an effort to avoid double counting of data, the municipal survey also requested that cities identify the facility to which each material was transported for processing.

The final page of the municipal survey requested residential and ICI disposal data. R.W. Beck utilized this data to calculate the municipal recycling rate, as discussed in Section 3.

1.2.2 Private Processor Survey

R. W. Beck developed the processor survey based on the EPA handbook “Measuring Recycling: A Guide for State and Local Governments.” R. W. Beck, NCTCOG staff, and the TTR subcommittee worked together to refine the processor survey into its final form. A copy of the processor survey is presented in Appendix C of this report.

R. W. Beck designed the processor survey to provide detailed insight into ICI recycling activity. The first page of the survey requested respondent information, such as company name, contact information and the primary business activity. The following two pages of the processor survey requested data regarding residential and ICI recycling. As with the municipal survey, the processor survey requested data relating to the following material classifications:

- Primary MSW (residential and ICI);
- Other MSW (residential and ICI, where applicable); and
- C&D material.

R. W. Beck divided the processor survey into three sections based on the above material classifications. Within each of these three sections of the survey, respondents provided data as to the amount of each type of material processed originating from residential and ICI sources.¹ The survey requested that the processors provide detail on the geographic location where the recycling material was generated. However, R. W. Beck found that very few processors were able to provide recycling data on a zip code or county-by-county basis because this information is not typically tracked by processors. In fact, only one processor provided recycling data by geographic region. For this reason, all recycling data from the processor survey is presented within this report on an aggregated, Metroplex-wide basis.

R. W. Beck considered the issue of confidentiality in designing the survey. R. W. Beck made clear to participating processors that specific responses provided by survey respondents would remain confidential and that no individual processor’s response would be provided to NCTCOG. The goal of this assurance of confidentiality was to increase participation in the processor survey. In addition, R. W. Beck provided respondents with a copy of a confidentiality agreement that they could opt to sign and have signed by R. W. Beck. Virtually all of the processor survey participants opted to enter into the confidentiality agreement with R. W. Beck.

¹ If a processor did not have a year’s worth of recyclable data to provide, R. W. Beck asked that the processor estimate annual totals. R. W. Beck utilized its industry knowledge, and data from comparable firms to confirm the reasonableness of estimated recyclable totals.

1.3 Data Gathering

NCTCOG staff and R. W. Beck worked together to develop the list of municipalities and processors to include in the survey. NCTCOG distributed the initial surveys to the municipalities and processors that were included on the final list. NCTCOG staff was initially responsible for the follow-up effort for the municipal survey; however, this responsibility was transferred to R. W. Beck in April 2007. In addition, R. W. Beck was responsible for following up with unresponsive processors in an effort to increase the processor survey response rate.

In completing the survey, respondents provided recycling information for the 12 month period from September 2004 to August 2005 (survey time period). If information for this time period was not available, R. W. Beck and NCTCOG staff asked respondents to provide data from the most recent 12 month period.

1.4 Analysis

R. W. Beck analyzed the data collected from the municipal and processor surveys. R.W. Beck compared recyclable tonnage totals to total regional MSW generation to determine residential, ICI, and overall recycling rates within the North Central Texas region. In calculating total MSW disposal within the North Central Texas region, R.W. Beck excluded MSW that was imported into the region and included MSW that was generated in the region and then exported for disposal.

R. W. Beck took the necessary steps to ensure that recycling data was not double counted. Specifically, in calculating the regional recycling rates, R. W. Beck used the municipal survey as the source for residential recycling data. ICI recycling data collected from the municipal survey was not used in this analysis. Additionally, R. W. Beck used the processor survey as the source for ICI recycling data. Residential recycling data collected from the processor survey was not used in this analysis. Table 1-1 is a matrix that summarizes the data that was included in the calculation of the North Central Texas regional recycling rates.

Table 1-1
Methodology to Prevent Double Counting

	Recycling Data	
	Residential	ICI
Municipal Survey	Included	NOT Included
Processor Survey	NOT Included	Included

1.5 Calculating the Regional Recycling Rate

In order to determine regional recycling rates, R. W. Beck needed to develop a methodology for the calculation of these rates. R. W. Beck relied on the EPA handbook “Measuring Recycling: A Guide for State and Local Governments” as the guideline for developing this methodology. The EPA handbook uses the following formula to determine MSW recycling rates:

$$\text{MSW Recycling Rate (\%)} = \frac{\text{Total MSW Recycled}}{\text{Total MSW Generated}} \times 100$$

The formula to calculate Total MSW Generated is listed as follows:

$$\text{Total MSW Generated} = \text{Total MSW Disposal} + \text{Total MSW Recycled}$$

Section 2

Survey Execution and Response Rate

2.1 Overview

The following subsections describe the specific strategies and efforts employed by R. W. Beck in conducting both the municipal and processor surveys. These subsections also include a discussion of the response rates for the municipal and processor surveys.

2.2 Municipal Surveying

2.2.1 Survey Distribution by the NCTCOG

NCTCOG staff leveraged its internal database of municipal contacts in order to compile a list of municipalities to include in the survey. A total of 70 cities were selected to participate in the survey. Table 2-1 lists the cities that were included in the municipal survey.

Table 2-1
Cities Included in Municipal Survey

City Names				
Addison	Corinth	Frisco	Little Elm	Sachse
Allen	Corsicana	Garland	Mansfield	Saginaw
Arlington	Crowley	Glenn Heights	McKinney	Seagoville
Azle	Dallas	Grand Prairie	Mesquite	Southlake
Balch Springs	Denton	Grapevine	Midlothian	Stephenville
Bedford	Desoto	Greenville	Mineral Wells	Terrell
Benbrook	Duncanville	Haltom City	Murphy	The Colony
Burleson	Ennis	Highland Park	North Richland Hills	Trophy Club
Carrollton	Eules	Highland Village	Plano	University Park
Cedar Hill	Farmers Branch	Hurst	Richardson	Watauga
Cleburne	Flower Mound	Irving	Richland Hills	Waxahachie
Colleyville	Forest Hill	Keller	River Oaks	Weatherford
Commerce	Forney	Lancaster	Rockwall	White Settlement
Coppell	Fort Worth	Lewisville	Rowlett	Wylie

By selecting the largest 70 cities in the North Central Texas region, all cities with a population greater than 7,000 were included. These 70 cities represent 87.6 percent of the total population in the North Central Texas region. Staff from NCTCOG sent surveys to each municipality via U.S. mail in June 2006. NCTCOG staff requested that each municipality return the completed survey by U.S. mail, electronic mail or electronic facsimile no later than September 15, 2006. NCTCOG staff followed up with municipalities that did not meet the initial deadline in an effort to obtain their data. As a result of their follow up efforts, 44 of the 70 municipalities returned surveys to the NCTCOG.

2.2.2 R. W. Beck Survey Effort

At the time that R. W. Beck undertook responsibility for the municipal surveying, 44 of the 70 cities had returned surveys to the NCTCOG. However, only eight cities had submitted surveys containing complete data. In completing the survey, the cities had the option to either provide recycling and disposal information directly to the NCTCOG or authorize NCTCOG staff to request information from the city's hauler. A total of 29 municipalities authorized NCTCOG staff to contact their private haulers directly to obtain survey information.

Some of the surveys that were returned to NCTCOG required additional analysis or follow up. There were two surveys that required additional analysis and five that required follow up questions with city staff. Finally, at the time that R. W. Beck took responsibility for the survey effort, 26 cities had not submitted any information in response to the original survey. Table 2-2 describes the status of each of the 70 surveys at the time that R. W. Beck took responsibility for the municipal survey.

Table 2-2
Survey Response Status

Status Code	Description	Number of Cities	% of Total
Status 1	Incomplete data requiring follow up with private companies	29	42%
Status 2	Additional calculations or analysis required	2	3%
Status 3	Follow-up questions with cities required	5	7%
Status 4	No response	26	37%
None	Complete surveys	8	11%
Total Surveyed Cities		70	100.0%

2.2.3 Follow Up Efforts

As detailed in Table 2-2, 11 percent of surveys were complete when R. W. Beck undertook responsibility for the municipal surveying effort. The following subsections describe the strategies employed by R. W. Beck to increase this municipal survey response rate.

Status 1 Cities

The Status 1 municipalities required follow up with private companies in order to obtain recycling and disposal data. In order to ensure the highest level of cooperation from each city's private hauler, R. W. Beck asked each city to send a written letter to their hauler directing them to complete the municipal survey. R. W. Beck followed up with each city at least three times to ensure that they had provided this letter to their haulers. R. W. Beck confirmed that each of these 29 cities sent a request to their haulers. R. W. Beck also contacted the haulers to confirm that they had received this letter as well as ensure that they completed the surveys in a timely manner.

Status 2 Cities

The survey responses from Status 2 cities required calculations or analysis before being integrated into the municipal recycling data. The two cities for which R. W. Beck performed additional calculations were Addison and Murphy. After performing initial calculations, R. W. Beck needed additional data from both cities. R. W. Beck obtained all necessary data from city staff in order to complete the analysis.

Status 3 Cities

Status 3 cities required follow up with city staff members in order to clarify survey responses. Cities classified as Status 3 are listed as follows: Allen, Balch Springs, De Soto, Forney, and Glenn Heights.

After initial review of the data received from these cities, R. W. Beck determined that the cities of Forney and Glenn Heights would be best classified as Status 1. Both of these cities contracted with a private hauler for the collection of residential garbage and recyclables. R. W. Beck used strategies consistent with the Status 1 cities in order to obtain data for Forney and Glenn Heights.

The cities of Allen and DeSoto both submitted disposal data that needed further clarification. R. W. Beck clarified this data with each city.

The survey response submitted by the City of Balch Springs also required clarification with city staff. R. W. Beck made three phone calls to the city in attempt to clarify the information submitted, but city staff did not respond.

Status 4 Cities

Of the 70 cities that were initially surveyed, 26 did not submit any form of response. R. W. Beck prioritized these cities based on population and focused on obtaining data from the largest cities first. These cities are listed below in order of prioritization:

- | | | |
|---------------|------------------|--------------------|
| ■ Dallas | ■ Keller | ■ Stephenville |
| ■ Garland | ■ Lancaster | ■ Mineral Wells |
| ■ McKinney | ■ Burleson | ■ White Settlement |
| ■ Frisco | ■ Rockwall | ■ Midlothian |
| ■ Bedford | ■ Farmers Branch | ■ Azle |
| ■ Haltom City | ■ Weatherford | ■ Commerce |
| ■ The Colony | ■ Benbrook | ■ Highland Park |
| ■ Hurst | ■ Ennis | ■ River Oaks |
| ■ Duncanville | ■ Sachse | |

R. W. Beck sent a letter and survey to key staff members for each of these cities. R. W. Beck followed up with these individuals to confirm that they received the survey and also to offer assistance with completing the survey. By contacting city staff members, R. W. Beck was able to confirm that 23 of the 26 cities received the survey. R. W. Beck received data from 23 of the 26 cities. R. W. Beck staff made up to six phone calls to each of these cities in order to obtain the completed survey.

2.2.4 Municipal Response Rate

R. W. Beck classified the following as survey responses:

- Cities that submitted a completed survey to R. W. Beck.
- Cities that did not provide a response to the survey but for which R. W. Beck was able to obtain their data from another source.
- Cities that R. W. Beck confirmed do not have a recycling program in place.

Overall Response Rate

R. W. Beck received a total of 64 municipal survey responses for a response rate of 91 percent. These responses represent 97 percent of the population included in the survey. Table 2-3 describes the survey response rate based on population.

**Table 2-3
Municipal Surveying Response Rate**

	Number of Cities	Population
Responses Received	64	5,032,122
Total Cities Surveyed	70	5,184,613
Response Rate (%)	91%	97%

Source of Responses

As previously discussed, a total of 64 cities responded to the municipal survey. Table 2-4 provides a detailed summary of the sources of these survey responses.

**Table 2-4
Municipal Survey Response Detail Summary**

Source of Response	Number of Cities	Percent of Total Cities	Population Represented	Percent of Population
Total Cities Surveyed	70	100%	5,184,613	100%
Responses Received by NCTCOG	8	11%	1,387,717	27%
Responses Received by R.W. Beck				
From city	24	34%	2,318,332	45%
From private hauler	23	33%	777,494	15%
From other source	8	11%	532,843	10%
Total R.W. Beck Responses	55	79%	3,628,669	70%
Total Survey Responses	64	91%	5,032,122	97%
Unresponsive				
Cities	3	4%	61,525	1%
Private haulers	3	4%	90,966	2%
Total Unresponsive Cities	6	9%	152,491	3%

Data Received

The municipal survey requested residential and ICI recycling data as well as residential and ICI disposal data. Of the 64 cities that submitted survey responses, very few cities have been able to provide each type of data requested in the survey. Table 2-5 is a matrix that shows the number of cities for which R. W. Beck has received the different types of data requested by the survey.

Table 2-5
Data Received from Municipal Survey Responses

	Residential Data	ICI Data
Recycling Data	61	15
Disposal Data	29	25

Private Hauler Participation

As previously discussed, many cities requested that their private haulers provide data to R. W. Beck in order to participate in the survey. Virtually all of the private haulers provided data on behalf of their contracted cities. R. W. Beck would like to express appreciation to these companies for their cooperation in providing this data.

2.3 Private Processor Surveying

R. W. Beck took the lead role in surveying processors in the North Central Texas region. The following subsections describe R. W. Beck's methodology for distributing the survey, the survey response rate, and challenges encountered by R. W. Beck in surveying the processors.

2.3.1 Survey Distribution

Identification of Private Processors

R. W. Beck and NCTCOG staff compiled a comprehensive list of processors within the 16-county North Central Texas region. This list included processors of primary MSW, other MSW, and C&D materials. At the outset of the survey, NCTCOG and R.W. Beck agreed to prioritize primary MSW processors for the processor survey. For the purposes of this study, primary MSW processors were defined as private companies that haul or process one or more of the following materials:

- Food Waste
- Glass
- Metals
- Paper
- Plastics
- Textiles
- Wood
- Yard Trimmings

Initially, 65 primary MSW processors were identified by NCTCOG and R. W. Beck. This initial list of processors was reduced to a final list of 55 processors. Table 2-6 describes changes to the list of processors to be surveyed.

Table 2-6
List of Processors Surveyed

	Number of Processors
Initial List of Processors	65
Less: Eliminated Processors	
Discontinued Operations	(2)
Sold to Other Processors Surveyed	(4)
Redundant Surveying of Same Company	(1)
Do Not Recycle COG Materials	(3)
Municipal Operations	(3)
Broker	(1)
Plus: Newly Identified Processors	4
Final List of Processors	55

Since R. W. Beck placed priority on primary MSW processors, budgetary constraints prohibited R. W. Beck from being able to survey other MSW and C&D processors. These budgetary constraints were driven by the following factors:

- An initial low response rate to the survey of primary MSW recyclers, which caused additional project budget dollars to be allocated towards increasing the response rate of this survey; and
- No survey of this kind had been previously undertaken within the North Central Texas region.¹

NCTCOG staff mailed surveys to each of the 55 processors on the final list in June 2006. R. W. Beck asked that survey respondents return the completed survey via U.S. mail, electronic mail or electronic facsimile no later than September 30, 2006. Each survey included contact information for R. W. Beck in the case that a respondent had any questions. If a processor requested a new copy of the survey, R. W. Beck typically sent this new copy by electronic facsimile or electronic mail.

2.3.2 Follow Up Efforts

After the deadline of September 30, 2006, R. W. Beck undertook a follow-up effort during the months of October, November, and December 2006 to solicit responses from unresponsive processors. R. W. Beck contacted processors and asked if they were willing to complete the survey. If they were interested, R. W. Beck sent an additional survey by fax or electronic mail to the respondent for their convenience.

¹ Updates of this initial survey should be more efficient. R. W. Beck would expect that a survey of C&D processors, in addition to the basic MSW survey, could be completed in the next survey round.

All processors who did not initially turn in a completed survey were given at least five follow-up phone calls, while larger processors received at least ten follow-up phone calls.² Unfortunately, many of the follow-up phone calls had to be left on voice mail or through phone messages and were not returned by the processors. In addition to phone calls, R. W. Beck performed a limited number of site visits to Metroplex-area processors in an attempt to gather additional data in meetings with private processor employees.

R. W. Beck sent out a final letter to non-responsive processors in early January 2007. This letter emphasized the importance of completing the survey and set a final survey deadline of February 1, 2007 for the receipt of all data. After February 1, 2007, R. W. Beck staff ended the active pursuit of survey responses.

2.3.3 Private Processor Response Rate

R. W. Beck classified the following as survey responses:

- Companies that submitted a completed survey to R. W. Beck.
- Companies that refused to participate in the survey.

The survey response rate includes processors that refused to participate in the survey. The survey completion rate includes only those surveys that were completed by the private processors.

Overall Response Rate

As of the initial deadline of September 2006, nine percent of the processors surveyed had submitted a survey response. In order to increase the survey response rate, R. W. Beck placed several hundred follow-up phone calls with previously unresponsive processors. These efforts led to a significant increase in the response rate between the initial survey deadline and the final survey deadline.

As of the final survey deadline, R. W. Beck had received 36 completed surveys for a survey completion rate of 65.5 percent. R. W. Beck would like to express appreciation for the companies that participated in the processor survey. These companies are not identified in this report because of the confidentiality agreement.

In addition, a total of nine companies refused to complete the survey. The following is a list of companies that refused to participate in the survey:

- | | |
|----------------------|--------------------------------|
| ■ Balcones Recycling | ■ Recycle to Conserve TX, Inc. |
| ■ Brinks | ■ Rowell Investments, Inc. |
| ■ Dallas Recycling | ■ Silver Creek |
| ■ Garland Steel | ■ Standard Waste Systems |
| ■ Jack's Recycling | |

² Unless the company stated an unwillingness to participate in the survey on a prior call

Those processors that refused to participate in the survey listed a number of reasons for non participation, including:

- Too busy;
- Not interested unless required by law; and
- Protesting government subsidization of public recycling.

R. W. Beck included in the survey response rate both processors that completed surveys and processors that refused to participate in the survey. Therefore, there were 45 processors classified as having responded to the survey for a response rate of 81.8 percent. Table 2-7 provides a summary of responses to the processor survey.

Table 2-7
Private Processor Survey Responses

	Number of Processors	Percentage of Processors
Surveys Distributed	55	100.0%
Unresponsive Processors	10	18.2%
Survey Responses		
Surveys Completed	36	65.5%
Refused to Participate	9	16.4%
Total Response Rate	45	81.8%

Unresponsive Companies

There were 10 processors that did not provide a response to the processor survey, listed as follows:

- | | |
|---------------------------|------------------------|
| ■ Champion Waste | ■ North Main Recycling |
| ■ Dlubak Glass | ■ Shred-It Dallas |
| ■ Granbury Welding Metals | ■ Travis Equipment |
| ■ International Paper | ■ U.S. Green Fiber |
| ■ New Phoenix Metal | ■ Vista Fibers |

R. W. Beck documented several reasons for non-responsiveness of these 10 processors, including:

- Non-responsiveness to repeated phone calls/site visits;
- Promised to complete the survey but did not;
- Too busy; and
- Data quality concerns (lack of scales, lack of ability to estimate tonnage).

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Section 3

Data Analysis

3.1 Overview

This section describes how R. W. Beck utilized data collected in the municipal survey and the processor survey to calculate residential, ICI and overall recycling rates for the North Central Texas region. As discussed in Section 1, R. W. Beck calculated the recycling rates for the region based on the following formula:

$$MSW \text{ Recycling Rate (\%)} = \frac{\text{Total MSW Recycled}}{\text{Total MSW Generated}} \times 100$$

Below is the formula used to calculate Total MSW Generated:

$$\text{Total MSW Generated} = \text{Total MSW Disposal} + \text{Total MSW Recycled}$$

In this section, R. W. Beck describes the methodology for calculating residential and ICI disposal. In addition, R. W. Beck summarizes total residential and ICI recycling on a commodity-by-commodity basis. R. W. Beck would mention that the methodology employed in this section is primarily based on the methodology that R. W. Beck originally developed to complete the Metroplex Solid Waste Study in 2004. The purpose of this prior study was to understand the quantity of material being generated, disposed and recycled between residential and ICI sectors in the Dallas-Fort Worth Metroplex.

3.2 Disposal Data

The following subsections describe how R. W. Beck utilized data collected from the municipal survey as well as landfills located in the North Central Texas region to determine total residential and ICI disposal for the survey time period.

3.2.1 Methodology Overview

R. W. Beck collected data from the 24 landfills in the North Central Texas region in order to calculate total MSW disposal in the region for the survey time period. However, in order to calculate residential and ICI recycling rates, R. W. Beck needed to determine how much of this total regional disposal was generated from residential sources and how much was generated from ICI sources.

R. W. Beck used data gathered from the municipal survey to determine how much of the regional disposal can be categorized as residential. R. W. Beck extrapolated the disposal data for the cities that did not submit disposal data in response to the municipal survey.

ICI disposal data was not requested as part of the processor survey. In order to estimate total ICI disposal, R. W. Beck subtracted total residential disposal from total regional disposal.

3.2.2 Landfill Data

R. W. Beck utilized disposal data from the 24 landfills in the North Central Texas region in order to determine total regional disposal for the survey time period. R. W. Beck obtained landfill disposal information from the annual report data that each facility is required to submit to the TCEQ. Table 3-1 presents total disposal at North Central Texas landfills during Fiscal Year 2005, or September 2004 to August 2005.

Table 3-1
Total MSW Disposal in North Central Texas Region
September 2004 – August 2005

Landfill	Total Disposal	Landfill	Total Disposal
121 Regional Disposal	556,125	IESI Fort Worth C&D	253,984
Arlington Municipal	448,247	IESI Weatherford	194,125
Camelot	417,343	Lewisville	228,995
Charles M. Hinton	368,089	Maxwell Creek	822
City of Cleburne	1,728	McCommas Bluff	1,635,403
City of Denton	124,513	McKinney	104,576
City of Grand Prairie	161,597	Republic Maloy	139,550
Corsicana Regional	119,364	Skyline	881,415
CSC Disposal	261,594	Southeast	295,306
DFW	1,161,099	Stephenville Municipal	4,888
ECD	171,482	Turkey Creek	625,461
Hunter Ferrell	111,713	Westside Recycling & Disposal	587,447
		Total Disposal	8,854,867

Table 3-1 shows total disposal in the North Central Texas region. However, in order to calculate the regional recycling rate, R. W. Beck needed to calculate how much of this disposal was generated in the North Central Texas region. Therefore, R. W. Beck contacted each landfill within the North Central Texas region to determine the amount of waste that was imported into that landfill from outside of the North Central Texas region. In addition, R. W. Beck contacted each landfill in counties adjacent to the 16-county North Central Texas region to determine if any North Central Texas waste

was exported for disposal outside of the region. Using the additional information gathered from the landfills, R. W. Beck calculated total disposal for the North Central Texas region.

Landfill operators consider waste import and export information to be proprietary. In order to keep the import and export data of each landfill confidential, R. W. Beck has presented this information on an aggregated basis. Table 3-2 summarizes R. W. Beck's calculation of North Central Texas MSW Disposal net of waste imports and exports.

Table 3-2
North Central Texas MSW Disposal
September 2004 – August 2005

	MSW Disposal
North Central Texas Disposal ^[1]	8,854,867
Less: Waste Imports	
Disposal in North Central Texas landfills that originated outside of the region	(176,931)
Plus: Waste Exports	
Disposal in landfills outside of the North Central Texas region that originated within the region	45,000
North Central Texas MSW Disposal	8,722,936

[1] See Table 3-1

3.2.3 Residential Disposal Data Availability

Of the 70 cities that were included in the municipal survey, 29 provided residential disposal data in response to the survey. These 29 cities represent 74.5 percent of the population of the cities that were included in the survey. Table 3-3 shows the populations of the cities that provided residential disposal information.

Table 3-3
Reported Municipal Disposal
September 2004 – August 2005

City	2005 Population	% of Total ^[1]	City	2005 Population	% of Total ^[1]
Addison	13,667	0.3%	Grand Prairie	144,337	2.8%
Allen	69,222	1.3%	Highland Park	8,793	0.2%
Arlington	362,805	7.0%	Highland Village	15,105	0.3%
Burleson	29,613	0.6%	Irving	193,649	3.7%
Carrollton	118,870	2.3%	Lewisville	90,348	1.7%
Cleburne	29,184	0.6%	Mesquite	129,902	2.5%
Crowley	9,691	0.2%	Midlothian	13,188	0.3%
Dallas	1,213,825	23.4%	Murphy	11,026	0.2%
Denton	104,153	2.0%	Plano	250,096	4.8%
DeSoto	44,653	0.9%	Richardson	99,187	1.9%
Euless	51,226	1.0%	Rowlett	53,664	1.0%
Farmers Branch	26,487	0.5%	Seagoville	11,112	0.2%
Forney	10,579	0.2%	The Colony	37,972	0.7%
Fort Worth	624,067	12.0%	University Park	23,806	0.5%
Frisco	70,793	1.4%			
			Population Represented	3,861,020	74.5%

[1] Shows each city's population as a percentage of the total population of the 70 cities surveyed as part of the Municipal Recycling Survey. The total population of these 70 cities is 5,184,613 for FY 2005.

3.2.4 Residential Disposal Data Extrapolation

R. W. Beck developed a methodology to extrapolate residential disposal data for those cities that did not report disposal data in response to the municipal survey. First, R.W. Beck calculated annual MSW disposal per single-family resident for each of the cities that reported residential disposal tonnage. The average disposal per single family resident for these 29 cities was 0.54 tons per single family resident, or 1,083 pounds per single family resident, for FY 2005. R. W. Beck summarized this analysis in Table 3-4.

Table 3-4
Average Disposal per Single Family Resident

City	Reported Disposal	Single Family Residents	Tons/ Single Family Resident	City	Reported Disposal	Single Family Residents	Tons/ Single Family Resident
Addison	1,626	3,813	0.43	Grand Prairie	55,209	103,634	0.53
Allen	22,920	61,331	0.37	Highland Park	8,522	7,448	1.14
Arlington	115,158	244,531	0.47	Highland Village	7,305	15,045	0.49
Burleson	16,042	26,681	0.60	Irving	60,464	93,339	0.65
Carrollton	44,753	88,439	0.51	Lewisville	27,825	50,595	0.55
Cleburne	9,920	26,470	0.37	Mesquite	46,529	100,804	0.46
Crowley	5,527	8,063	0.69	Midlothian	3,805	10,405	0.37
Dallas	566,369	679,742	0.83	Murphy	5,585	10,960	0.51
Denton	28,335	62,388	0.45	Plano	71,059	186,572	0.38
DeSoto	18,109	35,767	0.51	Richardson	45,921	74,688	0.61
Euless	15,016	30,172	0.50	Rowlett	23,182	52,430	0.44
Farmers Branch	15,805	21,243	0.74	Seagoville	4,850	8,178	0.59
Forney	3,321	9,024	0.37	The Colony	17,400	36,529	0.48
Fort Worth	208,270	459,937	0.45	University Park	16,111	20,616	0.78
Frisco	24,335	57,342	0.42				
				Total	1,489,273	Average	0.54

For those 41 cities that did not report residential disposal in response to the survey, R. W. Beck extrapolated residential disposal based on an average of 0.54 tons, or 1,083 pounds of garbage per single family resident. In addition, R. W. Beck extrapolated the disposal for the population of the North Central Texas region that was not included in the municipal survey. As shown in Table 3-5, the total extrapolated disposal amount for these 41 cities and the unincorporated areas is 988,386 tons.

**Table 3-5
Residential Disposal Data Extrapolation**

City	Single Family Residents	Extrapolated Disposal (tons)	City	Single Family Residents	Extrapolated Disposal (tons)
Azle	9,077	4,916	Lancaster	25,625	13,877
Balch Springs	15,541	8,416	Little Elm	11,221	6,077
Bedford	31,647	17,139	Mansfield	34,330	18,592
Benbrook	17,318	9,379	McKinney	77,168	41,791
Cedar Hill	38,089	20,627	Mineral Wells	14,043	7,605
Colleyville	22,170	12,006	North Richland Hills	47,914	25,948
Commerce	5,948	3,221	Richland Hills	6,904	3,739
Coppell	31,737	17,187	River Oaks	6,606	3,577
Corinth	17,548	9,503	Rockwall	24,892	13,480
Corsicana	21,962	11,893	Sachse	16,584	8,981
Duncanville	30,616	16,580	Saginaw	16,515	8,944
Ennis	16,899	9,152	Southlake	23,806	12,892
Flower Mound	60,096	32,545	Stephenville	11,977	6,486
Forest Hill	12,857	6,963	Terrell	15,104	8,179
Garland	172,428	93,379	Trophy Club	6,791	3,678
Glenn Heights	6,508	3,525	Watauga	23,313	12,625
Grapevine	34,266	18,557	Waxahachie	20,465	11,083
Greenville	19,510	10,566	Weatherford	20,610	11,162
Haltom City	28,152	15,246	White Settlement	13,124	7,107
Hurst	29,159	15,791	Wylie	20,720	11,221
Keller	35,028	18,969	Unincorporated Areas ^[1]	730,828	395,782
			Total Extrapolated Disposal		988,386

[1] R. W. Beck assumed that all 730,828 residents of the unincorporated areas can be classified as single family residents.

R. W. Beck summed the total reported disposal and the total extrapolated disposal to develop its estimate for total residential disposal in the region. R. W. Beck estimated that total residential disposal for the survey time period is 2,477,659 tons.¹ R. W. Beck used this estimate to calculate the regional residential recycling rate.

¹ Reported disposal of 1,489,273 tons + extrapolated disposal of 988,386 tons = 2,477,659 tons.

3.2.5 ICI Disposal Estimate

For the purposes of this analysis, R. W. Beck assumed that all waste not accounted for in residential tonnage may be classified as ICI waste. In order to estimate total ICI disposal for the survey time period, R. W. Beck subtracted residential disposal from total North Central Texas MSW disposal figure shown in Table 3-2. Based on this calculation, ICI disposal for the survey time period is 6,245,278 tons. Table 3-6 shows R. W. Beck's calculation for ICI disposal. R. W. Beck will use this estimate to calculate the North Central Texas regional ICI recycling rate.

Table 3-6
ICI Disposal Calculation
September 2004 – August 2005

	North Central Texas Disposal
Total North Central Texas MSW Disposal	8,722,936
Less: Residential Disposal	
R. W. Beck residential disposal estimate	2,477,659
ICI Disposal Estimate	6,245,278

3.2.6 ICI Disposal Data Extrapolation

Table 3-6 shows R. W. Beck's estimate of total ICI disposal for the North Central Texas region. The purpose of the ICI disposal data extrapolation is to estimate the amount of this disposal that is generated in each of the 70 municipalities that were surveyed. As discussed in Section 2, 25 of the cities that responded to the survey were able to provide ICI disposal data. However, it is likely that the ICI disposal data reported by these cities understates actual ICI disposal because many cities have an open market system for ICI refuse collection. R. W. Beck confirmed that six of these 25 cities have closed systems with one company exclusively collecting all of the ICI waste in the city. ICI disposal information for these six cities is listed in Table 3-7.

Table 3-7
Reported ICI Disposal
September 2004 – August 2005

City	Tons	City	Tons
Allen	24,592	Plano	150,996
Grand Prairie	122,720	Seagoville	3,750
Lewisville	111,079	The Colony	22,800
		TOTAL	435,938

R. W. Beck accounted for 435,938 tons of ICI waste due to the data provided by the six cities in Table 3-7. In order to determine ICI disposal for the remaining 64 cities, R. W. Beck extrapolated the remaining 5,809,340 tons of waste based on the number

of employees in each city.² In order to approximate employment for each city, R. W. Beck used the 2000 employment estimates developed by the NCTCOG Research and Information Services Department.³ Table 3-8 shows the ICI extrapolation for the remaining 64 cities.

Table 3-8
ICI Disposal Data Extrapolation

City	Disposal (tons)	City	Disposal (tons)	City	Disposal (tons)
Addison	86,624	Farmers Branch	142,346	Mineral Wells	12,059
Arlington	267,464	Flower Mound	9,735	Murphy	3,089
Azle	6,867	Forest Hill	6,359	North Richland Hills	39,812
Balch Springs	11,236	Forney	2,740	Richardson	179,879
Bedford	44,366	Fort Worth	853,537	Richland Hills	15,115
Benbrook	8,471	Frisco	16,010	River Oaks	2,738
Burleson	9,752	Garland	176,982	Rockwall	18,392
Carrollton	129,416	Glenn Heights	7,033	Rowlett	14,957
Cedar Hill	11,722	Grapevine	94,056	Sachse	10,004
Cleburne	30,872	Greenville	19,927	Saginaw	11,065
Colleyville	9,422	Haltom City	30,481	Southlake	11,623
Commerce	17,995	Highland Park	4,564	Stephenville	12,836
Coppell	34,918	Highland Village	11,959	Terrell	10,545
Corinth	4,199	Hurst	36,288	Trophy Club	6,397
Corsicana	25,534	Irving	313,933	University Park	17,101
Crowley	4,402	Keller	42,844	Watauga	4,611
Dallas	1,970,326	Lancaster	24,895	Waxahachie	30,447
Denton	111,165	Little Elm	3,642	Weatherford	16,471
DeSoto	30,698	Mansfield	15,735	White Settlement	10,063
Duncanville	26,113	McKinney	49,894	Wylie	9,761
Ennis	20,967	Mesquite	102,064	Unincorporated Areas	502,247
Euless	34,922	Midlothian	7,651		
				TOTAL	5,809,340

² Total ICI disposal of 6,245,278 tons less commercial disposal of six cities in Table 3-7.

³ Source: <http://www.nctcog.org/ris/demographics/employment/2000cityemp.pdf>. In the event that NCTCOG had not developed employment estimates for a particular city, R. W. Beck used 2000 census data for total employed workforce as a proxy for total employment.

3.3 Residential Recycling

In the following subsections, R. W. Beck aggregated and summarized the residential recycling data collected during the conduct of the municipal recycling survey.

3.3.1 Recycling By Material

The municipal recycling survey requested diversion data for three categories of materials: primary MSW, other MSW, and C&D waste. This subsection describes residential recycling of these materials as reported by participating cities in the survey.

Primary Municipal Solid Waste

Table 3-9 summarizes North Central Texas residential recycling of primary MSW.

Table 3-9
Reported Recycling of Primary MSW
September 2004 – August 2005

Material	Tons	Material	Tons	Material	Tons
Metals		Plastic		Paper	
Aluminum Cans	1,789	PETE	3,055	Old Magazines	2
Tin/Steel Cans	3,135	HDPE Natural	1,393	Old Newspaper	48,003
Major Appliances	614	HDPE Colored	814	OCC	8,922
Other Ferrous	-	PVC	32	Office Paper	57
Other Non Ferrous	-	LDPE	-	Phone Directories	732
Mixed Metals	5,066	PP	-	Mixed Paper	78,562
Subtotal	10,604	PS	29	Other Paper	90
		Mixed Plastic	3,616	Subtotal	136,368
		Other Plastic	62		
		Subtotal	9,001		
Yard Trimmings		Glass		Wood	
Brush and Branches	48,663	Clear	93	Wood Packaging	-
Grass	-	Amber	-	Other Wood	545
Leaves	-	Green	-	Subtotal	545
Tree Stumps	-	Mixed Glass	11,414		
Mixed Yard Trimmings	100,098	Subtotal	11,507		
Subtotal	148,761				
Food Waste		Textiles		Commingled/Other	
Food Waste	-	Textiles	20	Commingled	25,627
Subtotal	-	Subtotal	20	Other	-
				Subtotal	25,627

Other Municipal Solid Waste

Table 3-10 summarizes North Central Texas residential recycling of other MSW.

Table 3-10
Recycling of Other MSW
September 2004 – August 2005

Material	Tons	Material	Tons
HHW		Tires	
Cleaning Supplies	12	Tires	1,110
Painting Supplies	86		
Used Oil	335		
Antifreeze	38	Consumer Electronics	
Lead Acid Batteries	80	Consumer Electronics	199
Household Batteries	9		
Other	408		
Subtotal	968		

Construction and Demolition Waste

Table 3-11 provides a summary of North Central Texas residential recycling of construction and demolition materials.

Table 3-11
Recycling of Construction and Demolition Waste
September 2004 – August 2005

Material	Tons
Asphalt	-
Concrete	-
Metals	129
Natural Disaster Debris	-
Wood	-
Other C&D	-
Subtotal	129

Materials Summary

Table 3-12 provides a summary by material of total residential recycling in the North Central Texas region.

Table 3-12
Residential Recycling Materials Summary
September 2004 – August 2005

Material	Tons	% of Total
Primary MSW		
Metal	10,604	3.1%
Plastic	9,001	2.6%
Paper	136,368	39.5%
Yard Trimmings	148,761	43.1%
Glass	11,507	3.3%
Wood	545	0.2%
Food Waste	0	0.0%
Textiles	20	0.0%
Commingled/Other	25,627	7.4%
Other MSW		
Tires	1,110	0.3%
Consumer Electronics	199	0.1%
HHW	968	0.3%
Construction and Demolition	129	0.0%
Total Residential Recycling	344,839	100%

3.3.2 North Central Texas Residential Recycling Rate

Based on the disposal data extrapolation analysis and the total residential recycling tonnage shown in Table 3-12, R. W. Beck calculated that the North Central Texas residential recycling rate is 12.2 percent. The calculation is shown in Table 3-13.

Table 3-13
North Central Texas Regional Residential Recycling Rate
September 2004 – August 2005

	Tonnage
Disposal	2,477,659
Recycling	344,839
MSW Generation	2,822,498
Residential Recycling Rate	12.2%

3.4 ICI Recycling

In the following subsection, R. W. Beck aggregated and summarized the ICI recycling data collected during the conduct of the processor survey.

3.4.1 Recycling by Material

The processor survey requested diversion data for three categories of materials: primary MSW, other MSW, and C&D materials. This subsection describes ICI recycling of these three categories of materials as reported in the processor survey.

Primary Municipal Solid Waste

Table 3-14 summarizes North Central Texas ICI recycling of primary MSW materials.

Table 3-14
ICI Recycling of Primary MSW
September 2004 – August 2005

Material	Tons	Material	Tons	Material	Tons
Metals		Plastic		Paper	
Aluminum Cans	5,859	PETE	1,867	Old Magazines	620
Tin/Steel Cans	846	HDPE Natural	328	Old Newspaper	53,218
Major Appliances	6,000	HDPE Colored	335	OCC	193,738
Other Ferrous	510,531	PVC	-	Office Paper	29,637
Other Non Ferrous	150,113	LDPE	40	Telephone Directories	2,385
Mixed Metals	2,199	PP	96	Mixed Paper	113,666
Subtotal	675,548	PS	52	Other Paper	118,110
		Mixed Plastic	5,751	Subtotal	511,374
		Other Plastic	2,034		
		Subtotal	10,503		
Yard Trimmings		Glass		Wood	
Brush and Branches	19,051	Clear	341	Wood Packaging	1,040
Grass	325	Amber	831	Other Wood	-
Leaves	325	Green	8	Subtotal	1,040
Tree Stumps	-	Mixed Glass	9,601		
Mixed Yard Trimmings	15,000	Subtotal	10,781		
Subtotal	34,701				
Food Waste		Textiles		Commingled/Other	
Food Waste	-	Textiles	-	Commingled	17,160
Subtotal	-	Subtotal	-	Other	110
				Subtotal	17,270

Other Municipal Solid Waste

Table 3-15 summarizes North Central Texas ICI recycling of other MSW materials.

Table 3-15
ICI Recycling of Other MSW
September 2004 – August 2005

Material	Tons	Material	Tons
HHW		Tires	
Cleaning Supplies	-	Tires	-
Painting Supplies	-		
Used Oil	1		
Antifreeze	-	Consumer Electronics	
Lead Acid Batteries	-	Consumer Electronics	50
Household Batteries	-		
Other	-		
Subtotal	1		

Construction and Demolition Waste

Table 3-16 provides a summary of North Central Texas ICI recycling of construction and demolition materials.

As previously discussed, R. W. Beck focused its processor survey efforts on processors of primary MSW material and did not focus on collecting data from construction and demolition recycling companies. As such, it is likely that the data represented in Table 3-16 is lower than actual recycling of construction and demolition materials in the North Central Texas region.

Table 3-16
ICI Recycling of Construction and Demolition Waste
September 2004 – August 2005

Material	Tons
Asphalt	-
Concrete	600
Metals	-
Natural Disaster Debris	-
Wood	1,907
Other C&D	26,687
Subtotal	29,194

Materials Summary

Table 3-17 provides a summary by material of total ICI recycling in the North Central Texas region. Based on the data collected in the processor survey, ICI recycling in the North Central Texas region was 1,290,462 tons for the survey time period.

Table 3-17
ICI Recycling Materials Summary
September 2004 – August 2005

Material	Tons	% of Total
Primary MSW		
Metal	675,548	52.3%
Plastic	10,503	0.8%
Paper	511,374	39.6%
Yard Trimmings	34,701	2.7%
Glass	10,781	0.8%
Wood	1,040	0.1%
Food Waste	-	0.0%
Textiles	-	0.0%
Commingled/Other	17,270	1.3%
Other MSW		
Tires	-	0.0%
Consumer Electronics	50	0.0%
HHW	1	0.0%
Construction and Demolition	29,194	2.3%
Total ICI Recycling	1,290,462	100%

3.4.2 North Central Texas ICI Recycling Rate

Based on the disposal data extrapolation analysis discussed in this section and the total ICI recycling tonnage shown in Table 3-17, R. W. Beck calculated that the regional ICI recycling rate is 17.1 percent. This calculation is described in Table 3-18.

Table 3-18
North Central Texas Regional ICI Recycling Rate

	Tonnage
Disposal	6,245,278
Recycling	1,290,462
MSW Generation	7,535,740
ICI Recycling Rate	17.1%

3.5 Regional Recycling Rate

Based on the data collected from the municipal and processor surveys, R. W. Beck calculated an overall regional recycling rate of 15.8 percent. R. W. Beck would note that with a municipal survey response rate of 91 percent and a processor survey completion rate of 65.5 percent, it is likely that this recycling rate does not account for all of the recycling activity that is currently taking place in the region. Table 3-19 summarizes R. W. Beck's calculation of the North Central Texas regional residential, ICI, and overall recycling rates.

Table 3-19
North Central Texas Regional Recycling Rates
September 2004 – August 2005

	Residential	ICI	Overall
Disposal	2,477,659	6,245,278	8,722,936
Recycling	344,839	1,290,462	1,635,301
Waste Generation	2,822,498	7,535,740	10,358,237
Regional Recycling Rate	12.2%	17.1%	15.8%

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Section 4

Municipal Recycling Summary

4.1 Overview

The following subsections summarize the recycling data obtained from the 70 cities surveyed as part of NCTCOG and R. W. Beck's municipal survey effort. For each city that has responded to the survey, R. W. Beck has summarized the recycling and disposal data provided in the survey response. For those cities that have not responded, R. W. Beck has described the efforts undertaken in order to obtain a complete survey.

R. W. Beck calculated the residential recycling rates for each municipality. However, R. W. Beck calculated ICI recycling rates for only the 13 cities that provided ICI recycling data in response to the survey. Additionally, R. W. Beck only calculated an overall recycling rate for those cities that provided both residential and ICI recycling data. R.W. Beck included the extrapolated or reported ICI disposal amount for each city in accordance with the ICI disposal data extrapolation analysis discussed in Section 3.2.6. Traditionally, recycling programs in the North Central Texas region have focused on the ICI waste stream. R. W. Beck has included the ICI disposal amount in the discussion of recycling rates in order to show the potential diversion opportunities that exist in the ICI waste stream.

As previously discussed, only 29 of the 64 cities that responded to the survey were able to provide residential disposal data. In order to calculate the residential recycling rate for these cities, R. W. Beck utilized the extrapolated disposal amounts as discussed in Section 3.2.4 of this report.

4.2 Recycling Rate by Municipality

4.2.1 Addison

Residential Recycling

The City of Addison participated in the municipal survey. Addison residents recycled 370 tons of commingled material during the survey time period.¹

¹ Several cities were not able to provide recycling information on a commodity by commodity basis. In response to the survey, these cities reported their total recycling tonnage as commingled material.

Disposal and Recycling Rate

Table 4-1 provides a summary of recycling rates in Addison.

Table 4-1
City of Addison Recycling Rates
September 2004 – August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	370	194	353	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	370	194	353	N/A	N/A
Disposal	1,626	853	1,552	86,624	Unknown
Waste Generation	1,996			n/a	Unknown
Recycling Rate	18.5%			n/a	Unknown

4.2.2 Allen

Residential Recycling

The City of Allen provided a response to the municipal survey. Table 4-2 is a summary of residential recycling in the City of Allen.²

Table 4-2
City of Allen Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Paper	1,621	16.7%
Mixed Yard Trimmings	7,189	73.9%
Computer Components	32	0.3%
Commingled Materials	891	9.2%
Total Recycling	9,733	100%

² The City of Allen also diverts HHW materials through the City of Plano's HHW diversion program. All HHW tonnages for Allen are included with Plano's numbers.

ICI Recycling

The City of Allen was also able to provide data for ICI recycling activity in the city. Table 4-3 summarizes the ICI recycling data that was reported by the city.

Table 4-3
City of Allen ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Commingled Materials	172	10.3%
OCC	1,500	89.7%
Total Recycling	1,672	100%

Disposal and Recycling Rate

Table 4-4 provides a summary of recycling rates in the City of Allen.

Table 4-4
City of Allen Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	9,733	317	971	1,672	11,405
Organic Waste	7,189	234	717	N/A	N/A
Remaining	2,544	83	254	N/A	N/A
Disposal	22,920	747	2,287	24,592	47,512
Waste Generation	32,653			26,264	58,917
Recycling Rate	29.8%			6.4%	19.4%

4.2.3 Arlington

Residential Recycling

The City of Arlington responded to the municipal survey. Table 4-5 provides a summary of residential recycling in the City of Arlington.³

Table 4-5
City of Arlington Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	208	0.9%
Steel cans	247	1.0%
Mixed metals	695	2.9%
PETE	714	2.9%
HDPE natural	251	1.0%
HDPE colored	146	0.6%
Mixed Plastic	165	0.7%
OCC	1,931	7.9%
Mixed paper	10,220	42.0%
Mixed glass	909	3.7%
Mixed yard trimmings	8,618	35.4%
Tires	48	0.2%
Other electronics	32	0.1%
Other HHW	140	0.6%
Total Recycling	24,324	100%

ICI Recycling

Arlington also provided ICI recycling data. Based on information provided by the city, ICI entities in Arlington recycled 2,886 tons of OCC during the survey time period.

³ The City of Arlington has prohibited residents from disposing of grass clippings in the garbage since 1993. It should be noted that this program likely diverts a significant amount of waste from the landfill that is not accounted for in the recycling rate that is calculated in this report.

Disposal and Recycling Rate

Table 4-6 shows the recycling rate in Arlington.

Table 4-6
City of Arlington Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	24,324	199	525	2,886	27,210
Organic Waste	8,618	70	186	N/A	N/A
Remaining	15,706	128	339	N/A	N/A
Disposal	124,808	1,021	2,695	267,464	392,272
Waste Generation	149,132			270,350	419,482
Recycling Rate	16.3%			1.1%	6.5%

4.2.4 Azle

Residential Recycling

The City of Azle participated in the survey. Table 4-7 provides a summary of residential recycling in Azle.

Table 4-7
City of Azle Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	8	2.0%
Steel cans	19	4.9%
Mixed Plastic	55	13.4%
Mixed paper	289	70.5%
Mixed glass	39	9.5%
Total Recycling	410	100%

Disposal and Recycling Rate

Table 4-8 describes recycling rates in Azle.

Table 4-8
City of Azle Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	410	90	225	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	410	90	225	N/A	N/A
Disposal	4,916	1,083	2,697	6,867	Unknown
Waste Generation	5,326			Unknown	Unknown
Recycling Rate	7.7%			Unknown	Unknown

4.2.5 Balch Springs

The City of Balch Springs responded to the initial survey sent by the NCTCOG. However, R. W. Beck needed further clarification on the response provided. R. W. Beck made three phone calls to the city in order to clarify the data, but the city did not respond to these attempts.

4.2.6 Bedford

Residential Recycling

The City of Bedford participated in the municipal survey. Table 4-9 summarizes residential recycling in Bedford.

Table 4-9
City of Bedford Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	55	2.0%
Steel cans	137	5.0%
Mixed Plastic	247	9.0%
Mixed paper	2,032	74.0%
Mixed glass	275	10.0%
Total Recycling	2,746	100%

Disposal and Recycling Rate

Table 4-10 summarizes the recycling rates for the City of Bedford.

Table 4-10
City of Bedford Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,746	174	399	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	2,746	174	399	N/A	N/A
Disposal	17,139	1,083	2,491	44,366	Unknown
Waste Generation	19,884			Unknown	Unknown
Recycling Rate	13.8%			Unknown	Unknown

4.2.7 Benbrook

Residential Recycling

The City of Benbrook provided recycling data that includes both residential and ICI recycling activity. R. W. Beck made two follow up phone calls in order to determine the how this tonnage can be classified between residential and ICI, but the city was unable to provide any estimates to this effect. R. W. Beck classified all recycling data received as residential. Table 4-11 is a summary of recycling data from Benbrook.

Table 4-11
City of Benbrook Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	35	2.0%
Steel cans	88	5.0%
Mixed Plastic	158	8.9%
Mixed paper	1,299	73.5%
Mixed glass	176	10.0%
Painting Supplies	9	0.5%
Used Oil	1	0.0%
Antifreeze	1	0.0%
Lead Acid Batteries	1	0.0%
Household Batteries	1	0.0%
Total Recycling	1,769	100%

Disposal and Recycling Rate

Table 4-12 describes the recycling rate in Benbrook.

Table 4-12
City of Benbrook Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,769	204	469	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,769	204	469	N/A	N/A
Disposal	9,379	1,083	2,491	8,471	Unknown
Waste Generation	11,148			Unknown	Unknown
Recycling Rate	15.9%			Unknown	Unknown

4.2.8 Burleson

Residential Recycling

The City of Burleson participated in the municipal survey. Table 4-13 provides a summary of recycling information for the City of Burleson.

Table 4-13
City of Burleson Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Metals	1	0.0%
Old Corrugated Containers	9	0.2%
Mixed Paper	51	0.9%
Mixed Glass	14	0.3%
Brush and Branches	5,423	98.4%
Other HHW ^[1]	15	0.3%
Total Recycling	5,513	100%

[1] Burleson had 345 households drop off HHW at the Fort Worth ECC during the survey time period. In order to convert the number of participants to tons, R. W. Beck used data provided by staff at the ECC. The average participating household brings 85 lbs. of material to the ECC. Based on this assumption, 85 lbs. * 345 households = 29,325 lbs or 15 tons.

Disposal and Recycling Rate

Table 4-14 provides a summary of recycling rates in Burleson.

Table 4-14
City of Burleson Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	5,513	413	1,144	Unknown	Unknown
Organic Waste	5,423	406	1,126	N/A	N/A
Remaining	89	7	18	N/A	N/A
Disposal	16,042	1,202	3,331	9,752	Unknown
Waste Generation	21,555			Unknown	Unknown
Recycling Rate	25.6%			Unknown	Unknown

4.2.9 Carrollton

Residential Recycling

The City of Carrollton elected to participate in the survey. Residents in Carrollton recycled 4,837 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-15 shows the recycling rate in the City of Carrollton.

Table 4-15
City of Carrollton Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	4,837	109	303	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	4,837	109	303	N/A	N/A
Disposal	44,753	1,012	2,803	129,416	Unknown
Waste Generation	49,590			Unknown	Unknown
Recycling Rate	9.8%			Unknown	Unknown

4.2.10 Cedar Hill

Residential Recycling

Residents in Cedar Hill recycle an average of 163 tons per month of commingled material. Neither a commodity-by-commodity breakdown nor actual tonnage for the survey time period is available from the hauler. Based on the available information, R. W. Beck estimated that Cedar Hill residents recycle 1,956⁴ tons of commingled material per year.

Disposal and Recycling Rate

Table 4-16 provides a summary of recycling rates in the City of Cedar Hill.

Table 4-16
City of Cedar Hill Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,956	103	304	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,956	103	304	N/A	N/A
Disposal	20,627	1,083	3,206	11,722	Unknown
Waste Generation	22,583			Unknown	Unknown
Recycling Rate	8.7%			Unknown	Unknown

4.2.11 Cleburne

Residential Recycling

The City of Cleburne participated in the municipal survey. In conversations with the hauler, R. W. Beck learned that the city does not have a residential recycling program in place.⁵ However, in subsequent conversations with city staff, the city was able to provide data for brush diversion activity at the city's transfer station. The city processed 2,380 tons of brush during the survey time period.⁶

⁴ 163 tons * 12 months = 1,956 tons per year

⁵ Although the city does not have a recycling program in place, Cleburne has entered into discussions with a private contractor regarding the implementation of a residential recycling program.

⁶ Cleburne also diverts used motor oil and tires from the landfill, but information regarding the quantity of this material that is diverted is not available.

Disposal and Recycling Rate

Table 4-17 provides a summary of recycling rates for Cleburne.

Table 4-17
City of Cleburne Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,380	180	489	Unknown	Unknown
Organic Waste	2,380	180	489	N/A	N/A
Remaining	0	0	0	N/A	N/A
Disposal	9,920	750	2,039	30,872	Unknown
Waste Generation	12,300			Unknown	Unknown
Recycling Rate	19.3%			Unknown	Unknown

4.2.12 Colleyville

Residential Recycling

The City of Colleyville participated in the municipal survey. Residents in Colleyville recycled 1,772 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-18 summarizes the recycling rates in Colleyville.

Table 4-18
City of Colleyville Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,772	160	489	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,772	160	489	N/A	N/A
Disposal	12,006	1,083	3,314	9,422	Unknown
Waste Generation	13,779			Unknown	Unknown
Recycling Rate	12.9%			Unknown	Unknown

4.2.13 Commerce

During the conduct of the survey, R. W. Beck was able to confirm that the City of Commerce does not have any recycling programs in place.

4.2.14 Coppell

Residential Recycling

Residents in Coppell recycle an average of 115 tons per month of newspaper, 58 tons per month of commingled materials, and 55 tons per month of mixed yard trimmings. Neither a commodity-by-commodity breakdown nor actual tonnage for the survey time period is available from the hauler. Based on the available information, R. W. Beck estimated that residents in Coppell recycle 1,380 tons of newsprint⁷ and 696 tons of commingled material⁸ annually. In addition, R. W. Beck estimates that the city recycles 660 tons of yard trimmings annually.⁹ Table 4-19 provides a summary of residential recycling in Coppell.

Table 4-19
City of Coppell Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Old Newspaper	1,380	50.4%
Mixed Yard Trimmings	660	24.1%
Commingled	696	25.4%
Total Recycling	2,736	100%

Disposal and Recycling Rate

Table 4-20 shows the recycling rate in the City of Coppell.

Table 4-20
City of Coppell Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,736	172	509	Unknown	Unknown
Organic Waste	660	41	123	N/A	N/A
Remaining	2,076	131	386	N/A	N/A
Disposal	17,187	1,083	3,195	34,918	Unknown
Waste Generation	19,923			Unknown	Unknown
Recycling Rate	13.7%			Unknown	Unknown

⁷ 115 tons per month x 12 months = 1,380 tons of newspaper

⁸ 58 tons per month x 12 months = 696 tons of commingled material

⁹ 55 tons per month x 12 months = 660 tons of yard trimmings

4.2.15 Corinth

Residential Recycling

Residents in Corinth recycle an average of 36 tons per month of newspaper and 17 tons per month of commingled material. Neither a commodity-by-commodity breakdown nor actual tonnage for the survey time period is available from the hauler. Based on the available information, R. W. Beck estimates that residents in Corinth recycle 432 tons of newspaper¹⁰ and 204 tons of commingled material¹¹ annually. Table 4-21 provides a summary of residential recycling in Corinth.

Table 4-21
City of Corinth Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Old Newspaper	432	67.9%
Commingled	204	32.1%
Total Recycling	636	100%

Disposal and Recycling Rate

Table 4-22 shows the recycling rate in Corinth.

Table 4-22
City of Corinth Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	636	72	210	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	636	72	210	N/A	N/A
Disposal	9,503	1,083	3,141	4,199	Unknown
Waste Generation	10,139			Unknown	Unknown
Recycling Rate	6.3%			Unknown	Unknown

¹⁰ 36 tons per month x 12 months = 432 tons of newspaper

¹¹ 17 tons per month x 12 months = 204 tons of commingled material

4.2.16 Corsicana

Residential Recycling

The City of Corsicana participated in the municipal survey. During the survey time period, residents in Corsicana recycled 30 tons of commingled material at the city's recycling drop-off center.

ICI Recycling

Corsicana also provided ICI recycling data in response to the municipal survey. ICI entities in Corsicana recycled 275 tons of OCC during the survey time period.

Disposal and Recycling Rate

Table 4-23 summarizes the residential recycling rate in Corsicana.

Table 4-23
City of Corsicana Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	30	3	7	275	305
Organic Waste	0	0	0	N/A	N/A
Remaining	30	3	7	N/A	N/A
Disposal	11,893	1,083	2,870	25,534	37,428
Waste Generation	11,923			25,809	37,733
Recycling Rate	0.3%			1.1%	0.8%

4.2.17 Crowley

Residential Recycling

The City of Crowley chose to participate in the municipal survey. Residents in Crowley recycled 761 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-24 provides a summary of recycling rates for Crowley.

Table 4-24
City of Crowley Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	761	189	542	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	761	189	542	N/A	N/A
Disposal	5,527	1,371	3,935	4,402	Unknown
Waste Generation	6,288			Unknown	Unknown
Recycling Rate	12.1%			Unknown	Unknown

4.2.18 Dallas

Residential Recycling

The City of Dallas provided a response to the municipal survey. Table 4-25 provides a summary of residential recycling activity reported by Dallas.

Table 4-25
City of Dallas Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	66	0.1%
Tin Cans	180	0.4%
Mixed Metals	183	0.4%
PETE	196	0.4%
HDPE (color)	205	0.5%
PVC	32	0.1%
Mixed Paper	31,262	70.6%
Mixed Glass	998	2.3%
Mixed Yard Trimmings	8,967	20.3%
Tires	735	1.7%
Commingled	1,435	3.2%
Total Recycling	44,259	100%

ICI Recycling

The City of Dallas also provided ICI diversion data in response to the survey by R. W. Beck. Table 4-26 summarizes ICI diversion reported by Dallas.¹²

Table 4-26
City of Dallas ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Metals	60	0.1%
Asphalt	5,443	8.9%
Concrete	51,745	84.7%
Wood	3,817	6.3%
Total Recycling	61,065	100%

Disposal and Recycling Rate

Table 4-27 shows the recycling rates for the City of Dallas.

Table 4-27
City of Dallas Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	44,259	130	336	61,065	105,325
Organic Waste	8,967	26	68	N/A	N/A
Remaining	35,292	104	268	N/A	N/A
Disposal	566,369	1,666	4,299	1,970,326	2,536,695
Waste Generation	610,628			2,031,392	2,642,020
Recycling Rate	7.2%			3.0%	4.0%

¹² In responding to the survey, Dallas also included diversion of soil at the landfill in its ICI recycling data. R. W. Beck has not included soil diversion in the analysis because it is generally not considered recycling in the solid waste industry.

4.2.19 Denton

Residential Recycling

The City of Denton responded to the municipal survey. Table 4-28 provides a summary of residential recycling in the City of Denton.

Table 4-28
City of Denton Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	51	0.4%
Steel cans	159	1.2%
Mixed Plastic	159	1.2%
Old Newspaper	2,121	16.2%
Old Corrugated Containers	464	3.6%
Mixed paper	494	3.8%
Mixed glass	261	2.0%
Mixed Yard Trimmings	9,308	71.3%
Other Electronics	29	0.2%
Tires	15	0.1%
Total Recycling	13,061	100%

ICI Recycling

The City of Denton was also able to provide data on ICI recycling. Table 4-29 provides a summary of ICI recycling activity reported by city staff.

Table 4-29
City of Denton ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	4	0.1%
Steel Cans	12	0.3%
Mixed Plastic	11	0.3%
Newspaper	7	0.2%
OCC	246	7.1%
Office Paper	70	2.0%
Mixed Glass	79	2.3%
Brush and Branches	1,180	34.1%
Asphalt	184	5.3%
Concrete	1,548	44.8%
Commingled	122	3.5%
Total Recycling	3,460	100%

Disposal and Recycling Rate

Table 4-30 shows the recycling rates for the City of Denton.

Table 4-30
City of Denton Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	13,061	419	984	3,460	16,521
Organic Waste	9,308	299	701	N/A	N/A
Remaining	3,753	120	283	N/A	N/A
Disposal	28,335	908	2,135	111,165	139,500
Waste Generation	41,396			114,625	156,021
Recycling Rate	31.6%			3.0%	10.6%

4.2.20 Desoto

Residential Recycling

The City of Desoto responded to the municipal survey. Table 4-31 provides a summary of recycling information for the City of Desoto.

Table 4-31
City of Desoto Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	19	1.0%
Steel cans	21	1.1%
PETE	77	4.1%
HDPE Natural	36	1.9%
HDPE Colored	24	1.3%
PS	29	1.5%
Old Corrugated Containers	159	8.4%
Mixed Paper	1,361	71.7%
Other Paper	90	4.7%
Mixed Glass	172	9.1%
Total Recycling	1,988	100%

Disposal and Recycling Rate

Table 4-32 provides a summary of recycling rates in Desoto.

Table 4-32
City of Desoto Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,988	111	300	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,988	111	300	N/A	N/A
Disposal	18,109	1,013	2,734	30,968	Unknown
Waste Generation	20,097			Unknown	Unknown
Recycling Rate	9.9%			Unknown	Unknown

4.2.21 Duncanville

Residential Recycling

The City of Duncanville participated in the survey. Table 4-33 summarizes residential recycling in Duncanville.

Table 4-33
City of Duncanville Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	34	1.4%
Steel cans	41	1.7%
PETE	118	4.8%
HDPE Natural	42	1.7%
HDPE Colored	24	1.0%
Mixed Plastic	27	1.0%
Old Corrugated Containers	320	13.1%
Mixed Paper	1,691	69.1%
Mixed Glass	151	6.2%
Total Recycling	2,448	100%

Disposal and Recycling Rate

Table 4-34 provides a summary of recycling rates in the City of Duncanville.

Table 4-34
City of Duncanville Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,448	160	446	Unknown	Unknown
Organic Waste	0	0	0	NA	N/A
Remaining	2,448	160	446	N/A	N/A
Disposal	16,580	1,083	3,022	26,113	Unknown
Waste Generation	19,028			Unknown	Unknown
Recycling Rate	12.9%			Unknown	Unknown

4.2.22 Ennis

The City of Ennis did not respond to the survey. R. W. Beck made several follow up phone calls in order to determine the status of the survey, but City staff was unresponsive to these calls.

4.2.23 Euless

Residential Recycling

The City of Euless participated in the survey. Table 4-35 summarizes residential recycling in Euless.

Table 4-35
City of Euless Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	9	1.0%
Steel Cans	27	3.0%
Mixed Plastic	45	5.0%
Mixed Paper	721	80.0%
Mixed Glass	99	11.0%
Total Recycling	901	100%

ICI Recycling

The City of Euless also provided ICI recycling data in response to the survey. Table 4-36 summarizes ICI recycling reported by the city.

Table 4-36
City of Euless Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	1	0.7%
Steel Cans	4	2.9%
Mixed Paper	111	80.4%
Mixed Plastic	7	5.1%
Mixed Glass	15	10.9%
Total Recycling	138	100%

Disposal and Recycling Rate

Table 4-37 provides a summary of recycling rates in the City of Euless.

Table 4-37
City of Euless Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	901	60	143	138	1,040
Organic Waste	0	0	0	NA	N/A
Remaining	901	60	143	N/A	N/A
Disposal	15,016	995	2,379	34,922	49,938
Waste Generation	15,917			35,061	50,978
Recycling Rate	5.7%			0.4%	2.0%

4.2.24 Farmers Branch

Residential Recycling

The City of Farmers Branch participated in the municipal survey. Residents in Farmers Branch recycled 192 tons of commingled materials at its drop off centers during the survey time period.

Disposal and Recycling Rate

Table 4-38 shows the recycling rate in Farmers Branch.

Table 4-38
City of Farmers Branch Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	192	18	52	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	192	18	52	N/A	N/A
Disposal	15,805	1,488	4,271	142,346	Unknown
Waste Generation	15,997			Unknown	Unknown
Recycling Rate	1.2%			Unknown	Unknown

4.2.25 Flower Mound

Residential Recycling

The City of Flower Mound participated in the municipal survey. Table 4-39 summarizes residential recycling in Flower Mound.

Table 4-39
City of Flower Mound Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	68	2.0%
Steel cans	170	5.0%
Mixed Plastic	306	9.0%
Mixed Paper	2,517	74.0%
Mixed Glass	340	10.0%
Total Recycling	3,401	100%

Disposal and Recycling Rates

Table 4-40 summarizes recycling rates in Flower Mound.

Table 4-40
City of Flower Mound Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	3,401	113	354	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	3,401	113	354	N/A	N/A
Disposal	32,545	1,083	3,490	9,735	Unknown
Waste Generation	36,946			Unknown	Unknown
Recycling Rate	9.5%			Unknown	Unknown

4.2.26 Forest Hill

During the conduct of the municipal survey, R. W. Beck confirmed with city staff that the City of Forest Hill does not currently have any recycling programs.

4.2.27 Forney

Residential Recycling

The City of Forney participated in the municipal survey. Table 4-41 summarizes residential recycling in Forney.

Table 4-41
City of Forney Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Metals	72	15.1%
Mixed Plastic	28	5.9%
Old Newspaper	297	62.3%
Mixed Paper	42	8.8%
Clear Glass	38	8.0%
Total Recycling	477	100%

Disposal and Recycling Rates

Table 4-42 summarizes the recycling rate in Forney.

Table 4-42
City of Forney Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	477	106	304	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	477	106	304	N/A	N/A
Disposal	3,321	736	2,120	2,740	Unknown
Waste Generation	3,798			Unknown	Unknown
Recycling Rate	12.6%			Unknown	Unknown

4.2.28 Fort Worth

Residential Recycling

The City of Fort Worth participated in the municipal survey. The city contracts with a private company for the hauling of recyclables for both residential customers and small ICI customers. Therefore, recycling tonnages for small ICI customers are included in the residential recycling figures shown in Table 4-43.

Table 4-43
City of Fort Worth Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	501	0.9%
Steel cans	826	1.6%
PETE	1,014	1.9%
HDPE Natural	520	1.0%
HDPE Colored	369	0.7%
Mixed Plastic	326	0.6%
Old Newspapers	20,134	38.0%
Old Corrugated Containers	3,659	6.9%
Mixed Paper	4,263	8.0%
Mixed Glass	4,020	7.6%
Mixed Yard Trimmings	16,766	31.6%
Used Oil	299.2	0.6%
Antifreeze	33	0.1%
Lead Acid Batteries	33	0.1%
Household Batteries	3	0.0%
Other HHW ^[1]	249	0.5%
Total Recycling	53,015	100%

[1] Includes 1 ton of fluorescent bulbs and 247.5 tons of used oil filters

Disposal and Recycling Rate

Table 4-44 describes the recycling rates in Fort Worth.

Table 4-44
City of Fort Worth Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	53,015	231	616	Unknown	Unknown
Organic Waste	16,766	73	195	N/A	N/A
Remaining	36,248	158	421	N/A	N/A
Disposal	208,270	906	2,418	853,537	Unknown
Waste Generation	261,285			Unknown	Unknown
Recycling Rate	20.3%			Unknown	Unknown

4.2.29 Frisco

Residential Recycling

The City of Frisco participated in the municipal survey. Table 4-45 provides a summary of residential recycling in Frisco.

Table 4-45
City of Frisco Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Yard Trimmings	1,506	17.2%
Commingled	7,192	82.4%
Consumer Electronics	22	0.3%
Painting Supplies	18	0.2%
Used Oil	13	0.1%
Antifreeze	2	0.0%
Total Recycling	8,731	100%

Disposal and Recycling Rate

Table 4-46 summarizes recycling rates in the City of Frisco.

Table 4-46
City of Frisco Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	8,731	305	843	Unknown	Unknown
Organic Waste	1,506	53	145	N/A	N/A
Remaining	7,225	252	698	N/A	N/A
Disposal	24,335	849	2,351	16,010	Unknown
Waste Generation	33,066			Unknown	Unknown
Recycling Rate	26.4%			Unknown	Unknown

4.2.30 Garland

Residential Recycling

The City of Garland participated in the municipal survey. Table 4-47 provides a summary of residential recycling in Garland.

Table 4-47
City of Garland Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	1	0.0%
Mixed Metals	0.5	0.0%
Old Newspaper	1,955	4.7%
Brush and Branches	38,304	91.3%
Commingled	1,508	3.6%
Tires ^[1]	166	0.4%
Total Recycling	41,934	100%

[1] Includes both residential and ICI tires. The city did not provide information on how to categorize residential vs. ICI tires.

ICI Recycling

Garland was also able to provide information regarding ICI recycling during the survey time period. ICI entities in Garland recycled 70 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-48 provides a summary of recycling rates in the City of Garland.

Table 4-48
City of Garland Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	41,934	486	1,430	70	42,004
Organic Waste	38,304	444	1,306	N/A	N/A
Remaining	3,630	42	124	N/A	N/A
Disposal	93,379	1,083	3,184	176,982	270,360
Waste Generation	135,313			177,052	312,365
Recycling Rate	31.0%			0.0%	13.4%

4.2.31 Glenn Heights

In responding to the initial survey, the City of Glenn Heights authorized NCTCOG staff to contact the private contractor in order to obtain survey data. In discussions with the R. W. Beck, the contractor stated that although the city does have a recycling program in place, data regarding the tonnage of collected material is not tracked.

4.2.32 Grand Prairie

Residential Recycling

The City of Grand Prairie provided a response to the municipal survey. Table 4-49 summarizes residential recycling information for Grand Prairie.

Table 4-49
City of Grand Prairie Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	45	0.6%
Steel Cans	54	0.8%
PETE	155	2.2%
HDPE Natural	54	0.8%
HDPE Colored	32	0.4%
Mixed Plastic	36	0.5%
OCC	419	5.9%
Mixed Paper	2,214	31.0%
Mixed Glass	197	2.8%
Mixed Yard Trimmings	3,728	52.1%
Lead Acid Batteries	5	0.1%
Tires	62	0.9%
Electronics	23	0.3%
Mixed Metal	129	1.8%
Total Recycling	7,153	100%

ICI Recycling

Grand Prairie also provided ICI recycling data in response to the survey. Table 4-50 is a summary of the data provided by Grand Prairie.¹³

Table 4-50
City of Grand Prairie ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Paper	1,733	8.1%
Brush and Branches	5,592	26.1%
Mixed Metals	13,946	65.0%
Concrete	194	0.9%
Total Recycling	21,465	100%

Disposal and Recycling Rate

Table 4-51 provides a summary of recycling rates in Grand Prairie.

Table 4-51
City of Grand Prairie Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	7,153	138	400	21,465	28,618
Organic Waste	3,728	72	208	N/A	N/A
Remaining	3,425	66	192	N/A	N/A
Disposal	55,209	1,065	3,090	122,720	177,929
Waste Generation	62,362			144,185	206,547
Recycling Rate	11.5%			14.9%	13.9%

¹³ City staff also provided data on soil diversion activity that occurs at the city's landfill. R. W. Beck did not include this tonnage in the analysis because it is generally not considered to be recycling in the solid waste industry.

4.2.33 Grapevine

Residential Recycling

The City of Grapevine participated in the municipal survey. Table 4-52 summarizes recycling information for Grapevine.

Table 4-52
City of Grapevine Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum cans	55	2.0%
Steel cans	138	5.0%
Mixed Plastic	248	9.0%
Mixed Paper	2,043	74.0%
Mixed Glass	275	10.0%
Total Recycling	2,759	100%

Disposal and Recycling Rate

Table 4-53 describes the recycling rate in Grapevine.

Table 4-53
City of Grapevine Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,759	161	428	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	2,759	161	428	N/A	N/A
Disposal	18,557	1,083	2,881	94,056	Unknown
Waste Generation	21,316			Unknown	Unknown
Recycling Rate	12.9%			Unknown	Unknown

4.2.34 Greenville

The City of Greenville chose to participate in the survey and requested that their private contractor provide survey information to R. W. Beck. The contractor agreed to complete the survey on behalf of the city, but R. W. Beck never received their survey response. The contractor was unresponsive to follow up phone calls and emails regarding the survey.

4.2.35 Haltom City

The City of Haltom City agreed to participate in the survey, but city staff said that they were having difficulty obtaining survey information from their private contractor. R. W. Beck did not receive a completed survey for Haltom City.

4.2.36 Highland Park

Residential Recycling

The City of Highland Park participated in the municipal survey. Table 4-54 provides a summary of residential recycling in Highland Park.

Table 4-54
City of Highland Park Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Brush and Branches	2,440	81.4%
Commingled	559	18.6%
Total Recycling	2,999	100%

Disposal and Recycling Rate

Table 4-55 shows the recycling rate in Highland Park.

Table 4-55
City of Highland Park Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,999	805	1,981	Unknown	Unknown
Organic Waste	2,440	655	1,612	N/A	N/A
Remaining	559	150	369	N/A	N/A
Disposal	8,522	2,289	5,630	4,564	Unknown
Waste Generation	11,522			n/a	Unknown
Recycling Rate	26.0%			n/a	Unknown

4.2.37 Highland Village

Residential Recycling

The City of Highland Village participated in the municipal survey. Table 4-56 is a summary of the recycling data provided by the city.

Table 4-56
City of Highland Village Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Mixed Metals	405	15.5%
Mixed Plastic	405	15.5%
Mixed Paper	719	27.5%
Mixed Yard Trimmings	545	20.8%
Other Wood	545	20.8%
Total Recycling	2,619	100%

Disposal and Recycling Rate

Table 4-57 shows the recycling rate in Highland Village.

Table 4-57
City of Highland Village Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,619	348	1,093	Unknown	Unknown
Organic Waste	1,090	145	455	N/A	N/A
Remaining	1,528	203	638	N/A	N/A
Disposal	7,305	971	3,049	11,959	Unknown
Waste Generation	9,924			Unknown	Unknown
Recycling Rate	26.4%			Unknown	Unknown

4.2.38 Hurst

Residential Recycling

The City of Hurst participated in the municipal survey. Table 4-58 is a summary of residential recycling information as reported by Hurst.

Table 4-58
City of Hurst Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	38	2.0%
Tin Cans	95	5.0%
Mixed Plastic	170	9.0%
Mixed Paper	1,399	74.0%
Mixed Glass	189	10.0%
Total Recycling	1,891	100%

Disposal and Recycling Rate

Table 4-59 is a summary of recycling rates in Hurst.

Table 4-59
City of Hurst Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,891	130	332	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,891	130	332	N/A	N/A
Disposal	15,791	1,083	2,773	36,288	Unknown
Waste Generation	17,682			Unknown	Unknown
Recycling Rate	10.7%			Unknown	Unknown

4.2.39 Irving

Residential Recycling

The City of Irving participated in the municipal survey. Table 4-60 summarizes recycling data for Irving.

Table 4-60
City of Irving Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	14	0.2%
Steel Cans	41	0.5%
Major Appliances	494	5.7%
PETE	19	0.2%
HDPE Colored	14	0.2%
Other Plastic	36	0.4%
Old Newspaper	1,926	22.3%
OCC	5	0.1%
Office Paper	9	0.1%
Mixed Paper	128	1.5%
Textiles	20	0.2%
Mixed Glass	187	2.2%
Brush and Branches	5,538	64.2%
Consumer Electronics	19	0.2%
Tires	128	1.5%
Used Oil	11	0.1%
Lead Acid Batteries	1	0.0%
Anti Freeze	42	0.5%
Total Recycling	8,632	100%

ICI Recycling

The City of Irving provided ICI recycling information for only those recyclables that are collected from city-owned facilities. Table 4-61 summarizes municipal recycling in the City of Irving.

Table 4-61
City of Irving ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	1	1.6%
OCC	5	7.9%
Mixed Paper	57	90.5%
Total Recycling ^[1]	63	100%

[1] Represents only recycling that is collected from municipal facilities.

Disposal and Recycling Rate

Table 4-62 summarizes recycling rates in the City of Irving.

Table 4-62
City of Irving Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	8,632	185	462	63	8,695
Organic Waste	5,538	119	296	N/A	N/A
Remaining	3,094	66	166	N/A	N/A
Disposal	60,464	1,296	3,239	313,933	374,397
Waste Generation	69,096			313,996	383,092
Recycling Rate	12.5%			0.0%	2.3%

4.2.40 Keller

Residential Recycling

The City of Keller participated in the municipal survey. Table 4-63 summarizes recycling information for Keller.

Table 4-63
City of Keller Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	37	2.0%
Steel Cans	28	5.0%
Mixed Plastic	170	9.0%
Mixed Paper	1,381	74.0%
Mixed Glass	189	10.0%
Total Recycling	1,805	100%

Disposal and Recycling Rate

Table 4-64 describes the recycling rate in Keller.

Table 4-64
City of Keller Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,805	103	320	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,805	103	320	N/A	N/A
Disposal	18,969	1,083	3,358	42,844	Unknown
Waste Generation	20,774			Unknown	Unknown
Recycling Rate	8.7%			Unknown	Unknown

4.2.41 Lancaster

During the conduct of the municipal survey, R. W. Beck confirmed that there are no recycling programs in the City of Lancaster.

4.2.42 Lewisville

Residential Recycling

The City of Lewisville participated in the municipal survey. Table 4-65 summarizes residential recycling in Lewisville.

Table 4-65
City of Lewisville Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	24	0.9%
Steel Cans	48	1.7%
PETE	141	5.1%
HDPE Natural	15	0.5%
HDPE Colored	14	0.5%
Mixed Plastic	55	2.0%
OCC	187	6.7%
Mixed Paper	1,844	66.1%
Telephone Directories	266	9.5%
Mixed Glass	197	7.1%
Total Recycling	2,791	100%

ICI Recycling

City staff also reported data for ICI recycling. Table 4-66 summarizes ICI recycling data provided by the city.

Table 4-66
City of Lewisville ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
OCC	50	12.3%
Mixed Paper	355	87.7%
Total Recycling	405	100%

Disposal and Recycling Rate

Table 4-67 shows the recycling rate in Lewisville.

Table 4-67
City of Lewisville Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,791	110	284	405	3,196
Organic Waste	0	0	0	N/A	N/A
Remaining	2,791	110	284	N/A	N/A
Disposal	27,825	1,100	2,827	111,079	138,904
Waste Generation	30,616			111,484	142,100
Recycling Rate	9.1%			0.4%	2.2%

4.2.43 Little Elm

Residential Recycling

The City of Little Elm chose to participate in the survey. Table 4-68 is a summary of residential recycling in Little Elm.

Table 4-68
City of Little Elm Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	15	1.2%
Steel Cans	10	0.8%
PETE	37	2.9%
HDPE Natural	32	2.5%
Mixed Plastic	10	0.8%
Old Newspaper	1,041	80.8%
Mixed Glass	144	11.2%
Total Recycling	1,289	100%

ICI Recycling

City staff reported that ICI entities in the city recycled 97 tons of OCC during the survey time period.

Disposal and Recycling Rates

Table 4-69 summarizes recycling rates in the City of Little Elm.

Table 4-69
City of Little Elm Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,289	230	703	97	1,387
Organic Waste	0	0	0	N/A	N/A
Remaining	1,289	230	703	N/A	N/A
Disposal	6,077	1,083	3,314	3,642	9,719
Waste Generation	7,366			3,739	11,105
Recycling Rate	17.5%			2.6%	12.5%

4.2.44 Mansfield

Residential Recycling

The City of Mansfield participated in the municipal survey. Table 4-70 summarizes residential recycling in Mansfield.

Table 4-70
City of Mansfield Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	28	1.4%
Steel Cans	33	1.7%
PETE	95	4.9%
HDPE Natural	33	1.7%
HDPE Colored	19	1.0%
Mixed Plastic	22	1.1%
OCC	257	13.3%
Mixed Paper	1,329	68.6%
Mixed Glass	121	6.2%
Total Recycling	1,937	100%

Disposal and Recycling Rate

Table 4-71 shows the recycling rate in the City of Mansfield.

Table 4-71
City of Mansfield Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,937	113	350	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,937	113	350	N/A	N/A
Disposal	18,592	1,083	3,358	15,735	Unknown
Waste Generation	20,529			Unknown	Unknown
Recycling Rate	9.4%			Unknown	Unknown

4.2.45 McKinney

Residential Recycling

The City of McKinney responded to the municipal survey. Table 4-72 summarizes the residential recycling data provided by McKinney.

Table 4-72
City of McKinney Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	36	1.0%
Steel Cans	90	2.4%
Mixed Plastic	164	4.5%
Old Newspaper	2,712	73.8%
OCC	260	7.1%
Mixed Glass	153	4.2%
Commingled	264	7.2%
Total Recycling	3,679	100%

Disposal and Recycling Rate

Table 4-73 shows the recycling rate in McKinney.

Table 4-73
City of McKinney Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	3,679	95	275	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	3,677	95	275	N/A	N/A
Disposal	41,791	1,083	3,130	49,894	Unknown
Waste Generation	45,470			Unknown	Unknown
Recycling Rate	8.1%			Unknown	Unknown

4.2.46 Mesquite

Residential Recycling

The City of Mesquite responded to the municipal survey. Table 4-74 summarizes residential recycling in Mesquite.

Table 4-74
City of Mesquite Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	8	0.0%
Steel Cans	21	0.1%
Mixed Metals	4,406	16.1%
Mixed Plastic	24	0.1%
Old Newspaper	911	3.3%
OCC	9	0.0%
Mixed Paper	106	0.4%
Mixed Yard Trimmings	21,949	80.0%
Total Recycling	27,434	100%

Disposal and Recycling Rate

Table 4-75 shows the recycling rate in Mesquite.

Table 4-75
City of Mesquite Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	27,434	544	1,530	Unknown	Unknown
Organic Waste	21,949	435	1,224	N/A	N/A
Remaining	5,486	109	306	N/A	N/A
Disposal	46,529	923	2,594	102,064	Unknown
Waste Generation	73,964			Unknown	Unknown
Recycling Rate	37.1%			Unknown	Unknown

4.2.47 Midlothian

Residential Recycling

The City of Midlothian responded to the municipal survey. Midlothian residents recycled 242 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-76 summarizes the recycling rate for the City of Midlothian.

Table 4-76
City of Midlothian Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	242	47	133	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	242	47	133	N/A	N/A
Disposal	3,805	731	2,092	7,651	Unknown
Waste Generation	4,047			Unknown	Unknown
Recycling Rate	6.0%			Unknown	Unknown

4.2.48 Mineral Wells

During the conduct of the municipal survey, R. W. Beck confirmed that there is no recycling program in place in the City of Mineral Wells.

4.2.49 Murphy

Residential Recycling

The City of Murphy participated in the municipal survey. Table 4-77 summarizes residential recycling in Murphy.

Table 4-77
City of Murphy Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	23	3.6%
Steel Cans	19	3.0%
Mixed Plastic	59	9.4%
Old Newspaper	422	66.9%
Mixed Glass	109	17.3%
Total Recycling	632	100%

Disposal and Recycling Rates

Table 4-78 shows the recycling rate in Murphy.

Table 4-78
City of Murphy Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	632	115	349	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	632	11	349	N/A	N/A
Disposal	5,585	1,019	3,088	3,089	Unknown
Waste Generation	6,217			n/a	Unknown
Recycling Rate	10.2%			n/a	Unknown

4.2.50 North Richland Hills

Residential Recycling

The City of North Richland Hills participated in the survey. Table 4-79 summarizes residential recycling as reported by the city.

Table 4-79
City of North Richland Hills Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	54	2.0%
Steel Cans	136	5.0%
Mixed Plastic	245	9.0%
Mixed Paper	2,015	74.0%
Mixed Glass	272	10.0%
Total Recycling	2,722	100%

Disposal and Recycling Rates

Table 4-80 summarizes recycling rates in North Richland Hills.

Table 4-80
City of North Richland Hills Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,722	114	302	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	2,722	114	302	N/A	N/A
Disposal	25,948	1,083	2,881	39,812	Unknown
Waste Generation	28,670			Unknown	Unknown
Recycling Rate	9.5%			Unknown	Unknown

4.2.51 Plano

Residential Recycling

The City of Plano participated in the municipal survey. Table 4-81 summarizes residential recycling in Plano.¹⁴

Table 4-81
City of Plano Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	174	0.5%
Steel Cans	245	0.6%
Major Appliances	95	0.2%
PETE	445	1.2%
HDPE Natural	171	0.4%
HDPE Colored	162	0.4%
Old Newspaper	11,288	29.2%
OCC	1,184	3.1%
Office Paper	48	0.1%
Telephone Directories	466	1.2%
Mixed Paper	2,424	6.3%
Mixed Glass	1,107	2.9%
Mixed Yard Trimmings	20,649	53.5%
Consumer Electronics	57	0.1%
Cleaning Supplies	12	0.0%
Painting Supplies	59	0.2%
Used Oil	6	0.0%
Household Batteries	1	0.0%
Other HHW	5	0.0%
Total Recycling	38,598	100%

¹⁴ The City of Allen diverts HHW materials through the City of Plano's HHW diversion program. All HHW tonnages for Allen are included with Plano's numbers.

ICI Recycling

In response to the survey, Plano also provided ICI recycling data. Table 4-82 provides a summary of ICI recycling in Plano.

Table 4-82
City of Plano ICI Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	40	0.1%
Mixed Metals	1,917	2.8%
#1 Plastics	50	0.1%
#2 Plastics (natural)	50	0.1%
Old Corrugated Containers	61	0.1%
Mixed Paper	24,233	34.8%
Food Waste	2,758	4.0%
Asphalt	2,458	3.5%
Concrete	20,883	30.0%
Metals	763	1.1%
Wood	9,364	13.5%
Total Recycling	69,599	100%

Disposal and Recycling Rate

Table 4-83 shows the recycling rates in the City of Plano.

Table 4-83
City of Plano Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	38,598	414	1,130	69,599	108,197
Organic Waste	20,649	222	605	N/A	N/A
Remaining	17,948	192	525	N/A	N/A
Disposal	71,059	762	2,080	150,996	222,055
Waste Generation	109,656			220,595	330,252
Recycling Rate	35.2%			31.6%	32.8%

4.2.52 Richardson

Residential Recycling

The City of Richardson responded to the municipal survey. Table 4-84 summarizes residential recycling in Richardson.

Table 4-84
City of Richardson Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	51	1.5%
Steel Cans	94	2.7%
Mixed Plastic	173	5.0%
Mixed Paper	2,880	84.0%
Mixed Glass	229	6.7%
Total Recycling	3,427	100%

Disposal and Recycling Rate

Table 4-85 shows the recycling rate in Richardson.

Table 4-85
City of Richardson Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	3,427	92	238	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	3,427	922	238	N/A	N/A
Disposal	45,921	1,230	3,185	179,879	Unknown
Waste Generation	49,348			Unknown	Unknown
Recycling Rate	6.9%			Unknown	Unknown

4.2.53 Richland Hills

Residential Recycling

The City of Richland Hills participated in the municipal survey. Table 4-86 summarizes residential recycling in Richland Hills.

Table 4-86
City of Richland Hills Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	7	2.0%
Steel Cans	17	5.0%
Mixed Plastic	31	9.0%
Mixed Paper	257	74.0%
Mixed Glass	35	10.0%
Total Recycling	347	100%

Disposal and Recycling Rates

Table 4-87 summarizes recycling rates in Richland Hills.

Table 4-87
City of Richland Hills Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	347	101	246	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	347	101	246	N/A	N/A
Disposal	3,739	1,083	2,654	15,115	Unknown
Waste Generation	4,086			Unknown	Unknown
Recycling Rate	8.5%			Unknown	Unknown

4.2.54 River Oaks

During the conduct of the municipal survey, R. W. Beck confirmed that there are no recycling programs in the City of River Oaks.

4.2.55 Rockwall

Residential Recycling

The City of Rockwall responded to the municipal survey. During the survey time period, Rockwall residents recycled 1,320 tons of commingled material.

Disposal and Recycling Rate

Table 4-88 shows the recycling rate in Rockwall.

Table 4-88
City of Rockwall Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,320	106	286	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,320	106	286	N/A	N/A
Disposal	13,480	1,083	2,924	18,392	Unknown
Waste Generation	14,800			Unknown	Unknown
Recycling Rate	8.9%			Unknown	Unknown

4.2.56 Rowlett

Residential Recycling

The City of Rowlett participated in the municipal survey. Table 4-89 summarizes recycling in Rowlett.

Table 4-89
City of Rowlett Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	36	2.9%
Steel Cans	37	3.0%
Mixed Plastic	88	7.1%
Newspaper	997	80.5%
Mixed Glass	82	6.6%
Total Recycling	1,240	100%

Disposal and Recycling Rate

Table 4-90 summarizes the recycling rate in the City of Rowlett.

Table 4-90
City of Rowlett Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	1,240	47	146	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	1,240	47	146	N/A	N/A
Disposal	23,182	884	2,733	14,957	Unknown
Waste Generation	24,422			Unknown	Unknown
Recycling Rate	5.1%			Unknown	Unknown

4.2.57 Sachse

Residential Recycling

The City of Sachse participated in the municipal survey. Residents in Sachse recycled 677 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-91 shows the recycling rate in Sachse.

Table 4-91
City of Sachse Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	677	82	248	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	677	82	248	N/A	N/A
Disposal	8,981	1,083	3,282	10,004	Unknown
Waste Generation	9,658			Unknown	Unknown
Recycling Rate	7.0%			Unknown	Unknown

4.2.58 Saginaw

Residential Recycling

The City of Saginaw participated in the municipal survey. Table 4-92 summarizes recycling in Saginaw.

Table 4-92
City of Saginaw Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	11	2.0%
Steel Cans	28	5.0%
Mixed Plastic	50	9.0%
Mixed Paper	408	74.0%
Mixed Glass	55	10.0%
Total Recycling	552	100%

Disposal and Recycling Rate

Table 4-93 summarizes the recycling rate in the City of Saginaw.

Table 4-93
City of Saginaw Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	552	67	196	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	552	67	196	N/A	N/A
Disposal	8,944	1,083	3,173	11,065	Unknown
Waste Generation	9,496			Unknown	Unknown
Recycling Rate	5.8%			Unknown	Unknown

4.2.59 Seagoville

Residential Recycling

Table 4-94 summarizes residential recycling as reported by the City of Seagoville.

Table 4-94
City of Seagoville Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	1	0.8%
Steel Cans	3	2.0%
PETE	9	7.1%
HDPE Natural	3	2.4%
Mixed Plastic	2	1.2%
Old Magazines	2	1.6%
Old Newspaper	70	55.6%
OCC	21	16.3%
Mixed Paper	9	6.7%
Mixed Glass	8	6.3%
Total Recycling	128	100%

ICI Recycling

Seagoville reported that ICI entities recycled 410 tons of OCC for the survey time period.

Disposal and Recycling Rate

Table 4-95 shows the recycling rates in Seagoville.

Table 4-95
City of Seagoville Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	128	31	87	410	536
Organic Waste	0	0	0	N/A	N/A
Remaining	128	31	87	N/A	N/A
Disposal	4,850	1,186	3,345	3,750	8,600
Waste Generation	4,978			4,160	9,136
Recycling Rate	2.5%			9.9%	5.9%

4.2.60 Southlake

During the conduct of the municipal survey, R. W. Beck confirmed that the City of Southlake did not have a recycling program during the survey time period. However, the city has since implemented a residential curbside recycling program.

4.2.61 Stephenville

During the conduct of the municipal survey, R. W. Beck confirmed that the City of Stephenville does not have a recycling program in place.

4.2.62 Terrell

During the conduct of the municipal survey, R. W. Beck confirmed that Terrell does not have any recycling programs in place.

4.2.63 The Colony

Residential Recycling

The City of The Colony responded to the municipal survey. Table 4-96 summarizes residential recycling in The Colony.

Table 4-96
City of The Colony Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	60	2.7%
Steel Cans	48	2.2%
Mixed Plastic	150	6.7%
Old Newspaper	1,075	48.2%
Mixed Paper	536	24.1%
Mixed Glass	278	12.5%
Mixed Yard Trimmings	60	2.7%
Tires	7	0.3%
Consumer Electronics	4	0.2%
Used Oil	4	0.2%
Antifreeze	2	0.1%
Lead Acid Batteries	4	0.2%
Total Recycling	2,228	100%

ICI Recycling

In responding to the survey, The Colony reported that one ton of tires were recycled by ICI entities during the survey time period.

Disposal and Recycling Rate

Table 4-97 summarizes recycling rates in The Colony.

Table 4-97
City of The Colony Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	2,228	122	383	1	2,229
Organic Waste	60	3	10	N/A	N/A
Remaining	2,168	119	373	N/A	N/A
Disposal	17,400	953	2,991	22,800	40,200
Waste Generation	19,628			22,801	42,429
Recycling Rate	11.4%			0.0%	5.3%

4.2.64 Trophy Club

The City of Trophy Club agreed to participate in the survey, and requested that their private hauler provide information to R. W. Beck. However, the hauler informed R.W. Beck that because of the small size of the garbage and recycling routes in Trophy Club, tonnages for the city are not tracked separately.

4.2.65 University Park

Residential Recycling

The City of University Park responded to the municipal survey. Table 4-98 summarizes residential recycling in University Park.¹⁵

Table 4-98
City of University Park Residential Recycling
September 2004 - August 2005

Material	Reported Tons	% of Total
Aluminum Cans	9	0.2%
Steel Cans	23	0.6%
Major Appliances	25	0.6%
Mixed Plastic	26	0.7%
Mixed Paper	1,026	25.8%
Mixed Glass	55	1.4%
Mixed Yard Trimmings	2,820	70.8%
Total Recycling	3,984	100%

Disposal and Recycling Rate

Table 4-99 shows the recycling rate in University Park.

Table 4-99
City of University Park Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	3,984	386	1,001	Unknown	Unknown
Organic Waste	2,820	273	709	N/A	N/A
Remaining	1,164	113	292	N/A	N/A
Disposal	16,111	1,563	4,048	17,101	Unknown
Waste Generation	20,095			Unknown	Unknown
Recycling Rate	19.8%			Unknown	Unknown

¹⁵ The City of University Park also has programs for consumer electronics and HHW diversion, but the city was unable to report the quantity of this material that is diverted.

4.2.66 Watauga

The City of Watauga agreed to participate in the survey, and requested that their private hauler provide information to R. W. Beck. However, the hauler informed R.W. Beck that because of the small size of the garbage and recycling routes in Watauga, tonnages for the city are not tracked separately.

4.2.67 Waxahachie

The City of Waxahachie agreed to participate in the municipal survey, and requested that their private hauler provide information directly to R. W. Beck. R. W. Beck had several conversations with representatives from the private hauler who promised to complete and submit the survey. However, the hauler never completed the survey.

4.2.68 Weatherford

The City of Weatherford did not respond to the municipal survey. R. W. Beck staff made four follow-up phone calls to the city, but the city never responded.

4.2.69 White Settlement

R.W. Beck confirmed that there are no recycling programs in White Settlement.

4.2.70 Wylie

Residential Recycling

The City of Wylie participated in the municipal survey. Residents in Wylie recycled 721 tons of commingled material during the survey time period.

Disposal and Recycling Rate

Table 4-100 shows the recycling rate in Wylie.

Table 4-100
City of Wylie Recycling Rates
September 2004 - August 2005

	Reported Residential (tons)	Lbs/ Capita	Lbs/ HH	Reported ICI (tons)	Reported Overall (tons)
Total Recycling	721	70	166	Unknown	Unknown
Organic Waste	0	0	0	N/A	N/A
Remaining	721	70	166	N/A	N/A
Disposal	11,221	1,083	2,578	9,761	Unknown
Waste Generation	11,942			Unknown	Unknown
Recycling Rate	6.0%			Unknown	Unknown

4.3 Municipal Recycling Rate Summary

The following subsections summarize the recycling rates in the 70 surveyed cities.

4.3.1 Residential Recycling Rate

Table 4-101 is a summary of the residential recycling rates calculated by R.W. Beck. The communities are listed alphabetically within ranges.

Table 4-101
Reported Residential Recycling Rates by Municipality
September 2004 – August 2005

0.1% to 4.9% Reported Recycling Rate		5.0% to 9.9% Reported Recycling Rate	
Corsicana		Azle	McKinney
Farmers Branch		Carrollton	Midlothian
Seagoville		Cedar Hill	North Richland Hills
		Corinth	Richardson
		Dallas	Richland Hills
		DeSoto	Rockwall
		Euless	Rowlett
		Flower Mound	Sachse
		Keller	Saginaw
		Lewisville	Wylie
		Mansfield	
10.0% to 14.9% Reported Recycling Rate		15.0% to 19.9% Reported Recycling Rate	
Bedford	Grand Prairie	Addison	
Coppell	Grapevine	Arlington	
Colleyville	Hurst	Benbrook	
Crowley	Irving	Cleburne	
Duncanville	Murphy	Little Elm	
Forney	The Colony	University Park	
20.0% to 24.9% Reported Recycling Rate		25.0% to 29.9% Reported Recycling Rate	
Fort Worth		Allen	Highland Park
		Burleson	Highland Village
		Frisco	
30.0% to 34.9% Reported Recycling Rate		35.0% and Greater Reported Recycling Rate	
Denton	Garland	Mesquite	Plano

R. W. Beck calculated recycling rates for the 52 cities listed in Table 4-101 but was unable to calculate recycling rates for the remaining 18 cities. The following details the reasons that R. W. Beck was unable to calculate a recycling rate for these cities:

- **Cities that have a residential recycling program in place, but records of tonnages are not kept:**
 - Glenn Heights
 - Trophy Club
 - Watauga
- **Cities that did not have residential recycling programs in place during the survey time period.**
 - Commerce
 - Forest Hill
 - Lancaster
 - Mineral Wells
 - River Oaks
 - Southlake
 - Stephenville
 - Terrell
 - White Settlement
- **Cities that did not respond to the survey.**
 - Balch Springs
 - Ennis
 - Weatherford
- **Cities that agreed to participate in the survey but their private haulers were unresponsive to data requests.**
 - Greenville
 - Haltom City
 - Waxahachie

4.3.2 ICI and Overall Recycling Rates

R. W. Beck calculated the ICI recycling rate and overall recycling rate for 14 cities. Table 4-102 provides a summary of the ICI and overall recycling rates for these cities.

Table 4-102
ICI and Overall Recycling Rate Summary
September 2004 – August 2005

City	ICI Recycling Rate	Overall Recycling Rate
Allen	6.4%	19.4%
Arlington	1.1%	6.5%
Corsicana	1.1%	0.8%
Dallas	3.0%	4.0%
Denton	3.0%	10.6%
Euless	0.4%	2.0%
Garland	0.0%	13.4%
Grand Prairie	14.9%	13.9%
Irving	0.0%	2.3%
Lewisville	0.4%	2.2%
Little Elm	2.6%	12.5%
Plano	31.6%	32.8%
Seagoville	9.9%	5.9%
The Colony	0.0%	5.3%

4.3.3 Residential Recycling and Disposal per Household

Table 4-103 provides a summary of residential recycling and disposal per household. Table 4-104 shows residential recycling exclusive of organic waste on a per household basis.

**Table 4-103
Residential Recycling and Disposal Per Household (in Lbs/HH)**

City	Recycling	Disposal	City	Recycling	Disposal
Addison	353	1,552	Highland Park	1,981	5,630
Allen	971	2,287	Highland Village	1,093	3,049
Arlington	525	2,695	Hurst	332	2,773
Azle	225	2,697	Irving	462	3,239
Balch Springs	-	3,401	Keller	320	3,358
Bedford	399	2,491	Lancaster	-	2,989
Benbrook	469	2,491	Lewisville	284	2,827
Burleson	1,144	3,331	Little Elm	703	3,314
Carrollton	303	2,803	Mansfield	350	3,358
Cedar Hill	304	3,206	McKinney	275	3,130
Cleburne	489	2,039	Mesquite	1,530	2,594
Colleyville	489	3,314	Midlothian	133	2,092
Commerce	-	2,524	Mineral Wells	-	2,762
Coppell	509	3,195	Murphy	349	3,088
Corinth	210	3,141	North Richland Hills	302	2,881
Corsicana	7	2,870	Plano	1,130	2,080
Crowley	542	3,935	Richardson	238	3,185
Dallas	336	4,299	Richland Hills	246	2,654
Denton	984	2,135	River Oaks	-	2,773
DeSoto	300	2,734	Rockwall	286	2,924
Duncanville	446	3,022	Rowlett	146	2,733
Ennis	-	3,206	Sachse	248	3,282
Euless	143	2,379	Saginaw	196	3,173
Farmers Branch	52	4,271	Seagoville	87	3,345
Flower Mound	354	3,390	Southlake	-	3,650
Forest Hill	-	3,293	Stephenville	-	2,437
Forney	304	2,120	Terrell	-	3,011
Fort Worth	616	2,418	The Colony	383	2,991
Frisco	843	2,351	Trophy Club	-	3,109
Garland	1,430	3,184	University Park	1,001	4,048
Glenn Heights	-	3,358	Watauga	-	3,303
Grand Prairie	400	3,090	Waxahachie	-	2,957
Grapevine	428	2,881	Weatherford	-	2,664
Greenville	-	2,794	White Settlement	-	2,762
Haltom City	-	2,816	Wylie	166	2,578

Table 4-104
Residential Recycling Less Organics Per Household (in Lbs/HH)

City	Recycling Less Organics	City	Recycling Less Organics
Addison	353	Highland Park	369
Allen	254	Highland Village	638
Arlington	339	Hurst	332
Azle	225	Irving	166
Balch Springs	-	Keller	320
Bedford	399	Lancaster	-
Benbrook	469	Lewisville	284
Burleson	18	Little Elm	703
Carrollton	303	Mansfield	350
Cedar Hill	304	McKinney	275
Cleburne	-	Mesquite	306
Colleyville	489	Midlothian	133
Commerce	-	Mineral Wells	-
Coppell	386	Murphy	349
Corinth	210	North Richland Hills	302
Corsicana	7	Plano	525
Crowley	542	Richardson	238
Dallas	268	Richland Hills	246
Denton	283	River Oaks	-
DeSoto	300	Rockwall	286
Duncanville	446	Rowlett	146
Ennis	-	Sachse	248
Euless	143	Saginaw	196
Farmers Branch	52	Seagoville	87
Flower Mound	354	Southlake	-
Forest Hill	-	Stephenville	-
Forney	304	Terrell	-
Fort Worth	421	The Colony	373
Frisco	698	Trophy Club	-
Garland	124	University Park	292
Glenn Heights	-	Watauga	-
Grand Prairie	192	Waxahachie	-
Grapevine	428	Weatherford	-
Greenville	-	White Settlement	-
Haltom City	-	Wylie	166

Section 5

Lessons Learned, Key Findings, and Recommendations

5.1 Overview

Since this is the first study of its kind performed in the North Central Texas region, it is important to provide an understanding of how efforts to develop the study progressed and a discussion of lessons learned, key findings and recommendations. The purpose of this section is to evaluate how the process can be improved in the future.

5.2 Comparison of Survey Response Rate to Other Select Surveys

To gauge the success of the survey efforts for the North Central Texas region, R. W. Beck compared the results from this study to two other states that have been conducting statewide recycling studies for a number of years.

- **State of Massachusetts:** Massachusetts has been surveying private recyclable processors for seven years. Since no mandate is in place requiring participation, all survey responses are voluntary. In 2005, Massachusetts received responses from 107 of 165 processors surveyed (a 65 percent response rate).
- **State of Washington:** Washington has been conducting recycling surveys since 1986. In Washington, processors are required to turn in annual recycling reports. Facilities that do not respond to surveys face state financial penalties. Washington reports a 98 percent survey response rate from approximately 300 processors surveyed.

Based on these other states' experiences, there are two key drivers to high survey response rates: (1) years of surveying; and (2) incentives to respond to the survey. As years of surveying increase, processors become more familiar with the goals of the survey and display more willingness to respond. The greatest driver in achieving the highest possible survey response rate is providing processors with financial or legal incentives to complete the survey. However, these types of incentives do not currently exist in Texas. Governmental entities which provide either a reward for completing the survey or a penalty for not completing the survey have realized the highest survey response rates.

Table 5-1 compares survey response rates across a number of governmental entities.

Table 5-1
Comparison of Survey Response Rates

Governmental Entity	Survey Response Rate	Years of Surveying	Financial or Legal Incentive for Companies to Respond?
State of Washington	98%	20	Yes
State of Massachusetts	65%	7	No
NCTCOG ^[1]	80%	1	No

[1] R. W. Beck calculated a blended response rate by combining the processor completion rate with the municipal survey response rate. A total of 36 out of 55 processors completed the survey, and a total of 64 of 70 municipalities completed the municipal survey. R. W. Beck divided the total number of completed surveys by the total number of surveyed entities to calculate the blended response rate: $(36+64)/(55+70) = 80\%$

5.2.1 Survey Response Rate Key Findings and Recommendations

- 1. Considering that this was the first recycling survey effort by the North Central Texas Council of Governments and that there was no legal or financial incentives for participating, the 81.8 percent ICI and 91 percent municipal response rates should be considered a success.**
- 2. The best opportunity to increase the response rate to the survey will be to continue administering the survey on a consistent basis.** By administering the survey every two years, processors and municipalities will begin to expect the need to complete the survey. A two year update will also provide the opportunity to benchmark recycling progress on a consistent basis.¹
3. Reaching a response rate as high as the State of Washington may be a challenge since Washington has financial penalties for processors that do not participate.

5.3 Survey Response Rate from Private Processors

As expected, obtaining survey responses from private processors was a challenge. However, the 65.5 percent completion rate from the private processors reflects that a clear majority of companies were willing to participate. Nevertheless, other survey respondents were unwilling or unable to complete the survey for the following reasons:

- Non-responsiveness to repeated phone calls/site visits;

¹ The TCEQ has recommended that the benchmarking survey be updated annually and that the Study be updated every other year. While there are many potential benefits to conducting the survey on an annual basis, the costs associated with this effort would be significant for the NCTCOG. Because of this, R.W. Beck would recommend updating the survey and the Study every two years.

- Unfulfilled promises to complete surveys;
- Too busy;
- Data quality concerns (lack of scales, lack of ability to estimate tonnage);
- Not interested unless required by law; and
- Protesting government subsidization of public recycling.

5.3.1 Processor Survey Key Findings and Recommendations

1. **Confidentiality was critical in ensuring a high survey completion rate from the private processors.** As such, R. W. Beck would recommend that NCTCOG utilize a third-party surveyor for the conduct of future surveys.
2. **Providing a benefit to survey respondents will encourage their participation in future surveys.** One benefit would be to provide each private processor with an electronic copy of the report. If requested by NCTCOG, R. W. Beck would be pleased to notify the processors (since their identities are confidential) regarding the availability of the report.
3. **When conducting future recycling studies, R. W. Beck would recommend that the survey include a limited survey of multiple types of businesses by industry sector.** The results of this survey effort could be cross referenced with the survey of the processors to better estimate an ICI recycling rate.
4. Based on discussions with NCTCOG staff and members of the TTR subcommittee, R. W. Beck identified processors that did not participate in Section 2.3 of this report as a way to encourage their future participation. R. W. Beck would recommend that this practice continue in the future.

5.4 Survey Response Rate from Municipalities

The response rate from the municipalities was very strong. In fact, only six cities, which account for four percent of the surveyed population, did not participate in the survey. The remaining 64 cities, which comprise 97 percent of the surveyed population, either completed the survey directly or authorized the NCTCOG to obtain the recycling data directly from their private haulers. While several of the private haulers were cooperative and responsive to the request for the recycling data, some companies were reluctant to provide the data. In many cases, the private haulers did provide the requested data, but it also appears that they are not providing program data to their cities. Going forward, cities whose private haulers did not provide the data should be able to make changes in their solid waste and recycling collection contracts to ensure that this data is provided to the city or made available for future surveys.

5.4.1 Municipal Survey Key Findings and Recommendations

1. **To address the problem of cities having challenges with their haulers providing requested data, R. W. Beck would recommend that cities include provisions in their recycling contracts requiring their private hauler to provide recycling data to the city on a monthly basis and to the NCTCOG as needed.** It is our understanding that the TTR subcommittee has considered a future NCTCOG priority implementation project, “Developing a Recycling Contract Negotiation Guidebook and Recycling Ordinances and Design Guidelines to Increase Recycling in the Region.” This project would provide an excellent forum to communicate language that should be included in future recycling contracts.

5.5 Overall Recycling Rate Results

Based on this survey, the recycling rate for the North Central Texas region was 15.8 percent. While this recycling rate is lower than rates typically published for other areas of the country, it is important to understand the following factors that contribute to this:

- This survey did not extrapolate any recycling amounts based on private companies or municipalities that did not provide data. While the methodology for this is sound, it does result in an under-reporting of the quantity of material being recycled in the region since the results are based on actual reported data.
- Since this was the initial effort to calculate the recycling rate in the North Central Texas region, some companies and cities were reluctant to participate. It is likely that future surveys will build on the momentum established by this initial effort.
- While this survey did include some C&D recycling, it did not include a comprehensive survey of the quantity of this C&D material that is being recycling in the region.
- Tipping fees in the North Central Texas region are among the lowest in the country, which can minimize incentives to recycle.
- There are no mandated recycling goals in Texas or the North Central Texas region, as compared to other states (e.g. California) that require cities to meet very high recycling rates.²

While the recycling rate in the North Central Texas region is not at the level as some other areas of the county, R. W. Beck believes that extensive opportunities do exist to increase recycling initiatives in the North Central Texas region. The following subsections detail the results of the processor and municipal surveys and provide specific detail concerning these findings and recommendations. Future versions of this survey should be benchmarked against the results of this survey to measure the success of future initiatives.

² While there are no mandated recycling goals in the state of Texas, TCEQ’s proposed recycling goal is 40 percent, as identified in 30 TAC Chapter 328 Subchapter B.

5.5.1 Overall Results Key Findings and Recommendations

1. **In order to make relevant “apples-to-apples” comparisons of future surveys to this survey, R. W. Beck would recommend that the NCTCOG maintain the same methodologies used in conducting this survey in future surveying efforts.**
2. **Based on the results of this study, NCTCOG and its membership should collaborate to determine the best opportunities to improve recycling efforts in the region.** For example, NCTCOG should work in cooperation with cities and private processors (including but not limited to those processors that responded to the processor survey) to promote recycling within North Central Texas through a public education campaign.
3. NCTCOG should utilize data gathered within this survey effort, as well as data gathered in future surveying efforts, to recommend the continued development of and changes to area recycling programs.
4. This survey should be updated every two years to monitor progress of improving area recycling programs.

5.6 ICI Recycling Rate Results

The ICI waste stream comprises a very significant component of the MSW stream in North Central Texas. In fact, based on this survey, ICI waste accounts for approximately 75 percent of waste disposal in the North Central Texas region. Based on waste characterization studies that R. W. Beck has completed for other clients in the United States, the allocation between ICI and residential waste is typically closer to 40 to 60 percent ICI waste. Therefore, having closer to 75 percent ICI waste further suggests the importance of this part of the waste stream, especially with regard to developing programs to minimize ICI waste.

Close to 1.3 million tons (equal to a 17.1 percent recycling rate) of ICI material are being recycled on an annual basis. Metal (675,548 tons) and paper (511,374 tons) account for 91.9 percent of the ICI material being recycled. As discussed in Section 5.5, the ICI recycling rate for the North Central Texas region is lower than other areas of the county. However, low tipping fees, survey participation rates and incomplete C&D surveying contribute to this lower recycling rate.

5.6.1 ICI Recycling Results Key Findings and Recommendations

1. **Given that ICI waste comprises such a significant percentage of the waste stream, it is important to develop programs focused on minimizing ICI waste.** Along these lines, NCTCOG has developed goals that are focused on the ICI component of the waste stream. In addition, several North Central Texas cities and private companies have developed very successful ICI recycling programs.

2. R. W. Beck would recommend that NCTCOG, local governments and private companies continue and/or increase their ICI recycling efforts.

5.7 Municipal Recycling Rate Results

As expected, there is a tremendous range in the recycling rates of the cities included in this survey. While the overall municipal recycling rate is 12.2 percent, a number of cities have higher recycling rates. In fact, nine of the cities had recycling rates greater than 25 percent.³ Another six cities achieved recycling rates that ranged from 15 to 25 percent.⁴

Another approach to measuring the success of a municipal recycling program is based on the quantity of material recycled on an annual per household basis. This analysis is specific to materials that would be included as a part of a typical recycling program, and excludes organic waste. Based on extensive industry experience, R. W. Beck has an understanding of the quantity of material being recycled through other successful recycling programs in the United States. For a mature program, R. W. Beck would expect that it would be reasonable for a single-stream program to yield 700 pounds of material per household, and for a dual-stream program to yield 500 pounds of material per household. Of the surveyed cities in the North Central Texas region, only five cities are recycling at least 500 pounds annually per household.⁵

While this study did not include a review of any of the city's individual program, R. W. Beck does have a fundamental understanding of many of the recycling programs in the region based on previous projects for the NCTCOG and individual cities. Based on this experience, the following summarizes key characteristics of the more successful recycling programs in the North Central Texas region:

- The collection of organic waste represents a significant portion of the material being diverted for many cities. These cities often have a dedicated yard waste collection program and process material into mulch and/or compost.
- Paper, specifically mixed paper, comprises a very significant amount of material recycled for the more successful recycling programs.
- Several of the cities have successfully implemented single-stream recycling, which has contributed to their relatively high recycling rates.
- A consistent and well funded public education program helps to ensure that residents know how to participate in the recycling program.

It is also important to mention that several of the cities in the North Central Texas region have implemented source reduction programs designed to minimize the quantity of material generated. For example, several cities limit or ban the quantity of yard waste that can be collected, requiring residents to mulch or compost at home. While these programs are preferable to recycling, they can not be easily quantified.

³ These cities include Burleson, Garland, Highland Park, Highland Village, Frisco, Allen, Denton, Plano and Mesquite.

⁴ These cities include Benbrook, Little Elm, Addison, Cleburne, University Park and Fort Worth.

⁵ These cities include Crowley, Frisco, Highland Village, Little Elm and Plano.

This could directly decrease the recycling rates for cities such as Arlington, Dallas and Grand Prairie.

5.7.1 Municipal Recycling Results Key Findings and Recommendations

1. **Many cities have developed successful recycling programs that are diverting significant quantities of material for recycling.** Key characteristics of these programs include a focus on collecting mixed paper and organics, utilizing single-stream programs and well funded public education campaigns.
2. **Only five of the surveyed cities are annually recycling (excluding organic waste) more than 500 pounds per household.** Given that many cities in the region have implemented curbside recycling programs, R. W. Beck would recommend that cities assess options to increase diversion quantities from these existing programs. This assessment could include but not be limited to reviewing public education, collection and processing methods and financial rate pricing.
3. **Other cities that do not have as successful recycling programs could certainly further develop their programs to increase their recycling rates.** It appears that the successful municipal programs span a range of geographic and demographic features in the region, which implies that cities with lower recycling rates would not have an inherent challenge to developing a successful program.
4. Several cities in the region, such as Dallas with a change to single-stream collection and Southlake with a new recycling program, have implemented significant changes in their recycling programs since the survey time period. Future benchmarking studies will be able to evaluate the impacts that these cities, and possibly others, may achieve due to program changes.

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Appendix A

Glossary of Terms

Aggregated: process of combining data from multiple sources into one group in order to ensure that individual data sources can not be segregated.

Aluminum Cans: refers to containers and packaging such as beverage cans or food and other nonfood cans. Examples of recycling include processing cans into new aluminum products (containers or foil).

Brush and Branches: refers to the natural woody material collected from yard trimmings. Whole trees, such as Christmas trees, are included. Excludes leaves and grass. Examples of recycling include processing brush and branches into compost additive or mulch.

Commercial Waste: refers to waste generated by businesses, such as office buildings; retail and wholesale establishments; and restaurants.

Commingled: refers to a mixture of several recyclable materials reported together.

Construction and Demolition (C&D) Material: refers to waste that is generated during the construction, remodeling, repair, or demolition of buildings, bridges, pavements, and other structures. C&D debris includes concrete, asphalt, lumber, steel girders, steel rods, wiring, dry wall, carpets, window glass, metal and plastic piping, tree stumps, soil, and other miscellaneous items related to the activities listed above.

Consumer electronics: any electrical or electronic appliance that are used for personal or home business use.

Disposal: final placement of refuse that is not salvaged or recycled.

Drop-Off Center: refers to a method of collection whereby recyclable or compostable materials are taken by individuals to a collection site and placed in designated containers.

Exports: refers to municipal solid waste and recyclables that are transported outside the state or locality where they originated.

Food Waste: refers to uneaten food and food preparation wastes from residences and commercial establishments (grocery stores, restaurants, and produce stands), institutional sources (school cafeterias), and industrial sources (employee lunchrooms). Excludes food processing waste from agricultural and industrial operations. Examples of recycling include composting and using food scraps to feed pigs, but excludes source reduction activities such as backyard (onsite) composting and use of food items for human consumption (food banks).

Glass: refers to containers and packaging such as beer and soft drink bottles, wine and liquor bottles, and bottles and jars for food, cosmetics, and other products. For the

purpose of recycling, container glass is generally separated in to color categories (clear, green, and amber or brown). Examples of recycling include processing glass into new containers, construction materials (aggregate), or fiberglass (insulation).

Grass: refers to lawn clippings. Excludes leaves, brush, and branches.

Hauler: refers to a waste collection company that provides complete refuse removal services. Many will also collect recyclables.

High Density Polyethylene (HDPE): refers to a plastic product in which the ethylene molecules are linked in long chains with few side branches. Examples of products made from HDPE include milk jugs, detergent bottles, margarine tubs, and garbage containers.

Household Hazardous Waste (HHW): refers to hazardous products that are used and disposed of by residential – rather than industrial – consumers. These products include some paints, stains, varnishes, solvents, and pesticides, and other materials or products containing volatile chemicals that catch fire, react, explode under certain circumstances, or that are corrosive or toxic. HHW is derived from municipal solid waste (MSW) with the exception of used oil which is excluded from the category of MSW. Examples of recycling include processing HHW components into new products after they have been diverted from the waste stream.

Imports: refers to municipal solid waste and recyclables that have been transported to a state or locality for processing or final disposition, but that did not originate in that state or locality.

Industrial, Commercial, and Institutional (ICI): refers to waste that is generated from either industrial, commercial or insitutional sources.

Industrial Waste: refers to non-hazardous wastes discarded at industrial sites from packaging and administrative sources. Examples include corrugated boxes, plastic film, wood palates, lunchroom wastes, and office paper. Excludes industrial process wastes from manufacturing operations.

Institutional Waste: refers to waste generated at institutions, such as schools, libraries, hospitals, and prisons. Examples include cafeteria and restroom trashcan wastes, office papers, classroom wastes, and yard trimmings.

Lead-Acid Batteries: refers to batteries used in automobiles, trucks, and motorcycles. They contain plastic, lead (a toxic metal), and sulfuric acid. Excludes lead-acid batteries from large equipment, heavy-duty trucks and tractors, aircraft, military vehicles, and boats.

Leaves: refers to the foliage of a plant. Excludes brush, branches, and grass.

Low Density Polyethylene (LDPE): refers to a plastic material in which the ethylene molecules are linked in a random fashion with the main chains of the polymer having long and short side branches. LDPE is used for both rigid containers and plastic film applications.

Major Appliances: refers to many different types, sizes and styles of ovens, microwave ovens, air-conditioners, refrigerators, freezers, washers, dryers,

dishwashers, water heaters, dehumidifiers, or trash compactors manufactured for household, commercial, or recreational use. Steel is the predominant material used in the manufacture of large appliances. Other materials found in appliances (in varying amounts) include, copper, brass aluminum, glass, rubber and paperboard.

Mixed Glass: Refers to recovered container glass that is not sorted into specific categories (color and grade).

Mixed Metals: refers to aluminum, ferrous, non-ferrous and tin/steel cans from residential, institutional, and commercial sources.

Mixed Paper: refers to recovered paper that is not sorted into specific categories (old magazines, old newspapers, and old corrugated containers).

Mixed Plastic: refers to recovered plastic that is not sorted into specific categories (HDPE, LDPE, and PETE).

Mixed Yard Trimmings: refers to grass, leaves, tree branches and brush, and tree stumps from residential, institutional, and commercial sources. Examples of recycling include processing yard trimmings into compost, mulch, or other similar uses, and landspreading leaves (when the depth of the application allows for degradation of the organic plant material).

Municipal Solid Waste (MSW): refers to wastes such as durable goods, nondurable goods, containers and packaging, food scraps, yard trimmings, and miscellaneous inorganic wastes from residential, commercial, institutional, and industrial sources, such as appliances, automobile tires, old newspapers, clothing, disposable tableware, office and classroom paper, wood pallets, and cafeteria wastes. Excludes solid wastes from other sources, such as construction and demolition debris, autobodies, municipal sludges, combustion ash, and industrial process wastes that might also be disposed of in municipal waste landfills or incinerators.

Municipal Solid Waste (MSW) Generation: total amount of refuse that is disposed and recycled.

North Central Texas Council of Governments (NCTCOG): area designated by the State as the regional planning agency for municipal solid waste in the 16-county region surrounding Dallas/Fort Worth.

North Central Texas Region: consists of the following sixteen counties: Collin, Dallas, Denton, Ellis, Erath, Hood, Hunt, Johnson, Kaufman, Navarro, Palo Pinto, Parker, Rockwall, Somervell, Tarrant, and Wise.

Office Paper: refers to high-grade papers such as copier paper, computer printout, and stationery. These papers are almost entirely made of uncoated chemical pulp, although some amounts of ground wood are used. It should be noted that this category of also is generated at locations other than offices, such as homes and institutions (schools).

Old Corrugated containers (OCC): refers to corrugated containers made from unbleached, unwaxed paper with ruffled (corrugated) inner liner.

Old Magazines: refers to dry, coated magazines, catalogues, and similar printed materials.

Old Newspaper: refers to periodicals printed on newsprint. Includes groundwater inserts (advertisements). Examples of recycling include processing old newspapers into new paper products (newspaper, paperboard, boxboard, or animal bedding).

Organic waste: consists of yard trimmings, wood and food waste.

Other Ferrous Metals: refers to ferrous metals from strapping, furniture, and metal found in tires and consumer electronics. Excludes the large quantities of metals found in construction materials or transportation products, such as automobiles, locomotives, and ships.

Other MSW: consists of tires, HHW and consumer electronics.

Other Nonferrous Metals: refers to nonferrous metals (lead, copper, and zinc) from appliances, consumer electronics, and non-packaging aluminum products (foil, closures, and aluminum lids from bimetal cans). Excludes nonferrous metals from industrial applications and construction and demolition debris.

Other Paper: refers to paper from books, third class mail, other commercial printing, paper towels, paper plates and cups, other non-packaging paper (posters, photographic papers, cards, and games), milk cartons, folding boxes (cereal boxes), bags, wrapping papers, and other paper and paperboard products.

Other Plastic: refers to plastic from appliances, furniture, trash bags, cups, eating utensils, sporting and recreational equipment, and other non-packaging plastic products.

Other Recyclables: other miscellaneous recyclable items found in municipal solid waste that cannot be otherwise categorized.

Other Wood: refers to wood from furniture, cabinets from consumer electronics, and other non-packaging wood products. Excludes wood recovered from construction and demolition activities (lumber and tree stumps) and industrial process waste (shavings and sawdust). Examples of recycling include processing wood into mulch, compost additive, or animal bedding.

Polyethylene Terephthalate (PETE): refers to a thermoplastic material used to manufacture plastic soft drink containers and rigid containers. PETE has a high melting point, is clear in its natural state, and has a relatively high density.

Polypropylene (PP): refers to a plastic polymer formed by linking propylene molecules. PP has good resistance to heat and is used in flexible and rigid packaging, film, and textiles.

Polystyrene (PS): refers to a plastic polymer formed by linking styrene molecules. PS is used to make a variety of products including plastic cutlery and food containers. It is often used in its foamed state.

Polyvinyl Chloride (PVC): refers to the family of plastic copolymers, also known as vinyl. PVC is used to make products such as pipes, bottles, upholstery, and automotive parts.

Primary MSW: consists of metals, plastic, paper, yard trimmings, glass, commingled, wood, food waste and textiles.

Processors: refers to intermediate operators that handle recyclable materials from collectors and generators for the purpose of preparing materials for recycling (material recovery facilities, scrap metal yards, paper dealers, and glass beneficiation plants). Processors act as intermediaries between collectors and end users of recovered materials.

Residential Waste: refers to waste generated by single- and multi-family homes including old newspapers, clothing, disposable tableware, food packaging, cans and bottles, food scraps and yard trimmings. Excludes food scraps and yard trimmings that are diverted to backyard (onsite) composting.

Survey time period: September 1, 2004 to August 31, 2005.

Telephone Directories: refers to telephone directories printed on paper with high ground wood content. Other directories, such as zip code and area code directories, are included in this category when they are printed on the same type of paper.

Textiles: refers to fibers from discarded apparel, furniture, linens (sheets and towels), and carpets. Examples of recycling include converting apparel and linens into wiper rags and processing textiles into new products (linen paper or carpet padding).

Tin/Steel Cans: refers to tin-coated steel containers such as cans used for food packaging.

Tires: refers to passenger car and light- and heavy-duty truck tires. Excludes high-speed industrial tires (from airplanes), bus tires, motorcycle tires, and special service tires, such as military, agricultural, off-road, and slow speed industrial tires (from construction vehicles). Examples of recycling include processing car and truck tires into new rubber products (trash cans, storage containers, and rubberized asphalt), and the use of whole tires for playground and reef construction.

Used Oil: refers to spent motor oil from passenger cars and trucks that is collected at specified locations for recycling. Used oil is excluded from the category of municipal solid waste.

Waste Generation: refers to the amount (weight or volume) of materials and products that enter the waste stream before recycling, composting, landfilling, or combustion takes place.

Waste Stream: refers to the total flow of solid waste from homes, businesses, institutions, and manufacturing plants that must be recycled, incinerated, or disposed of in landfills; or any segment thereof, such as the “residential waste stream” or the “recyclable waste stream.”

Wood Packaging: refers to wood products such as pallets, crates, and barrels. Excludes wood from furniture and other non-packaging wood products. Examples of recycling include processing wood into new products (mulch and compost).

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FORM 1. CONTACT AND CERTIFICATIONS (Page 1 of 1)

Reporting Period: September 1, 2004 to August 31, 2005

Return this form to either:

North Central Texas Council of Governments
Department of Environment and Development
Patricia D. B. Redfearn, Ph.D.
P. O. Box 5888
Arlington, TX 76005-5888

R.W. Beck, Inc.
Brett Matson
5806 Mesa Drive, Suite 310
Austin, TX 78731

Please return this form by: September 15, 2006

Direct all questions to: Patricia Redfearn at (817) 608-2360

RESPONDENT INFORMATION (PLEASE TYPE OR PRINT CLEARLY):

Municipality:

Address:

City:

Zip Code:

Telephone: ()

Fax: ()

Name of Contact Person:

Title:

Does your community:

- Haul residential municipal solid waste?

If no, you either

a) Contract with _____ or

b) Do not contract with anyone for commercial solid waste collection.

- Haul commercial municipal solid waste?

If no, you either

a) Contract with _____ or

b) Do not contract with anyone for commercial solid waste collection.

- Haul recyclable materials?

If no, you either

a) Contract with _____ or

b) Do not contract with anyone for commercial solid waste collection.

If you use a private hauler, would you prefer to obtain your community's waste data:

- Yourself
- With NCTCOG Assistance

CERTIFICATIONS

Please check one of the following and sign below:

- I certify that, to the best of my knowledge, the information reported in this form is accurate and truthful.
- I hereby authorize that NCTCOG Staff have my permission to request information from the hauler directly on my behalf.

Name and Title

Signature

Date

FORM 2. RESIDENTIAL RECYCLABLES COLLECTION DATA (Page 1 of 3)

Municipal solid waste (MSW) recyclables collected from residential and commercial sources in _____ during the stated reporting period. Refer to the Scope of MSW Recycling Table for specific examples of what to include as recycling.

Recyclable Material	Source of Recyclable Material			Total (net tons)
	Residential (net tons)	Were EPA or Other Conversion Factors Used?	To Which Facility were These Materials Hauled?	
Comingled Materials (described in comments section below)				
Food Waste				
Glass Containers:				
Clear				
Amber				
Green				
Mixed Glass				
Other Glass				
Subtotal Glass				
Lead-Acid Batteries				
Metals:				
Aluminum Cans				
Tin/Steel Cans				
Major Appliances				
Other Ferrous				
Other Nonferrous				
Mixed Metals				
Subtotal Metals				

FORM 2. RESIDENTIAL RECYCLABLES COLLECTION DATA (Page 2 of 3)

Recyclable Material	Source of Recyclable Material			Total (net tons)
	Residential (net tons)	Were EPA or Other Conversion Factors Used?	To Which Facility were These Materials Hauled?	
Paper:				
Old Magazines				
Old Newspaper				
Old Corrugated Containers				
Office Papers				
Telephone Directories				
Mixed Paper				
Other Paper				
Subtotal Paper				
Plastic:				
PETE (#1 Plastics)				
HDPE (#2 Plastics)				
PVC (#3 Plastics)				
LDPE (#4 Plastics)				
PP (#5 Plastics)				
PS (#6 Plastics)				
Mixed Plastic (#7 Plastics)				
Other Plastic				
<i>Subtotal Plastic</i>				
Textiles				
Tires				
Wood:				
Wood Packaging				
Other Wood				
<i>Subtotal Wood</i>				

FORM 2. RESIDENTIAL RECYCLABLES COLLECTION DATA (Page 3 of 3)

Recyclable Material	Source of Recyclable Material			Total (net tons)
	Residential (net tons)	Were EPA or Other Conversion Factors Used?	To Which Facility were These Materials Hauled?	
Yard Trimmings:				
Brush and Branches				
Grass				
Leaves				
Tree Stumps				
Mixed Yard Trimmings				
<i>Subtotal Yard Trimmings</i>				
Construction and Demolition Debris:				
Asphalt				
Concrete				
Metals				
Natural Disaster Debris				
Wood				
Other C & D				
Used Oil				
Other (Please specify)				
Other (Please specify)				
TOTAL (net tons)				

Are any of the reported quantities estimates or guesses? If they are, explain how they were determined below. Explanation of estimates/Comments:

FORM 3. COMMERCIAL RECYCLABLES COLLECTION DATA (Page 1 of 3)

Municipal solid waste (MSW) recyclables collected from residential and commercial sources in _____ during the stated reporting period. Refer to the Scope of MSW Recycling Table for specific examples of what to include as recycling.

Recyclable Material	Source of Recyclable Material			Total (net tons)
	Commercial (net tons)	Were EPA or Other Conversion Factors Used?	To Which Facility were These Materials Hauled?	
Comingled Materials (described in comments section below)				
Food Waste				
Glass Containers:				
Clear				
Amber				
Green				
Mixed Glass				
Other Glass				
Subtotal Glass				
Lead-Acid Batteries				
Metals:				
Aluminum Cans				
Tin/Steel Cans				
Major Appliances				
Other Ferrous				
Other Nonferrous				
Mixed Metals				
Subtotal Metals				

FORM 3. COMMERCIAL RECYCLABLES COLLECTION DATA (Page 2 of 3)

Recyclable Material	Source of Recyclable Material			Total (net tons)
	Commercial (net tons)	Were EPA or Other Conversion Factors Used?	To Which Facility were These Materials Hauled?	
Paper:				
Old Magazines				
Old Newspaper				
Old Corrugated Containers				
Office Papers				
Telephone Directories				
Mixed Paper				
Other Paper				
Subtotal Paper				
Plastic:				
PETE (#1 Plastics)				
HDPE (#2 Plastics)				
PVC (#3 Plastics)				
LDPE (#4 Plastics)				
PP (#5 Plastics)				
PS (#6 Plastics)				
Mixed Plastic (#7 Plastics)				
Other Plastic				
<i>Subtotal Plastic</i>				
Textiles				
Tires				
Wood:				
Wood Packaging				
Other Wood				
<i>Subtotal Wood</i>				

FORM 3. COMMERCIAL RECYCLABLES COLLECTION DATA (Page 3 of 3)

Recyclable Material	Source of Recyclable Material			Total (net tons)
	Commercial (net tons)	Were EPA or Other Conversion Factors Used?	To Which Facility were These Materials Hauled?	
Yard Trimmings:				
Brush and Branches				
Grass				
Leaves				
Tree Stumps				
Mixed Yard Trimmings				
<i>Subtotal Yard Trimmings</i>				
Construction and Demolition Debris:				
Asphalt				
Concrete				
Metals				
Natural Disaster Debris				
Wood				
Other C & D				
Used Oil				
Other (Please specify)				
Other (Please specify)				
TOTAL (net tons)				

Are any of the reported quantities estimates or guesses? If they are, explain how they were determined below. Explanation of estimates/Comments:

FORM 4. WASTE DATA (Page 1 of 1)

Municipal solid waste (MSW) collected from *residential and commercial* sources in _____ during the stated reporting period and hauled to transfer stations or disposal facilities (such as landfills, incinerators and waste-to-energy facilities). Refer to the attached Scope of MSW table for examples of what to include as MSW.

Type of MSW	Amount Hauled to a Transfer Station or Disposal Facility in _____	Were EPA or Other Conversion Factors Used?	Amount Exported to a Transfer Station or Disposal Facility Outside of _____	Were EPA or Other Conversion Factors Used?	Total (net tons)
Residential					
Commercial					
Total (net tons)					

Are any of the reported quantities estimates or guesses? If they are estimates, please explain how they were determined below.
 Explanation of estimates: _____

WASTE DATA – IMPORTS

MSW collected from *residential and commercial* sources outside of _____ between 9/1/04 and 8/31/05 but hauled to a transfer station or disposal facility in _____.

Type of MSW	Amount Hauled from Source Outside of _____ to Disposal Facility in _____	Were EPA or Other Conversion Factors Used?	Total (net tons)
Residential			
Commercial			
Total (net tons)			

Are any of the reported quantities estimates or guesses? If they are estimates, please explain how they were determined below. Explanation of estimates: _____

Recycling Rate Benchmarking Survey

Survey Information

Survey Deadline

Please provide all responses by September 30, 2006.

Timeframe

Please provide all data for the 12 month period beginning September 1, 2004 and ending August 31, 2005. If information is not available for this time period, please provide information for the most recent 12 month period.

Type of Information Requested

The data being collected for this survey has been divided into three groups:

- Primary municipal solid waste (residential and commercial)
- Other municipal solid waste (residential and commercial, where applicable)
- Construction and demolition (C&D) waste

See Sections 3, 4, and 5 for detailed information regarding which materials are classified as *Primary municipal solid waste* (MSW), *Other MSW*, or *C&D*. **Where indicated, please report data for either Residential or Commercial, or both.**¹

The focus of this survey is the *Primary MSW*, but to the extent you recycle materials categorized as *Other MSW* or *C&D*, please include information for those materials as well.

Recycling Rate by Location

One of the goals of this survey is understand recycling activity on the most detailed geographic level possible. In order to achieve that goal, we are requesting data on the most specific geographic level available. Our order of preference is by:

1. Zip code
2. City or community
3. County

We would like to reiterate that all individual responses will remain confidential. All data presented in the report will be aggregated. No individual responses will be shared through written communication with the NCTCOG and therefore will not be subject to public records laws. We recognize that each surveyed company will need to decide for which geographic level it is willing to provide data.

¹ For the purposes of this survey, Residential is defined as waste originating from residential sources and Commercial is defined as waste originating from businesses and other commercial sources.

Survey Responses

Section 1 – Participant Information

In Section 1, please identify your company and contact information.

Section 2 – Primary Business Activity

In Section 2, please indicate your primary business activity.

Section 3 – Primary MSW

Section 3 represents the key component of this survey. **For each geographic level serviced by your company, as discussed in the “Recycling Rate by Location” section above, please complete Section 3.** For example, if you are a material recovery facility that accepts waste from customers located in five zip codes, please complete Section 3 five times, one for each zip code. You may make as many copies of the Section 3 survey response as necessary. Please identify the entity and reporting period for each Section 3 survey response.

Sections 4 and 5 – Other MSW and C&D

To the extent that your company recycles those materials listed in Section 4 (*Other MSW*) and Section 5 (*C&D*), please respond using the same methodology as Section 3.

Other Options to Complete the Survey

Sections 3, 4 and 5 serve as a guide to what data R. W. Beck would like to receive in the response. We aware that many companies keep their information electronically. Rather than completing these three survey response Sections, you may also provide us either an electronic spreadsheet or a hard copy print out from your software that provides the information requested in Sections 3, 4 and 5.

Additionally, all survey documents are available electronically at the following website location:

<http://www.rwbeck.com/recyclingrate>

Returning Survey Responses to R. W. Beck

All responses may be returned to R. W. Beck by email, fax or mail. Please send all responses to the attention of Brent Matson.

Email bmatson@rwbeck.com

Fax (512) 450-0515

Mail R. W. Beck, Inc.
5806 Mesa Dr, Suite 310
Austin, TX 78731

Section 1 - Survey Participant Information		
Company Name	Name of Contact	Title
Street Address	City	Zip Code
Telephone	Fax	Email

Section 2 - Primary Business Activity (check all that apply)	
<input type="checkbox"/> Material Recovery Facility	<input type="checkbox"/> Plastic Processor
<input type="checkbox"/> Scrap Metal Processor	<input type="checkbox"/> Composting Operation
<input type="checkbox"/> Tire Processor	<input type="checkbox"/> Buy-back Center
<input type="checkbox"/> Glass Beneficiation Plant	<input type="checkbox"/> Drop-off Center
<input type="checkbox"/> Paper Processor	<input type="checkbox"/> Other: _____

Section 3 - Primary Municipal Solid Waste

Entity Location: _____ (Please submit one copy of Section 3 for each geographic location)

Reporting Period: September 1, 2004 to August 31, 2005 Other (please indicate): _____

Metals			Plastic			Paper		
<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards			<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards			<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards		
	Residential	Commercial		Residential	Commercial		Residential	Commercial
Aluminum cans	_____	_____	PETE	_____	_____	Old magazines	_____	_____
Tin/steel cans	_____	_____	HDPE Natural	_____	_____	Old newspaper	_____	_____
Major appliances	_____	_____	HDPE Colored	_____	_____	Old corrugated containers	_____	_____
Other Ferrous	_____	_____	PVC	_____	_____	Office paper	_____	_____
Other nonferrous	_____	_____	LDPE	_____	_____	Telephone directories	_____	_____
Mixed metals	_____	_____	PP	_____	_____	Mixed paper	_____	_____
			PS	_____	_____	Other paper	_____	_____
			Mixed Plastic	_____	_____			
			Other Plastic	_____	_____			

Yard Trimmings			Glass			Commingled/Other		
<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards			<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards			<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards		
	Residential	Commercial		Residential	Commercial		Residential	Commercial
Brush and branches	_____	_____	Clear	_____	_____	Commingled	_____	_____
Grass	_____	_____	Amber	_____	_____	Other	_____	_____
Leaves	_____	_____	Green	_____	_____		_____	_____
Tree stumps	_____	_____	Mixed Glass	_____	_____		_____	_____
Mixed yard trimmings	_____	_____						

Wood			Food Waste			Textiles		
<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards			<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards			<input type="checkbox"/> Tons <input type="checkbox"/> Pounds <input type="checkbox"/> Cubic Yards		
	Residential	Commercial		Residential	Commercial		Residential	Commercial
Wood Packaging	_____	_____	Food Waste	_____	_____	Textiles	_____	_____
Other Wood	_____	_____						

Section 4 - Other Municipal Solid Waste

Entity Location: _____ (Please submit one copy of Section 4 for each geographic location)

Reporting Period: September 1, 2004 to August 31, 2005 Other (please indicate): _____

Tires

Tons Pounds Cubic Yards Quantity
 _____ Residential _____ Commercial

Tires _____

Consumer Electronics

Tons Pounds Cubic Yards
 _____ Residential _____ Commercial

Consumer electronics _____

Household Hazardous Waste

Cleaning supplies	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons
Painting supplies	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons
Used oil	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons
Antifreeze	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons
Lead acid batteries	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons
Household Batteries	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons
Other	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards	<input type="checkbox"/> Gallons

Section 5 - Construction and Demolition Waste

Entity Location: _____ (Please submit one copy of Section 5 for each geographic location)

Reporting Period: September 1, 2004 to August 31, 2005 Other (please indicate): _____

Construction and Demolition Waste

Asphalt	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards
Concrete	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards
Metals	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards
Natural disaster debris	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards
Wood	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards
Other C&D	_____	<input type="checkbox"/> Tons	<input type="checkbox"/> Pounds	<input type="checkbox"/> Cubic Yards

CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT

THIS CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT (Agreement) is made and entered into as of _____ 2006 by and between R. W. Beck, Inc., (the Consultant), and _____ (the Company).

In consideration of the Company allowing the Consultant access to certain information so that the Consultant can provide certain services to the North Central Texas Council of Governments (NCTCOG) and the mutual covenants contained herein, it is agreed as follows:

1. Definitions.

1.1 **Confidential Information.** Confidential Information means all information, processes, process parameters, methods, practices, technical plans, and related documentation, customer lists, price lists, supplier lists, marketing plans, financial information, training materials and all other compilations of information which relate to the business of the Company.

2. Confidential Information and Trade Secrets.

2.1 **Acknowledgment by Consultant.** The Consultant acknowledges that: (i) the Consultant will have access to and become acquainted with the Confidential Information of the Company; (ii) the Confidential Information is proprietary to the Company and are commercially and competitively valuable to the Company; (iii) that the unauthorized use or disclosure of the Confidential Information would cause harm to the Company; and (iv) that the Company is the exclusive owner of and retains all right, title and interest in and to all copyright and other proprietary rights with respect to the Confidential Information.

2.2 **No Use or Disclosure.** The Consultant agrees not to use outside of the scope of services provided by the Consultant to the NCTCOG or disclose (directly or indirectly) any Confidential Information at any time or in any manner to any third party for any reason without the prior written consent of the Company. The Consultant may only disclose the Confidential Information to its employees on a need-to-know basis, and to the extent necessary for such employee to provide such services to the NCTCOG. At or prior to the time of such disclosure to the Consultant's employee, the Consultant shall provide such person with a copy of this Agreement and advise such person that any information of the Company is confidential and proprietary to the Company. Such employee shall acknowledge that the disclosure of Confidential Information is restricted by the terms of this Agreement and agree to comply with the terms of this Agreement. The Consultant agrees to take such precautions and to follow such procedures as may be reasonably requested by the Company to protect and preserve the Company's proprietary rights in the Confidential Information, including, but not limited to, providing the Company a list of the names and titles of each of its employees and officers who have received any of the Confidential Information.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

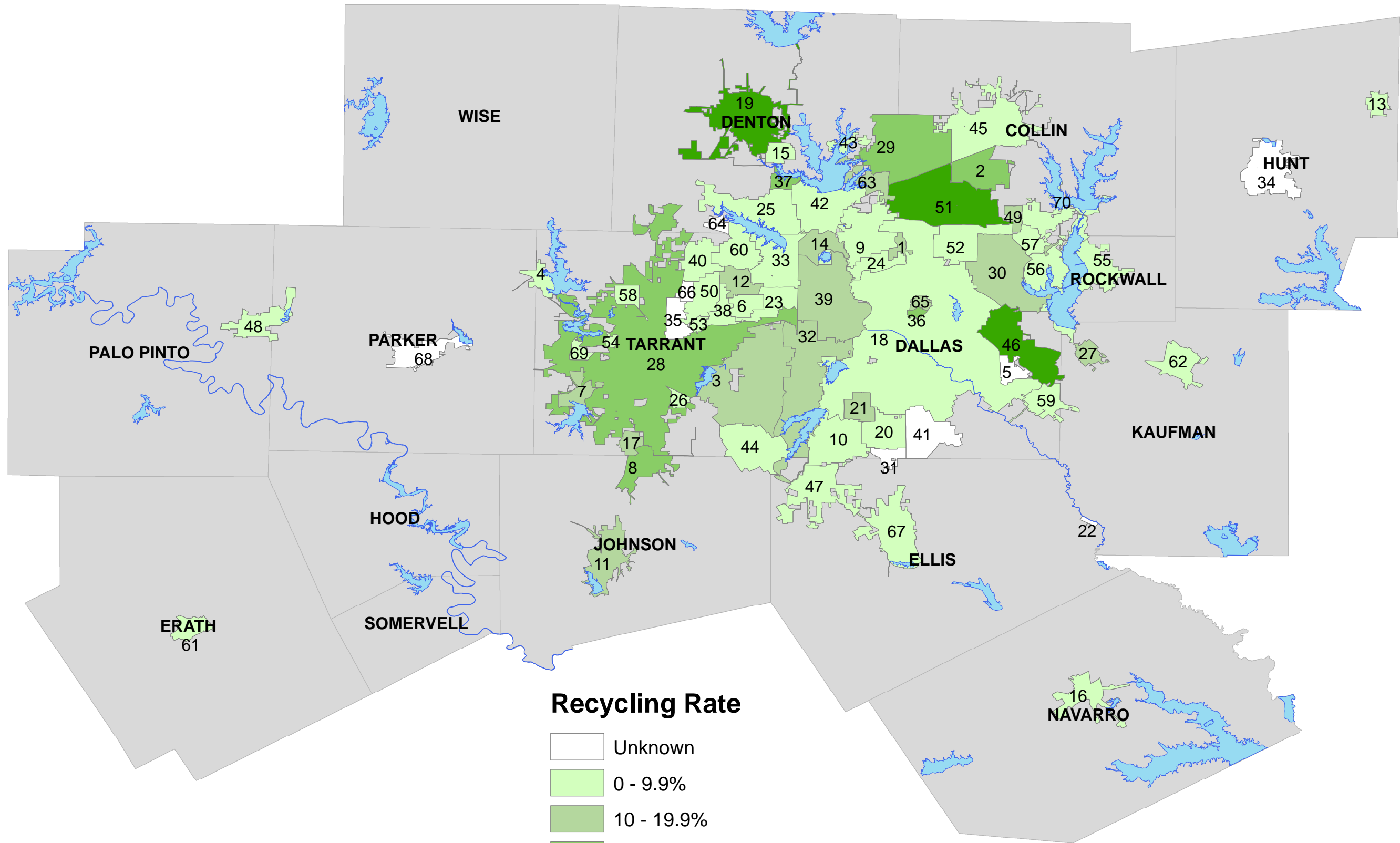
R. W. Beck, Inc.

By: _____
Name: _____
Title: _____

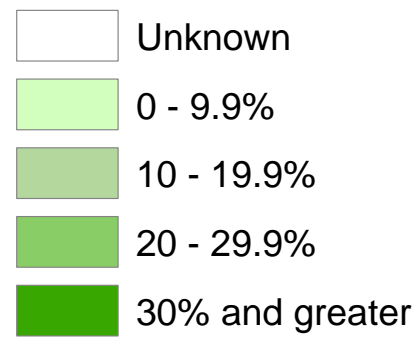
(company name)

By: _____
Name: _____
Title: _____

NCTCOG Residential Recycling Rates by City



Recycling Rate



Legend

- 1 Addison
- 2 Allen
- 3 Arlington
- 4 Azle
- 5 Balch Springs
- 6 Bedford
- 7 Benbrook
- 8 Burleson
- 9 Carrollton
- 10 Cedar Hill
- 11 Cleburne
- 12 Colleyville
- 13 Commerce
- 14 Coppell
- 15 Corinth
- 16 Corsicana
- 17 Crowley
- 18 Dallas
- 19 Denton
- 20 DeSoto
- 21 Duncanville
- 22 Ennis
- 23 Euless
- 24 Farmers Branch
- 25 Flower Mound
- 26 Forest Hill
- 27 Forney
- 28 Fort Worth
- 29 Frisco
- 30 Garland
- 31 Glenn Heights
- 32 Grand Prairie
- 33 Grapevine
- 34 Greenville
- 35 Haltom City
- 36 Highland Park
- 37 Highland Village
- 38 Hurst
- 39 Irving
- 40 Keller
- 41 Lancaster
- 42 Lewisville
- 43 Little Elm
- 44 Mansfield
- 45 McKinney
- 46 Mesquite
- 47 Midlothian
- 48 Mineral Wells
- 49 Murphy
- 50 North Richland Hills
- 51 Plano
- 52 Richardson
- 53 Richland Hills
- 54 River Oaks
- 55 Rockwall
- 56 Rowlett
- 57 Sachse
- 58 Saginaw
- 59 Seagoville
- 60 Southlake
- 61 Stephenville
- 62 Terrell
- 63 The Colony
- 64 Trophy Club
- 65 University Park
- 66 Watauga
- 67 Waxahachie
- 68 Weatherford
- 69 White Settlement
- 70 Wylie