

CITY OF SALINA, KANSAS  
**Community-wide Recycling Program  
Feasibility Study**

FINAL DRAFT | MARCH 2013



**SAIC**<sup>®</sup>

# Community-wide Recycling Study

## City of Salina, Kansas

Table of Contents

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*Table of Contents*  
*List of Tables*  
*List of Figures*

<b>Section 1 REVIEW OF CURRENT SYSTEM.....</b>	<b>1-1</b>
1.1 Overview.....	1-1
1.2 Curbside Recycling Operation.....	1-1
1.2.1 Collection Operation.....	1-1
1.2.2 Curbside-Sort Benchmarking.....	1-2
1.2.3 Materials Included.....	1-4
1.2.4 Program Performance.....	1-5
1.2.5 Staffing and Equipment.....	1-8
1.2.6 On-Route Operations.....	1-10
1.2.7 Collection Efficiency.....	1-11
1.2.8 Recycling Operation Trends and Transition.....	1-13
1.3 Processing.....	1-15
1.3.1 Facility and Equipment.....	1-15
1.3.2 Operations.....	1-16
1.3.3 End Markets.....	1-17
1.4 Cost of Service.....	1-18
1.5 Public Education.....	1-20
1.6 Policy Issues.....	1-21
1.6.1 Recycling Rate Goal.....	1-21
1.6.2 Universality.....	1-21
1.7 Automation of Refuse Collection Operation.....	1-22
1.8 Yard Waste Collection.....	1-25
1.8.1 Collection Operation.....	1-25
1.9 Key Findings and Recommendations.....	1-30
1.9.1 Recycling Program Key Findings and Recommendations.....	1-30
1.9.2 Yard Waste Program Key Findings and Recommendations.....	1-32
<b>Section 2 ALTERNATIVE RESIDENTIAL RECYCLING OPTIONS.....</b>	<b>2-1</b>
2.1 Overview.....	2-1
2.2 Collection Options.....	2-2
2.2.1 Assumptions.....	2-2
2.2.2 Collection Summary.....	2-8
2.3 Processing Options.....	2-10
2.3.1 Processing Assumptions.....	2-11

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2.3.2	Processing at a Single-Stream Private MRF.....	2-12
2.3.3	Processing at Source Separated Private MRF .....	2-14
2.3.4	Processing at City-Owned MRF .....	2-14
2.3.5	Processing Summary .....	2-22
2.4	Options Summary .....	2-22
2.4.1	Impact on Recycling Rate.....	2-23
2.4.2	Effect on Other Solid Waste Operations .....	2-23
2.4.3	Recycling Incentive Programs .....	2-24
2.5	Key Findings and Recommendations .....	2-26
2.5.1	Universal Collection Decreases Cost of Service .....	2-26
2.5.2	Single-Stream Provides Benefits Over Curb-Sort or Dual- Stream .....	2-26
2.5.3	Contracting with a Private MRF is the Recommended Option .....	2-26
2.5.4	Multiple Material Transportation Options Available .....	2-27
2.5.5	Increased Diversion Will Affect Other Solid Waste Departments.....	2-27
<b>Section 3 PUBLIC OUTREACH RESULTS.....</b>		<b>3-1</b>
3.1	Overview.....	3-1
3.2	Survey Design.....	3-1
3.3	Survey Execution.....	3-2
3.4	Analysis .....	3-2
3.4.1	Current Recycling Practices .....	3-2
3.4.2	Interest in Curbside Recycling Programs .....	3-5
3.5	Key Findings.....	3-10
3.5.1	Interest in Recycling.....	3-10
3.5.2	Strong Support For Universal Recycling Program.....	3-11
3.5.3	Residents Prefer Single-Stream or Curb-Sort Program Design .....	3-11
3.5.4	Residents are Sensitive to Program Pricing.....	3-11
3.5.5	Consider Implementing Pay-As-You-Throw or Recycling Rebate Rate Structure .....	3-11
<b>Section 4 IMPLEMENTATION PLAN .....</b>		<b>4-1</b>
4.1	Introduction.....	4-1
4.2	Development of Recycling Implementation Plan.....	4-1
4.2.1	Policy Decisions .....	4-2
4.2.2	Ordinance Development .....	4-4
4.3	Service Implementation .....	4-5
4.3.1	Collection Vehicles.....	4-6
4.3.2	Carts.....	4-7
4.3.3	Routing .....	4-8
4.3.4	Hire Staff .....	4-9
4.3.5	Recycling Processing.....	4-10
4.4	Procurement Process.....	4-11
4.4.1	Selection Process and Timeline.....	4-11

4.4.2	Procurement Considerations .....	4-12
4.5	Public Education .....	4-14
4.6	Summary of Recycling Implementation Schedule .....	4-15
4.7	Fully-Automated Refuse Collection Implementation Plan.....	4-17
4.7.1	Transition to Automated Refuse Collection .....	4-17
4.8	Yard Waste Processing Implementation Plan.....	4-20
4.9	Summary of Implementation Cost.....	4-20

### List of Tables

Table 1-1	Benchmark City Summary .....	1-3
Table 1-2	Curb-Sort Program Materials .....	1-5
Table 1-3	Composition of Materials Collected from Salina Curbside Program.....	1-6
Table 1-4	Curbside Recyclable Volume per Household.....	1-6
Table 1-5	2011 Residential Recycling Rate.....	1-7
Table 1-6	Recycling Participation.....	1-7
Table 1-7	Annual Cost of Curb-Sort Vehicle .....	1-8
Table 1-8	Residents with Multiple Recycling Bins .....	1-11
Table 1-9	Collection Efficiency Measures.....	1-12
Table 1-10	Recycling Collection Capacity Analysis .....	1-13
Table 1-11	Market Pricing for Recyclables .....	1-17
Table 1-12	Sanitation Cost of Service .....	1-19
Table 1-13	Refuse Routing Required.....	1-24
Table 1-14	Cost Comparison of Refuse Collection Operation .....	1-24
Table 1-15	Historical Tonnage of Diverted Yard Waste .....	1-26
Table 1-16	Current Cost of Yard Waste .....	1-27
Table 1-17	Yard Waste Processing's Effect on Landfill Disposal Cost .....	1-28
Table 1-18	Annual Cost of Mulching Yard Waste Material.....	1-29
Table 2-1	Summary of Collection and Processing Options Evaluated.....	2-2
Table 2-2	Collection Options .....	2-2
Table 2-3	Annual Material Recovery Assumptions.....	2-4
Table 2-4	Number of Daily Routes Needed Based on Different Collection Systems.....	2-5
Table 2-5	Staffing Cost Assumptions (per employee) <sup>1</sup> .....	2-5
Table 2-6	Staffing Requirements (per daily route) .....	2-6
Table 2-7	Vehicle Cost (per vehicle) .....	2-7
Table 2-8	Operational Requirements .....	2-9
Table 2-9	Annual Collection Cost.....	2-9
Table 2-10	Quantity of Recyclable Material.....	2-12
Table 2-11	Private MRF Single-Stream Annual Processing Revenue/(Cost) .....	2-13
Table 2-12	Private MRF Source Separated Processing Revenue/(Cost) .....	2-14
Table 2-13	Capital Cost Estimate – High Tonnage .....	2-17
Table 2-14	City-Owned MRF Rolling Stock Cost.....	2-18
Table 2-15	MRF Level of Operation .....	2-18
Table 2-16	City-Owned MRF Personnel Cost.....	2-19
Table 2-17	Annual Transportation Cost.....	2-20
Table 2-18	Annual MRF O&M Cost .....	2-20
Table 2-19	Residue Disposal Costs.....	2-21

Table 2-20 City-owned MRF Processing Revenue/ (Cost) .....	2-21
Table 2-21 Processing Revenue/ (Cost) Summary .....	2-22
Table 2-22 Recycling Options Cost Summary .....	2-22
Table 2-23 Projected Residential Recycling Rate .....	2-23
Table 2-24 Effect of Recycling on Landfill Disposal Cost and Sanitation Disposal Cost.....	2-24
Table 2-25 Recycling Incentive Program .....	2-25
Table 4-1 Estimate Number of Vehicles.....	4-6
Table 4-2 Estimate Number of Personnel.....	4-9
Table 4-3 Summary of Implementation Cost.....	4-21

## List of Figures

Figure 1-1: Recycling Bins with Lids.....	1-2
Figure 1-2: Curb-sort Vehicle and City Containers .....	1-8
Figure 1-3: Sorting Process.....	1-10
Figure 1-4: Residential Solid Waste and Recycling Set-out.....	1-11
Figure 1-5: City of Victoria Single-Stream Transfer Station.....	1-15
Figure 1-6: Tipping of Source Separated Material .....	1-16
Figure 1-7: Current Processing Facility Has Limited Capacity.....	1-17
Figure 1-8: Formula for Processing Contract Financial Terms .....	1-18
Figure 2-1: Examples of Curb-Sort, Split Body and Fully-Automated Vehicles .....	2-6
Figure 2-2: Dual-Stream City-Owned MRF Layout.....	2-15
Figure 2-3: Source Separated MRF Loose Material Bunkers, Baler Pit and Baler Conveyor.....	2-16
Figure 2-4: Covered Baled Material Storage .....	2-17
Figure 3-1: Refuse Hauler.....	3-2
Figure 3-2: Subscription Curbside Recycling Participants .....	3-3
Figure 3-3: Recycling Set-out Frequency .....	3-3
Figure 3-4: Residents Utilizing Recycling Drop-off .....	3-4
Figure 3-5: Recycling Drop-off Frequency .....	3-4
Figure 3-6: Interest in Alternative Collection Programs.....	3-5
Figure 3-7: Universality of Recycling Program.....	3-6
Figure 3-8: Curbside Recycling Program Financial Sensitivity .....	3-7
Figure 3-9: Recycling Incentive Programs .....	3-8
Figure 3-10: Effectiveness of City's Communication Mediums .....	3-10
Figure 4-1: Potential Recycling Rate Goal Timeline.....	4-2
Figure 4-2: Procurement Process Timeline.....	4-12
Figure 4-3: Recycling Implementation Timeline.....	4-16
Figure 4-4: Refuse Implementation Plan .....	4-19

# Section 1

## REVIEW OF CURRENT SYSTEM

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### 1.1 Overview

SAIC conducted an evaluation of the current residential recycling system in order to provide recommendations to improve efficiencies and increase material recovery. As part of this analysis, SAIC analyzed the City of Salina's (City's) collection and processing operations for residential recycling and yard waste collection. SAIC also considered the current effect of these operations on the City's landfill and solid waste collection. SAIC's analysis includes an evaluation of the current operation, policy, and public education. In addition, SAIC has determined the cost of service for the residential recycling system.

At the end of this section, SAIC summarized the key findings and recommendations for improving the current City collection system. This analysis is focused on the City's current collection operation, specifically recycling and yard waste collection; subsequent sections of this report will analyze options to increase material recovery and decrease cost by transitioning to a different type of recycling system.

### 1.2 Curbside Recycling Operation

In this section, SAIC evaluated the collection and processing for the current curbside recycling program.

#### 1.2.1 Collection Operation

The City of Salina operates a subscription curbside-sort (curb-sort) recycling program for approximately 855 residential accounts within a customer base of 14,604 households. The waiting list for customers that would like to receive recycling collection has historically ranged between 40 and 100 customers. City crews provide collection service for the recycling program. The City contracts for processing service with a local recycling processor, Images. The City uses 18-gallon plastic bins with lids for recycling collection (see Figure 1-1).



Figure 1-1: Recycling Bins with Lids

In this section SAIC evaluated the efficiency and effectiveness of the current collection operation, including the following:

- Materials included;
- Program performance;
- Staffing and equipment;
- On-route operations; and
- Collection efficiency.

## 1.2.2 Curbside-Sort Benchmarking

This analysis includes references to similar recycling programs in order to provide a more thorough assessment of the City's current system. SAIC utilized its internal database of recycling programs in order to identify cities with similar recycling programs for this analysis. SAIC selected the following cities for inclusion in this benchmarking analysis:

- Olathe, Kansas;
- El Dorado, Kansas;
- Hays, Kansas;
- Winfield, Kansas;
- Fayetteville, Arkansas;
- Jacksonville, Arkansas;
- Minneapolis, Minnesota; and
- Killeen, Texas.

Table 1-1 provides summary information for the recycling programs in each of the benchmark cities.

**Table 1-1  
Benchmark City Summary**

City	Program Type	Subscription Rate <sup>1</sup>	Homes Served <sup>2</sup>	Collection Frequency	Container
Salina, KS	Curb-sort, subscription	6%	855	Weekly	18-gallon bins
Olathe, KS <sup>3</sup>	Curb-sort, subscription	27%	9,800	Weekly	18-gallon bin
El Dorado, KS	Dual-stream, city-wide	n/a	5,000	Weekly	Clear bags
Hays, KS	Dual-stream, city-wide	n/a	6,700	Weekly	Blue bags
Winfield, KS <sup>4</sup>	Curb-sort, city-wide	n/a	4,300	Weekly	36-gallon bins
Fayetteville, AR	Curb-sort, city-wide	n/a	18,300	Weekly	18-gallon bin
Jacksonville, AR	Curb-sort, city-wide	n/a	7,800	Weekly	3 open bins <sup>5</sup>
Minneapolis, MN	Curb-sort, rebate <sup>6</sup>	n/a	108,000 <sup>7</sup>	Every-other Week	24-gallon bins
Killeen, TX	Curb-sort, subscription	6%	2,400	Weekly	22-gallon bins

1. Subscription rate refers to the number of subscribers divided by the total residential households in the city.
2. For cities with subscription programs, this represents the number of subscribers, not the total number of households in the City.
3. Olathe, KS has transitioned to a single-stream program; however, SAIC provided the metrics of the former curb-sort program in Olathe for comparison purposes.
4. Winfield, KS is considering implementing every-other-week automated, single-stream collection of recyclables starting in 2013.
5. The exact size of these bins is unknown; however, SAIC estimates they are approximately 10-14 gallons each.
6. Participating residents receive a rebate on their monthly solid waste bill.
7. Approximately half of these accounts are served by a private hauler due to city ordinance.

- In evaluating the benchmark cities, SAIC found that the Cities of Killeen and Winfield have the most similar programs to Salina in terms of the following factors, which will be further discussed in subsequent sections:
  - Materials included;
  - Collection operation;
  - Program design; and
  - Program performance.

One key difference between the recycling programs is the material accepted. The Cities of Killeen and Winfield accept old corrugated cardboard (OCC), and Killeen also accepts chipboard while the City of Salina does not. In addition, the City of Salina accepts Plastics #1 to #5, while the Cities of Killeen and Winfield only accept Plastics #1 and #2. Also, Winfield does not accept mixed paper.

Data from the other benchmarked cities will be used for portions of this analysis but there are limitations to this analysis due to programmatic differences from the City's current program. Key programmatic variations between the programs include:

- Different program design – El Dorado and Hays
- City-wide recycling programs – El Dorado, Hays, Winfield, Fayetteville, Jacksonville and Minneapolis
- Greater number of households served – Fayetteville and Minneapolis

- Larger annual volume of recyclable tonnage – Fayetteville and Minneapolis
- Every-other-week collection frequency – Minneapolis
- Fewer types of materials accepted – Jacksonville
- Different curbside collection container – El Dorado and Hays

It should be noted that SAIC researched information regarding various curbside recycling programs in Kansas through KansasRecycles.org, in order to identify communities that collect recyclables using city crews, as these would be most relevant and most likely to provide applicable benchmark data.<sup>1</sup> Despite the fact that the benchmarked programs are not exactly the same as the City's, benchmarking of certain program elements is still of great value.

### 1.2.3 Materials Included

The following materials are included in the City's curb-sort program and are sorted by collection crews into nine compartments on the recycling vehicle.

- Newspaper
- Magazines
- Mixed Paper (Mish Mosh)
- Aluminum Cans
- Steel Cans
- Clear Glass
- Brown Glass
- Plastics #1 to #5
- The City also collected green glass in 18-gallon bins attached to the back of the collection truck.

Table 1-2 shows materials that are included in the recycling programs for the eight benchmarked cities. As shown in the table, the variety of materials included in the City's program is comparable to other curb-sort programs.

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<sup>1</sup> <http://www.kansasrecycles.org/curbside>

Table 1-2  
Curb-Sort Program Materials

City	Newspaper	Mixed Paper <sup>1</sup>	Aluminum	Steel	Glass <sup>2</sup>	Plastic <sup>3</sup>	OCC	Chipboard
Salina, KS	■	■	■	■	■	■	■	■
Olathe, KS	■	■	■	■	■	■	■	■
El Dorado, KS	■	■	■	■	■	■	■	■
Hays, KS	■	■	■	■	■	■	■	■
Winfield, KS <sup>4</sup>	■	■	■	■	■	■	■	■
Fayetteville, AR	■	■	■	■	■	■	■	■
Jacksonville, AR	■	■	■	■	■	■	■	■
Minneapolis, MN	■	■	■	■	■	■	■	■
Killeen, TX	■	■	■	■	■	■	■	■

1. Includes various paper products including junk mail, cereal boxes and magazines.
2. Includes clear, brown and green glass in this category.
3. Includes various types of plastic ranging from #1 to #5.

The City accepts the majority of the materials that are included in dual-stream and single-stream recycling programs. The City is currently not capturing old corrugated cardboard (OCC), which is collected in seven of the nine benchmark communities. Salina also does not collect chipboard, which is collected in five of the nine benchmarked cities.

SAIC observed during field observations that residents currently set-out a significant amount of OCC for solid waste collection. The current recycling program configuration is limited by the number of truck compartments, making OCC a difficult material to include in the current collection program due to the volume of OCC material. The City's current challenge of recovering clean OCC from residents is a limitation of a curb-sort collection program.

## 1.2.4 Program Performance

### Residential Recycling Rate

The City collected 152 tons of material from the curb-sort program in 2011. Table 1-3 shows the material composition and volume for 2011.

**Table 1-3**  
**Composition of Materials Collected from Salina Curbside Program**

Material	Material Composition	2011 Tons
Newspaper and Magazines	40.7%	61.9
Mixed Paper (Mish Mosh)	27.0%	41
Aluminum	1.5%	2.3
Steel	3.9%	6
Clear Glass	8.5%	12.9
Brown Glass	8.0%	12.1
Green Glass	0.2%	0.3
Plastic #1 to #5	10.3%	15.6
<b>Total</b>	<b>100.0 %</b>	<b>152.1</b>

The City's curbside collection is a subscription program that serves 855 households of the City's 14,604 solid waste customers. The participating customers annually set out an average of 356 pounds of recyclable material per household. Despite the healthy volume set out by subscribers, the annual volume of recyclables collected from all of the City's customers, on a household basis, is not as robust as other cities. This annual per-household tonnage for each benchmark community is shown in Table 1-4.

**Table 1-4**  
**Curbside Recyclable Volume per Household**

City	Annual Tons	Lbs/ Household/Year (All Households)	Lbs/ Household/Year (Subscribers Only)
<b>Salina, KS</b>	<b>152</b>	<b>21</b>	<b>356</b>
Olathe, KS	1,965	108	401
El Dorado, KS	885	354	n/a
Hays, KS	1,150	343	n/a
Winfield, KS	1,147	535	n/a
Fayetteville, AR	5,523	587	n/a
Jacksonville, AR	466	119	n/a
Minneapolis, MN	22,205	370	411
Killeen, TX	380	19	317

Based on SAIC's experience, the City's curbside program is generating a healthy amount of material per participating household. For instance, SAIC completed a survey of 71 communities in North Central Texas, of which 51 communities reported having a curbside recycling program with an average of 316 pounds of curbside recyclables per household generated annually. The City of Salina currently generates 356 pounds of curbside recyclables per subscribing household, which is in-line with the average curbside volume generated in North Central Texas. However, the volume

generated per household from all City customers is much lower, at 21 pounds per household.

Table 1-5 shows the residential recycling rate in the City as calculated by SAIC. The residential recycling rate for the City's customers is 11.5 percent, including material generated from curbside recycling and yard waste diversion programs.

**Table 1-5  
2011 Residential Recycling Rate**

Waste Generation	Tons	% of Total
Recyclables (curb-sort)	152	1.0%
Yard Waste (composted)	1,657	10.5%
Refuse	13,940	88.5%
Residential Waste Generation	15,749	100%
<b>Residential Recycled Tonnage <sup>1</sup></b>	<b>1,809</b>	<b>11.5% <sup>2</sup></b>

1. Including curb-sort recyclables and composted yard waste

2.  $(\text{Recyclables} + \text{Yard Waste}) / (\text{Residential Waste Generation}) = \text{Residential Recycling Rate}$

### Set-out Rate and Participation Rate

Although the current collection operation serves 855 subscribing households, the operation collects an average of 658 set-outs a week, which equates to a set-out rate of approximately 75 to 80 percent. The current operation is limited to 855 customers at the current set-out rate, as additional customers or an increased set-out rate would require a second route. However, the 40 to 100 customers currently on the curbside recycling waitlist are not enough to merit the addition of a full route.

The participation rate is a measurement of the number of households that participate in the program on a regular basis - typically defined as at least once monthly. SAIC has assumed that all 855 recycling customers participate in the program since it is subscription-based and customers incur a cost to participate. Table 1-6 shows the participation rate among City customers and City-wide.

**Table 1-6  
Recycling Participation**

	Curbside Recycling Customers (Households)	Solid Waste Customers (Households)	Recycling Participation Rate
City collection customers	855	14,604	5.9%
Private collection customers	-	2,435	0%
City-wide customers	855	17,039	5.0%

As shown in the table above, the City currently has 5.9 percent participation in the curbside recycling program among City customers and 5.0 percent participation City-wide. To add recycling customers and increase the participation rate, an additional recycling route would need to be added; however, as discussed previously in this section, current demand does not merit the addition of a second recycling route.

## 1.2.5 Staffing and Equipment

### Vehicles

The City is currently using a single-axel Kann curb-sort truck with nine sorting compartments. The truck is equipped to enable the driver to stand while driving, allowing increased efficiencies and decreasing the likelihood of injuries. The driver sorts materials into side-load troughs. Once troughs are filled, the driver tips the material into the material compartments using on-board hydraulics. A compacting compartment is currently used for plastics to minimize the tipping frequency for this commodity. Figure 2-2 shows the City's current Kann curb-sort truck and curbside refuse and recycling containers.



Figure 1-2: Curb-sort Vehicle and City Containers

The City has one Kann curb-sort truck and utilizes two pick-up trucks with Gaylord boxes as back-up collection vehicles. The table below shows the cost that the City incurs for the curb-sort vehicle.

Table 1-7  
Annual Cost of Curb-Sort Vehicle

Vehicle Type	Equipment Useful Life	Annual Maintenance	Annual Fuel	Subtotal – Maintenance and Fuel Cost	Annual Replacement Cost (\$) <sup>1</sup>	Total Annual Cost
Split Body	7 years	\$7,854	\$7,959	\$15,813	\$30,000	\$45,813

1. The annual replacement cost is based on a front-line vehicle useful life of 7 years and a purchase price of \$210,000. Based on SAIC's industry experience, front-line curbside collection vehicles should be replaced after 7 years as typically the vehicle maintenance begins to exponentially increase after 7 years.

Generally speaking, SAIC would expect vehicle maintenance cost for the City's recycling truck to be on the low end of what is typically incurred by other types of recycling vehicles (e.g. rear-loaders and fully-automated). Recyclables are lighter than refuse, meaning that the trucks are required to handle much less weight on a daily basis. The City's annual maintenance and fuel cost for the curb-sort vehicle is approximately \$16,000. Compared to SAIC's operational experience with other curbsort vehicle maintenance and fuel costs, the City's annual cost of approximately

\$16,000 per vehicle is reasonable. For example, the City of Fayetteville also uses a Kann curb-sort truck and annual incurs an average of \$16,154 annually in maintenance and fuel cost per vehicle.

The curb-sort vehicle has been in service for eight years. SAIC typically recommends that front-line collection vehicles be transitioned to back-up status between the ages of seven and ten years. As vehicles age, they become less reliable and disrupt daily operations with increased break downs and maintenance cost. SAIC recommends that the City monitor the frequency of break downs and maintenance cost of the current recycling truck and consider purchasing a new front-line vehicle and transitioning the current front-line truck to a back-up vehicle.

The current back-up operation consists of two staff running the recycling routes with two pick-up trucks and Gaylord boxes. Although this back-up operation requires less time to complete the route, it requires an additional staff person and additional equipment. As the current collection vehicle has aged, this method of collection has become more common. The City will maintain a more cost-effective operation if the City is able to retain a dedicated curb-sort back-up truck.

### Staffing

The City has one full-time recycling driver that runs the daily curbside recycling route. The sanitation supervisor oversees the solid waste, yard waste and recycling drivers and workers. When the recycling back-up operation is running due to truck down time, the recycling driver is accompanied by one refuse worker/driver to operate the two pick-up trucks necessary to run the back-up operation. The City trains six personnel annually on the recycling collection operation. SAIC recommends that the City continue to cross-train sanitation employees to operate the recycling collection vehicle and sort materials, ensuring that there are multiple staff with the skills to perform front-line and back-up curb-sort collection. By ensuring staff versatility through cross training, the operation is able to operate with increased flexibility on a daily basis.

The current level of overtime on a department-wide basis is less than one percent. Based on operation reviews of other solid waste and recycling collection operations in the country, overtime typically ranges between five to seven percent. The City's current level of overtime of less than one percent is very low for a collection operation.

The sanitation management team supervises the recycling collection operation. A route-to-supervisor ratio of ten routes to one supervisor is typical for collection. Since the curbside recycling operation currently consists of one route, there is not a need for a dedicated recycling route supervisor. Based on SAIC's field observations the sanitation management is effectively managing the current recycling route.

## 1.2.6 On-Route Operations

### Collection Practices

Recycling collection routes include five geographic areas containing approximately 150 to 175 households each. Routes on Monday through Thursday are equally balanced, with Friday collection intentionally containing fewer households to allow for additional tipping time at the recycling processor as well as vehicle maintenance and service. The size of daily routes is well controlled as additional customers can not be added to a specific collection day unless an existing customer on that collection day cancels curbside recycling service.

One recycling collection driver operates the Kann curb-sort truck Monday through Friday. The collection driver operates the truck and hand sorts the curbside materials into the nine different compartments on the truck. The recycling bin hooks onto the sorting troughs to allow for the driver to sort with both hands, with the material at waist level. The sorting process is very physically demanding and time intensive. For instance, during SAIC's route observations it took the driver between 40 and 120 seconds to collect individual stops.



Figure 1-3: Sorting Process

SAIC would emphasize that the recycling truck driver exhibits a high level of effort in collecting and sorting the recyclable material. The sorting demands of a curb-sort program are the highest of any curbside recycling program. The City's recycling staff is efficient in their sorting and contribute to the overall success of the program. Because of the physical demands of the City's program, it is imperative for supervisors to continue to place an emphasis on safety.

### Set-Out Policies

City residents set out commingled recyclables for collection in 18-gallon bins. The City encourages, but does not require, residents to separate material by commodity. A properly separated set-out will include newspaper, mixed paper (mish mosh) and magazines in paper bags and all other material placed loosely in the bin. Approximately 30 percent of the bins contain sorted material. If material is pre-sorted

by residents, even a very large set-out can be sorted quickly and efficiently by the driver. SAIC recommends that the City develop specific public education strategies to encourage residents to pre-sort material. An example of an effective education strategy is leaving educational tags that describe the pre-sorting process for residents with unsorted set-outs.

The driver has the responsibility of leaving an educational brochure on the recycling bin of residents that do not participate properly. The driver will leave unacceptable material in the recycling bin accompanied with an educational brochure outlining material that is accepted in the curb-sort program. The ability to eliminate unacceptable material through the manual sorting process provides a recyclable stream with a very low contamination rate.



Figure 1-4: Residential Solid Waste and Recycling Set-out

Residents may have an unlimited number of bins. The City provides participating residents with one bin, but residents can request additional bins at no extra charge. Participating recycling households have, on average, 1.16 recycling bins. Table 1-8 illustrates the number of residents with multiple bins.

Table 1-8  
Residents with Multiple Recycling Bins

Number of Recycling Bins	Number of Recycling Participants	Percent of Recycling Participants
1	743	85.9%
2	115	13.3%
3	6	0.7%
4	1	0.1%

### 1.2.7 Collection Efficiency

The City collects curbside recyclables using one front-line collection vehicle and one driver. This vehicle runs five days per week for an average of eight hours per day.

The City operates under a task-based incentive program that allows the drivers to finish their day when their daily route is completed. Due to this incentive program, the City's drivers do not typically take a lunch break.

In order to conduct the collection efficiency analysis, SAIC made assumptions about the non-collection time (e.g. travel, inspections, etc.) for the recycling routes, based on conversations with City staff and field observations. Assumptions used for non-collection time for recycling routes are as follows:

- Pre-trip vehicle inspection – Completed by driver before beginning route – 10 minutes
- Morning Meeting – 5 minutes
- Time to and from route – 12 minutes
- Post-trip vehicle inspection – 15 minutes
- Refueling – 20 minutes
- Number of disposal trips – 0.4 trips (twice per week)
- Round trip travel time to Images – 20 minutes
- Unloading material – 20 minutes

SAIC used Minneapolis and Fayetteville collection information as benchmarks for collection efficiency. Table 1-9 summarizes key collection efficiency measures for the two programs.

**Table 1-9  
Collection Efficiency Measures**

Measures	Salina	Minneapolis	Fayetteville
Length of collection day	8 hours	8 hours	10 hours
Collections per route hour	27 households	43 households	42 households
Average route size	178 households	218 households	293 households
Hours spent not collecting per route <sup>1</sup>	1.3 hours	2.9 hours	3.0 hours
Collection efficiency ratio <sup>2</sup>	83%	61%	70%

1. Based on assumptions listed in the bulleted list above.

2. The collection efficiency ratio is the percentage of the work day that is spent performing on-route collection, net of MRF trips, pre and post trip inspections, lunches, breaks and refueling.

As shown in Table 1-9 the City has high collection efficiency with a collection efficiency ratio of 83 percent. A high collection efficiency ratio means the collection crew maximizes the amount of time spent on route as compared to other daily non-collection activities (i.e. tipping materials, pre- and post-trips, breaks, refueling, etc.).

All three communities have a curbside curb-sort collection program; however, Minneapolis has a rebate program and Fayetteville has a city-wide program. The universality of the other cities' collection operations results in the ability to collect more per hour due to the increased density of set-outs.

The City's curb-sort collection system has advantages, such as low material contamination and processing cost. However, curb-sort collection systems have low collection efficiency compared to more automated collection systems. For instance, in a fully-automated, cart-based collection system, drivers can collect between 125 and 150 homes per hour. Because curb-sort recycling programs are relatively uncommon and vary considerably between communities, it is challenging to assess the maximum collection efficiency achievable in Salina. In SAIC's opinion the City's curbside collection is operating efficiently under the current program structure.

SAIC conducted an analysis to determine if there is excess capacity in the City's recycling collection route. Based on the current program's productivity, the City needs exactly one route for the 855 households currently served by the recycling program. The following table summarizes this analysis.

**Table 1-10  
Recycling Collection Capacity Analysis**

Route Size Analysis	Unit	Routes Needed Analysis	Unit
Pure route time <sup>1</sup>	6.7 hours	Collections per week <sup>3</sup>	658 households
Collection per hour	27 households	Collections per day <sup>4</sup>	132 households
New route size <sup>2</sup>	178 households	Routes Needed <sup>5</sup>	0.74 routes

1. Based on a 8 hour work day
2. 6.7 hours x 27 households per hour = 178 households per route
3. 855 subscribing residents x 77% set out rate = 658 recycling set outs per week
4. 658 households / 5 days per week = 132 households per day
5. 132 households per day / 178 households per route = 0.74 routes

Based on the current recycling program configuration the City is running the one curbside recycling route effectively. As shown in Table 1-10 the City needs approximately one route to operate the current recycling system, accounting for 25 percent downtime for vehicle maintenance. This level of vehicle maintenance is a result of the City having one front-line vehicle and no back-up vehicle for recycling collection. If the City's goal for the recycling program is to add recycling customers and increase the volume of recyclables diverted in the City, SAIC recommends the City add an additional recycling route. If the City adds a second subscription curbside recycling route, SAIC recommends the City market the program in areas of the City that have historically shown an interest in recycling. As discussed previously, increasing the density of collection routes also increases collection efficiency. Benefits of increasing the number of recycling customers include increased collection efficiency and the generation of revenue from additional monthly recycling subscription fees.

## 1.2.8 Recycling Operation Trends and Transition

In recent years there has been an industry trend to transition towards more automated recycling collection. Curb-sort programs sometimes produce a high level of material but are very labor intensive and are by design unable to reach high levels of collection efficiency. Minneapolis, Minnesota is a large city that has run a successful curbside recycling program for many years and has recently announced that the city will be transitioning

to a single-stream program. SAIC has provided information on municipalities that have successfully transitioned their recycling programs.

### Olathe, Kansas

In 2009, the City of Olathe, Kansas (Olathe) transitioned its weekly subscription curbsort program to an every-other-week curbside single-stream program. The subscription curbsort program had a subscription rate of approximately 33 percent and diverted 108 pounds of recyclables per household annually. Currently, with a universal curbside single-stream program, Olathe has achieved approximately 70 percent participation by residents and is annually diverting 390 pounds per household. Through implementing a universal curbside single-stream recycling program, recycling diversion has increased by 282 pounds per household annually in just two years.

The City of Olathe distributed recycling carts between October 2009 and December 2009. During this time, material was collected from households that had been provided carts; however, customers were not billed until all carts had been distributed to ensure that the billing associated with the new service was universally applied to all customers. Collection is performed using semi-automated collection vehicles so that crews can effectively monitor material to reduce contamination. When carts with significant contamination are identified via visual inspection, crews tag the cart with an educational sticker and do not collect the cart contents. Existing rear-loaders in the solid waste fleet were retrofitted into semi-automated trucks to collect recyclable material. Olathe will be transitioning to fully-automated recycling collection in the coming year due to recent material audits reflecting a low contamination rate of approximately three percent and also an operational need to replace the retrofitted rear-loaders with new vehicles.

Olathe shared with SAIC useful feedback on its initial cart selection decision to provide both 65- and 96-gallon carts. Based on this feedback, Olathe believes savings and operational efficiencies could have been achieved by initially distributing exclusively 96-gallon recycling carts.

### Victoria, Texas

The City of Victoria, Texas (Victoria) historically collected recyclable materials via a drop-off location until February 2012 when they implemented a curbside single-stream collection program. Victoria operates a single-stream, every-other-week, fully-automated recycling program with 96-gallon carts. Collection crews tip the material at a small transfer station, where the material is loaded into compacting roll-off containers and hauled approximately 100 miles to a Waste Management Material Recovery Facility (MRF) in Houston, Texas. Figure 1-4 shows single-stream recyclable material being loaded into a roll-off compactor at the transfer station.



Figure 1-5: City of Victoria Single-Stream Transfer Station

With the single-stream program having only been in place for six months, data regarding the impact on recycling tonnage is not available; however, Victoria staff is optimistic about the volumes currently being collected. The successful transition to a single-stream recycling program was due in part to effectively communicating programmatic changes to the residents through radio announcements, newspaper articles, and community meeting appearances. As part of the recycling program's continuing education, Victoria will also be providing residents with calendars that indicate every-other-week recycling set-out dates.

## 1.3 Processing

The City utilizes a local processor, Images, to process the material collected from the curbside recycling program. Images accepts, bales, and markets the material. Images accepts approximately 150 tons annually from the City's curb-sort program.

### 1.3.1 Facility and Equipment

Images is a recycling collection and processing facility that is centrally located in the City. The location includes a drop-off center in the front of the facility and bales and stores material in the back of the facility. The central location serves as a benefit to the City's collection operation as the recycling truck can, on average, reach the processing location within 10 minutes from the residential recycling route. Although, the current location of Images has its benefits, the facility is landlocked, which has prevented the company from expanding to ensure adequate space for the collection vehicle to tip material. The recycling driver must notify the processors 30 minutes before arriving in order for the facility to make room for the collection vehicle to tip recyclables. The City and Images have successfully engineered a system to regularly tip material at this location; however, the current location is not intended for and is not ideal for the tipping of a collection vehicle.



Figure 1-6: Tipping of Source Separated Material

SAIC visited the City's processor while in Salina. Based on SAIC's observations and discussions with City staff and Images, the current processing location is limited to accepting the current volume of recyclables being collected from the City's curb-sort program. If the City were to pursue a different collection method, a different processing facility would need to be identified.

### 1.3.2 Operations

Material is tipped at Images twice a week. Newspaper, mixed paper (mish mosh) and plastic are tipped at the end of the day on Tuesday of each week. All nine program-accepted-materials are tipped at the end of the route on Friday.

When the recycling truck unloads material, the driver must back into the facility's indoor area. Images staff position Gaylord boxes with extensions to serve as a funnel for the material below the truck compartments. The driver tips the compartments one at a time in the Gaylord boxes. Images staff will weigh the material in the boxes to provide the City with monthly material weights. The paper, plastic, aluminum and steel material is loaded into the horizontal baler by Images staff. Baled material is stored at Images until it is sold to market.

Based on conversations with Images and City staff, it is a challenge for the processor to accept the volume of material and frequency of deliveries of the current program. In addition, the facility has limited space and limited staff to manage the current volume of curb-sort materials collected weekly by the City. If the City were to increase the volume of material collected, the current processor would need to expand to accommodate the increased volume or the City would need to utilize a different recycling processor.



Figure 1-7: Current Processing Facility Has Limited Capacity

### 1.3.3 End Markets

SAIC reviewed end market pricing for recyclable materials in the region. The City currently does not pay a processing fee nor does the City receive a revenue share from the sale of recyclable materials. This ensures that the City has no risk relative to the recycling commodity market; however, simultaneously the City receives no benefit from the sale of the collected recyclables. Table 1-11, on the following page, provides the average index price for each commodity in 2011.

Table 1-11  
Market Pricing for Recyclables

Commodity	Average Composition	2010 Market Pricing	2011 Market Pricing	Index Used
Newspaper	40.7%	\$96	\$124	OBM Southwest, High Price for ONP (#8)
Mixed Paper (Mish-Mosh)	27.0%	\$100	\$125	OMB Southwest, High Price for Mixed Paper
Aluminum	1.5%	\$1,468	\$1,738	WN SMP Houston (South-central USA) Aluminum Cans (baled, delivered)
Steel	3.9%	\$90	\$109	WN SMP Houston (South-central USA) Steel Cans (picked up)
Glass (Clear, Brown, Green)	16.7%	\$10	\$10	Actual Sales Price/ Verified Market Price
Plastic #1 - #5	10.3%	\$379	\$631	WN SMP Houston (South-central USA) PET #1 (baled, picked up)
Plastic #2 (HDPE)	4.1%	\$479	\$632	Average of WN SMP Houston (South-central USA) HDPE #2 colored (baled, picked up) and HDPE #2 natural (baled, picked up)
Plastic #3 to #7	2.0%	\$124	\$195	Actual Sales Price/ Verified Market Price
<b>Weighted Average</b>	<b>100.0%</b>	<b>\$131/ton</b>	<b>\$172/ton</b>	

The weighted average market value, based on indices, from City's material composition for 2010 was \$131 per ton and the average market value in 2011 was \$172 per ton. A typical processing agreement will include a processing cost for each ton received and a percentage of revenue from the sale of materials that is returned to the city. Figure 1-7 illustrates a typical formula for the financial terms of processing recyclable materials.

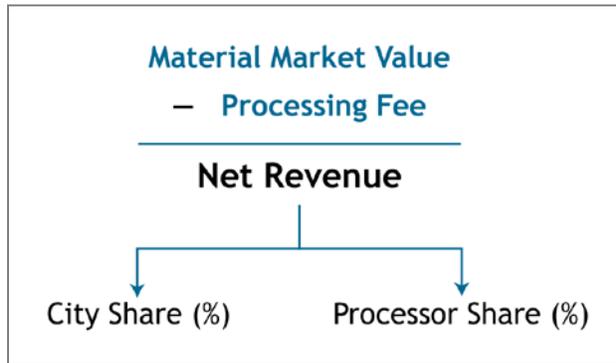


Figure 1-8: Formula for Processing Contract Financial Terms

The inclusion of processing fees per ton allows the processing facility to recover the cost of processing the material. It is a common practice for cities to structure a recycling contract to ensure that a city will not incur a cost for processing recyclables in the event the processing cost exceeds the recyclable revenue. The sharing of revenue generated from the sale of recyclables is an advantage to cities as it provides a direct incentive to the city to increase recycling and be financially rewarded for a successful program. SAIC recommends that in the future when the City negotiates a processing contract, that the contract includes both processing fees and a revenue share so the City can financially benefit from its recycling program.

## 1.4 Cost of Service

SAIC conducted a cost-of-service analysis for the sanitation and solid waste operation in the City. SAIC utilized the annual budget data and allocation information that was provided by the City to conduct the analysis. The City's costs were allocated into six different cost centers:

- Refuse Collection;
- Recycling Collection;
- Yard Waste Collection;
- Special Pick-ups Refuse/Limbs;
- Cart Work; and
- Disposal.

The annual costs of the City's sanitation operation are provided in Table 1-12. Table 1-12 also provides the monthly cost per household of each service provided.

**Table 1-12  
Sanitation Cost of Service**

Description	Annual Cost	Number of City Sanitation Customers Served	Monthly Cost per Household
<i>Residential Refuse</i>			
Refuse Collection	\$1,011,726	14,604	\$ 5.77
Residential Refuse Disposal	\$526,045	14,604	\$3.00
Refuse Cart Work	\$93,664	14,604	\$0.53
Subtotal			\$9.30
<i>Residential Curb-sort Recycling</i>			
Recycling Collection	\$132,202	855	\$12.89
Subtotal			\$12.89
<i>Residential Yard Waste</i>			
Yard Waste Collection	\$368,612	14,604	\$2.10
Yard Waste Disposal	\$72,765	14,604	\$0.42
Subtotal –Customers without Carts			\$2.52
Yard Waste Cart Work	\$35,906	5,540	\$0.52
Subtotal –Customers with Carts			\$3.04
Special Pick-ups <sup>1</sup>	\$225,159	N/A	N/A
<b>Total</b>	<b>\$2,466,079</b>	<b>N/A</b>	<b>N/A</b>

1. Special Pick-up cost is not recovered on a per household basis. The fee is charged per collection based on the crew's time spent collecting material.

SAIC observes that the City's rate for providing recycling and yard waste collection services is high compared to other cities. SAIC has provided brief discussion on the possible drivers of the City's high collection cost based on SAIC's experience with cost of service and operation reviews for municipalities in the U.S.

- **Refuse Collection.** The current refuse collection operation is very labor intensive and provides a very high level of service to customers. The current cost of the operation is reasonable considering the high level of labor involved in the current collection operation. A common range for other cart based collection programs, excluding disposal, is between \$5.00 and \$8.00 per household per month. The City is currently within a reasonable range for the service provided at a collection cost of \$5.77. In this report, SAIC has provided additional analysis in Section 1.7 to evaluate automating the refuse operation to achieve operational efficiencies and increase the City's cost competitiveness.
- **Recycling Collection.** The City's cost for providing recycling services is high compared to similar cities. In SAIC's experience, this is not uncommon for subscription-based recycling programs. The City could seek to add customers to the current route to achieve a minimal reduction in the monthly cost of service for curbside recycling per customer. Subscription based programs are inherently more

costly than universal programs as subscription programs are not able to achieve economies of scale. SAIC has performed cost of service analysis for cities with subscription recycling program with cost ranging from \$5.80 to \$11.95 per household per month. A universal curbside recycling collection cost will typically range between \$1.50 and \$3.00 per household per month.

- **Yard Waste Collection.** The current cost of collecting yard waste is higher than the typical range for weekly yard waste collection of \$1.00 to \$2.00 per household per month. The current operational configuration is highly manual and is operated by one worker/driver. The worker/driver must stop the truck and exit the cab to manually load the yard waste at each stop, in effect increasing the time spent per collection and decreasing the collection efficiency. In this report, SAIC has identified cost savings that can be achieved in the yard waste processing cost to better align the yard waste operation cost with a more typically range.
- **Special Pick-up.** Special pick-up service is scheduled by residents on a call-in basis. The City currently charges customers \$21.10 for the first 15 minutes of the special collection service and \$21.15 for each 30 minute interval after the original 15 minutes. This cost is not included in the residential customer's base rate. This rate structure is reasonable for a call-in special pick-up program; however, it is difficult to benchmark as this rate structure is not commonly used. SAIC recommends the City track the annual cost of the special pick-up program and special pick-up revenues to ensure the current rates adequately recover the cost of the service provided.

## 1.5 Public Education

The City uses several methods for public education for residents:

- **On-route public education.** Drivers will interact with customers and answer questions about the sanitation services provided by the City. SAIC observed positive interaction between drivers and residents during route observations.
- **Literature.** The City has brochures and pamphlets that are provided when a customer begins service with the City, are distributed during routes, and are available to residents at the solid waste office. These documents are provided on route to customers when they receive cart maintenance or repair, set out non-program recyclable materials, or do not follow set-out guidelines.
- **Media.** The City provides residents with information regarding sanitation services through Access TV, the Salina Journal, The Buyer's Guide and various radio stations.
- **Website.** The City sanitation website contains information about the recycling program and how to participate.

SAIC observed positive interaction between City workers and City residents during route observations. This level of personal interaction adds a unique and personal touch to the City's daily operations. Drivers and workers also communicate information to residents by leaving literature to address non-compliant set-outs. Literature can be an

effective way to communicate information to residents; however, SAIC recommends that in addition to leaving literature, households with improper set-outs should be tracked and contacted via phone or house visit by a member of the sanitation department or a dedicated public education employee. It is important that the solid waste public education and outreach is structured as a proactive tool to educate residents and does not operate as solely a reactionary program. By assigning public education duties to a specific City employee, collection crews can stay focused on the collection operation and are not overwhelmed with compliance, public education, and public outreach responsibilities.

## 1.6 Policy Issues

### 1.6.1 Recycling Rate Goal

The City does not currently have formal recycling rate goals. SAIC recommends the City consider outlining recycling goals for the yard waste and recycling programs if the City chooses to continue providing these services. In recent years a trend has emerged of states, counties and cities developing recycling rate goals. Establishing recycling goals enables the operation to develop direction and strategies for the City's operations. Establishing City recycling rate goals are policy decisions to be made by the City and are ultimately up to the discretion of the City Manager and City Commission.

### 1.6.2 Universality

As the City is an open market for collection services, in order to effectively implement recycling and maintain an equal level of competition with the private market, SAIC recommends that the City adopt an ordinance requiring all residential solid waste providers (including the City) to include recycling collection as part of their base services if the City decides to implement a citywide recycling program. Implementing a universal recycling program will allow the City to achieve the volume and set-out density needed to maximize the efficiency and success of a curbside recycling operation. City staff has confirmed that implementing a universal recycling ordinance is a viable option for the City. The implementation of a universal recycling ordinance is ultimately up to the discretion of the City Manager and City Commission.

In discussions with local private haulers, SAIC spoke about the potential for a City ordinance requiring residential haulers to provide recycling service as part of the base sanitation services. SAIC received mixed reactions from local private haulers. SAIC received both positive and negative feedback from local private haulers on the City implementing a universal curbside recycling program. It was identified that smaller haulers may struggle with running additional routes to collect recyclables separately from refuse.

As a way to ease the potential burden of implementing a recycling program for the smaller private haulers, SAIC recommends that the City make an allowance in all recycling contracts developed by the City for local private haulers to piggyback on the

City's recyclable processing contract(s). Allowing private haulers to utilize the City's processing agreement will assist private haulers in developing curbside recycling programs.

### Local Universal Recycling Trend

Recently Kansas cities and counties have been converting recycling collection operations from subscription to universal operations. In October 2011 the City of Wichita, Kansas (Wichita) approved a new solid waste and recycling program that requires all haulers to provide universal single-stream recycling and pay-as-you-throw rates. Wichita's 15 private haulers began providing universal single-stream recycling and a pay-as-you-throw rate structure November 1, 2012. Other Kansas communities that have recently converted to universal single-stream recycling include, but are not limited to:

- Derby, Kansas – 2009
- Hutchinson, Kansas – 2010
- Andover, Kansas – 2010
- Newton, Kansas – 2012
- Lawrence, Kansas – projected for 2013
- Atchison, Kansas – projected for 2013

## 1.7 Automation of Refuse Collection Operation

The City performs refuse collection using semi-automated collection vehicles. The City would be able to increase its collection efficiency through implementing a fully-automated collection configuration. The implementation of fully-automated routes would require certain vehicle and container changes, plus route modifications, such as discontinuing collection in the alleys. Based on SAIC and City staff discussions and route observations, City staff and SAIC do not anticipate any significant challenges with converting the City's refuse collection operation to a fully-automated collection system.

Advantages to implementing fully-automated collection include:

- **Decrease in crew size.** A fully-automated route requires one worker/driver while a semi-automated route requires one worker/driver and one to two workers.
- **Decrease in injuries.** The refuse operation is very labor intensive and has the potential to result in a high level of injuries. Fully-automated operations typically have less exposure to collection injuries.
- **Increase in collection efficiency.** Fully-automated routes typically are able to achieve a greater level of collection efficiency than semi-automated routes relative to the number of personnel.
- **Increase in retention rate of staff.** Due to the high level of injuries and physical demands of the current semi-automated collection operation, it has been a

challenge for the City to maintain a full staff. A fully-automated operation provides opportunities for positions that are less physically demanding.

- Disadvantages of transitioning to fully-automated collection include:
- **Increased vehicle capital cost.** Semi-automated vehicles typically cost approximately \$130,000 and fully-automated vehicles typically cost approximately \$255,000.
- **Increased vehicle maintenance cost.** Due to the increased level of hydraulics on a fully-automated vehicle the maintenance cost is typically higher for fully-automated trucks compared to semi-automated trucks. Based on SAIC's experience with solid waste operations throughout the county, SAIC anticipates a 50 percent increase in annual maintenance cost for automated side-loaders, as compared to rear-loaders. Based on the City's current annual rear-load maintenance cost, SAIC assumed an annual cost of approximately \$16,800 per automated side-loader vehicle.
- **Cart set-out restrictions (i.e. exiting alleys, street traffic/ parking, cart set-out position).** Carts must be placed properly at the curb and be accessible to the fully-automated truck in order for increased collection efficiency to be achieved. For example, if a driver must exit the truck to reposition a set-out, collection efficiency is reduced.

Due to the high level of efficiency maintained by City collection operators, automating the refuse collection operation would not decrease the number of required routes. SAIC projects that the City would need five fully-automated refuse routes to collect the City's refuse on a weekly basis. Table 1-13 provides the change in routing as an effect of automating the refuse operation. In this analysis, SAIC evaluated the fully-automated collection operation under an eight hour work day and a ten hour work day. Operating a ten hour work day, four days a week can provide operational efficiencies by allowing workers/drivers to perform non-collection duties four days per week and maximize daily truck payloads. Additional operational benefits can be achieved with a four day schedule such as a dedicated week day for fleet to work on solid waste equipment and solid waste employee morale associated with a four day work week. With fully-automation collection, it is feasible for the routes to be run on a ten hour work schedule, while with the manual nature of the semi-automated routes a ten hour work day is not feasible.

**Table 1-13  
Refuse Routing Required**

	Semi-automated	Automated	Automated
Daily Collection Shift	8 hour	8 hour	10 hour
Households Collected per Hour	159 households	139 households	139 households
Households Collected per Day	740 households	646 households	813 households
Number of City Customers	14,604 households	14,604 households	14,604 households
Daily Routes Needed	3.95 routes	4.52 routes	4.49 routes
Routes Needed (Rounded)	4.0 routes	5.0 routes	5.0 routes

Based on the routing information provided in Table 1-13, SAIC has developed a summary of the financial benefit the City will experience from transitioning from semi-automated collection to fully-automated collection in Table 1-14.

The costs in Table 1-14 represent planning-level analysis based on SAIC's knowledge of industry best practices.

**Table 1-14  
Cost Comparison of Refuse Collection Operation**

Description	Semi-automated	Fully-automated
Personnel	\$678,133	\$321,437
Capital Cost – Vehicles	\$85,787	\$200,357
Vehicle Maintenance	\$37,630	\$92,400
Fuel	\$46,800	\$58,500
Insurance	\$3,283	\$6,522
Capital Cost – Carts	\$83,975	\$86,638
Public Education	-	\$14,604
Administrative and Billing Cost <sup>1</sup>	\$403,274	\$403,274
<b>Total Annual Collection Cost</b>	<b>\$1,338,883</b>	<b>\$1,183,732</b>
Households	14,604	14,604
<b>Monthly Cost per Household<sup>2</sup></b>	<b>\$7.64</b>	<b>\$6.75</b>

1. Administrative and Billing Cost include current budget cost such as office supplies, apparel, tools, administration, data processing, etc.
2. The monthly cost per household does not include disposal cost.
3. The volume of refuse disposal for the operations modeled in Table 1-14 is assumed to be the same - 14,392 tons annually. Based on the current tipping fee at the landfill this cost would be \$438,965 annually. This cost equates to a monthly cost per household of \$2.50 for disposal.

The monthly cost per household does not include disposal cost.

It is important to note that the cost shown in Table 1-14 differs from the current operation cost shown in Table 1-12. In the analysis provided in Table 1-14, SAIC accounted for the following:

- The full cost of a refuse supervisor is included in each eight hour operation. Under the ten hour collection operation, SAIC accounted for 1.25 of a supervisor cost as the collection operation will require supervision for 50 hours each week.
- New vehicle costs are used for front-line equipment.
- Front-line vehicles are assumed to be replaced based on the following equipment useful life:
  - Rear-loader: 7 years
  - Automated Side-loader (operated 8 hours per day): 7 years
  - Automated Side-loader (operated 10 hours per day): 5.5 years
- Replacement of ten percent of the City carts is accounted for annually.
- A budget of \$1.00 of public education per household per year to transition the City's refuse collection to an automated system and maintain the program going forward.

The cost shown in Table 1-14 illustrates the cost savings the City could achieve by converting the refuse collection fleet to an automated collection system. The annual cost savings amounts to an 11.6 percent decrease in cost.

In addition to the financial benefits of automating the refuse fleet, there are also operational benefits, such as the potential for improved staff retention. The semi-automated collection configuration involves two workers running behind the rear loader collection vehicle and tipping refuse into the vehicle. This high level of manual labor and direct exposure to traffic increases the potential for daily injury by staff and results in a high level of staff turnover. SAIC would anticipate the current collection staff could be transitioned to automated refuse drivers.

## 1.8 Yard Waste Collection

### 1.8.1 Collection Operation

The following materials are included in the City's curbside yard waste program:

- Small twigs;
- Hedge trimmings;
- Garden waste;
- Grass; and
- Leaves.

Residents set out material in 65-gallon rolling-carts. Yard waste crews collect yard waste in semi-automated rear-loader trucks with dual tippers. One worker/driver operates the rear-loader and manually tips the yard waste. The yard waste is collected comingled with refuse from January to March each year due to decreased generation in yard waste volume. The sanitation operation will at times collect the yard waste

comingled with refuse when the operation experiences a high level of operator vacancies or absences.

The yard waste processor, Kanza, is limited in the type of material that it can accept. Kanza will not accept tree limbs or brush greater than 1/4 inches in diameter at the current processing cost. Limbs and large brush will require the processor to grind the material before adding it to the composting operation, which is a service that is not included in the City's current processing cost.

Yard waste diversion accounts for approximately 10 to 13 percent of material generated by City residents. Table 1-15 provides the historical volumes of yard waste the City has diverted.

**Table 1-15**  
**Historical Tonnage of Diverted Yard Waste**

	2009 Tons	2010 Tons	2011 Tons	Average
Yard Waste (Composted)	2,130	1,638	1,657	1,808
Percent of Waste Generation	12.8%	9.8%	10.5%	11.0%

Most of the 14,604 customer households participate in the yard waste collection program. The current level of diversion is healthy for the current level of participation and annual collection schedule. For reference, a waste characterization conducted by the U.S. Environmental Protection Agency (EPA) in 2010 identified that 13.4 percent of the waste stream consists of yard trimmings. If the City discontinues the intermittent disposal of yard waste, the City can further increase diversion. In addition, the City would be able to further increase diversion if the program accepted brush and limbs in addition to leaves and grass. However, the current processor will not accept material greater than 1/4 inch in diameter.

### Processing of Yard Waste

SAIC was able to visit the current processor's facility. Kanza composts the material in windrows approximately 14 feet wide by seven feet high. Based on discussions with Kanza, the operation is unable to accept material that is greater than 1/4 inch in diameter due to the current screening process. Kanza expressed an interest in accepting material that is larger than 1/4 inch in diameter, such as brush and limbs; however, the material would need to be ground by the City or an additional fee would need to be paid to Kanza for grinding the material.

### Cost of Yard Waste Program

Based on allocations provided by the City, SAIC has developed the cost for the yard waste collection operation which is shown in Table 1-16.

**Table 1-16**  
**Current Cost of Yard Waste**

Yard Waste Program Components	Value
Number of participating yard waste households	14,604
<i>Collection Cost</i>	
Annual yard waste collection cost	\$368,612
Monthly collection cost per household	\$2.10
<i>Composting Cost</i>	
Annual composting cost (Kanza)	\$72,765
Monthly composting cost per household	\$0.42
<b>Total annual yard waste cost without carts</b>	<b>\$441,377</b>
<b>Total monthly yard waste cost per household without carts</b>	<b>\$ 2.52</b>
<i>Cart Maintenance Cost</i>	
Annual maintenance cost of yard waste carts	\$35,906
Monthly maintenance cost per household	\$0.52
<b>Total monthly yard waste cost per household with carts</b>	<b>\$ 3.04</b>

The current monthly cost of \$2.52 to provide yard waste collection and composting for each participating household is high for a yard waste collection operation. Typically, the cost of providing residential yard waste collection will range from \$1.00 to \$2.00 per household per month. The cost for composting of the material is reasonable while the cart maintenance cost is higher than other collection operations SAIC has reviewed. However, the monthly collection cost of \$2.52 is the driving factor in the cost for the yard waste collection operation. The current operation configuration is operated by one worker/driver, where the worker/driver must stop the vehicle and exit the cab to manually load the yard waste at each stop. This collection method results in collection inefficiency and is likely the driver of the high collection cost.

### Disposal of Yard Waste

The City owns its own landfill. Landfill operating costs are predominately fixed costs, meaning the volume of tons accepted at the landfill has a direct effect on the landfill's cost of disposal per ton. As the City diverts greater quantities of yard waste from the landfill to Kanza, the per-ton disposal cost at the landfill increases. SAIC conducted an analysis of the financial impact of disposing all of the curbside yard waste in the City landfill as well as increasing the level curbside yard waste tons diverted to Kanza. Table 1-17 provides the sensitivity analysis of diverting yard waste from the City's landfill.

**Table 1-17  
Yard Waste Processing's Effect on Landfill Disposal Cost**

	Diverted to Kanza	Disposed at City Landfill <sup>1</sup>	Total Disposal and Diversion
<b>Current Annual Yard Waste Tonnage <sup>2</sup></b>			
Current City curbside tonnage	1,808 tons <sup>3</sup>	15,213 tons	17,021 tons
Cost per ton of diversion/disposal	\$40.24	\$34.58	
Annual cost of diversion/disposal	\$72,765	\$526,046	\$598,810
<b>All Yard Waste Disposed in Landfill <sup>4</sup></b>			
City curbside tonnage	0 tons	17,021 tons	17,021 tons
Cost per ton of diversion/disposal	N/A	\$33.77	
Annual cost of diversion/disposal	N/A	\$574,879	\$574,879
Cost/ (Savings)			<b>(\$23,930)</b>
<b>Increased Diversion of Yard Waste to Kanza</b>			
City curbside tonnage	2,155 tons	14,866 tons	17,021 tons
Cost per ton of diversion/disposal	\$33.77	\$33.74	
Annual cost of diversion/disposal	\$72,765	\$514,050	\$586,815
Cost/(Savings)			<b>(\$11,995)</b>

1. The volume disposed at the landfill represents the average refuse and special disposal tonnage from 2009 -2011.
2. The tonnage used is based on the average historical yard waste and residential refuse tonnage collected by the City from 2009, 2010 and 2011.
3. As shown in Table 1-15, 1,808 tons represents the average annual yard waste tonnage diverted from the City from 2009 to 2011.
4. The analysis assumes that if the City decides to dispose all yard waste in the City landfill and the City will cancel its contract with Kanza and incur no annual diversion cost.

The sensitivity analysis shown in Table 1-17 shows that the City's annual cost of disposal would decrease if the City's yard waste is disposed in the landfill or if the City diverts a greater volume of yard waste. A savings of approximately \$23,930 could be achieved annually if the tons currently diverted to Kanza were landfilled. By disposing of the 1,808 tons of yard waste currently diverted and increasing the tons landfilled, the landfill disposal cost would decrease by \$0.80 per ton. Conversely, if the City were to increase the level of yard waste diverted by 347 tons the City would save \$11,995 on disposal and processing annually. However, an increase in diverted yard waste would increase the landfill disposal cost by \$0.16 per ton.

Additionally, SAIC evaluated the effect the three yard waste scenarios listed in would have on the life of the landfill. Based on the tonnage assumption of 75,940 tons in 2012<sup>2</sup> and an annual growth in tonnage of 1 percent, SAIC estimates the landfill life will be extended by one year with increased diversion, and shortened by one year if the City begins to landfill the yard waste currently being diverted by City crews.

<sup>2</sup> SAIC accounted for the loss of McPherson County tonnage, reducing the annual landfill tonnage from approximately 97,500 tons in 2011 to 75,593 tons in 2012.

### Additional Options to Divert Yard Waste

As an alternative to Kanza or disposing of the City's yard waste, the City can mulch the yard waste material at the City landfill. The City can contract with the City's current chipping contractor and convert the yard waste material to mulch. SAIC recommends the City estimate the quality of the mulched material. The City can then determine if the mulched material would be best used at the landfill during wet weather, at City parks or to be provided to the City residents. Additionally, the City can investigate the possibility for the City to co-utilize the material with the Kanza operation. Table 1-18 provides SAIC's analysis of the annual financial cost of mulching the City's yard waste material.

**Table 1-18**  
**Annual Cost of Mulching Yard Waste Material**

Yard Waste Processing	Mulching at City Landfill
City curbside tonnage	1,808 tons
Tons processed per hour	45 tons/ hour <sup>1</sup>
Hours Needed	40 hours
Cost of grinding per hour	\$574 <sup>1</sup>
Annual processing cost	\$23,044 <sup>2</sup>

1. The grinding throughput and cost per hour was sourced from Fox Brothers, the City's current grinding processor
2. The annual processing cost does not include the cost of purchasing a screener to produce higher quality mulch. The purchase cost of a screener will range from \$100,000 - \$140,000.

As shown in Table 1-18 the annual cost of processing the material at the City landfill is \$23,004 as compared to the annual cost of \$72,765 to process the material at Kanza, or the annual cost of \$62,522 to dispose of the yard waste in the landfill. Based on the analysis in Table 1-18, the City can decrease yard waste costs by mulching the yard waste on City landfill property. It is important to note that the City should identify an end use or a market for the mulch. If the City is unable to find an end market, processing the yard waste would not be practical.

If the City implements a mulching operation at the City landfill, the City should monitor the annual cost of utilizing a private contractor to grind City yard waste. If the volume increases substantially, it could become financially beneficial for the City to invest in a grinder; however, the City does not currently collect enough material to warrant the capital investment of grinding equipment.

As shown in Tables 1-17 and 1-18 the City has the multiple options for yard waste that would generate cost savings. These changes include; landfilling yard waste being diverted, diverting an increased volume of yard waste, or mulching the yard waste material at the City landfill. However, as the City owns the landfill and has an interest in maintaining a low disposal cost per ton, the diversion or disposal of yard waste is a policy decision to be made by the City Manager and City Commission.

## 1.9 Key Findings and Recommendations

This section contains SAIC's key findings and recommendations related to the current curbsort recycling program and yard waste program. SAIC emphasizes that the analysis in this section focuses on the current recycling and yard waste systems; subsequent sections of this report will analyze options to increase material recovery and decrease cost by transiting to a different type of system.

### 1.9.1 Recycling Program Key Findings and Recommendations

#### 1. Healthy Volume Generated from Participating Curbsort Customers

The recycling program generates a healthy volume of recyclables per participating curbsort customer. Participating households are recycling 356 pounds of material annually. Based on SAIC's experience, this volume is in the typical range of established recycling programs.

Additionally, the curbsort material has minimal contamination, as drivers inspect material at the point of collection and have the ability to not collect contaminated material. This operational aspect of curbsort collection ensures the City collects high-quality recyclable material.

#### 2. Low Volume of Recyclables Captured City-wide

The City currently has a 5.9 percent subscription rate in the curbside recycling program among City customers and 5.0 percent subscription rate City-wide. The low participation rate is typical of subscription-based recycling programs. In addition, the average volume generated per household from all City customers is 21 pounds. The low volume collected across all households is typical for subscription programs.

#### 3. High Cost of Recycling and Yard Waste Collection

Based on SAIC's experience with cost of service and operation reviews for other municipalities, SAIC identified the following costs as higher than typical collection cost:

- Recycling Collection: \$12.89 per household per month
- Yard Waste Collection: \$2.93 per household per month

#### 4. Collection Efficiency is Reasonable Given the Manual Nature of Curbsort Program

The City's drivers collect approximately 27 households per hour on-route. Other cities with curbsort programs have averaged 43 homes per hour; however, Salina's operation is constrained by the low subscription rate for the program. Cities that are able to reach a level of 43 homes per hour have universal programs and better set out density. Low collection efficiency is the primary disadvantage of curbsort collection systems. For instance, in a fully automated cart-based collection system, drivers can collect between 125 and 150 homes per hour.

Based on SAIC's analysis the City has a high collection efficiency ratio of 83 percent, meaning the drivers effectively maximize the daily on-route collection time.

## 5. Current Operation Routes Are Sized Appropriately

Based on the current program's productivity, the City needs exactly one route for the 855 households currently served by the recycling program. The current route is sized to collect the City's weekly recycling set outs and allow for 25 percent vehicle downtime for maintenance.

## 6. Opportunities to Increase Material Recovery by Increasing Customers

SAIC found the City has a subscription rate of approximately 5.9 percent among City customers. The volume of material collected is a reflection of the low subscription rate. Among the 855 participating residents the City has a high set-out rate of 77 percent. The strong set-out rate and recovery of material per participating households illustrates that there is a healthy level of participation among the City customers subscribing in the curbside recycling program. However, the 5.9 percent of the customers participating are unable to divert a significant volume of recyclable material. Based on this data, SAIC recommends the following:

- The City should implement a universal recycling program. Implementing a universal recycling program will allow the City to achieve the volume and set-out density needed to maximize the efficiency and success of a curbside recycling operation.
- The City should establish a City recycling rate goal. SAIC recommends the City consider outlining recycling and diversion goals for the yard waste and recycling programs if the City chooses to continue providing these services. By setting a goal for the City residents and staff alike have a goal to encourage recycling and capture a larger volume of recyclable material.
- Increasing the level of public education outreach to residents will positively impact the level of diversion. SAIC recommends that in addition to leaving literature, the City track households with improper set-outs and contact residents via phone or house visit.

## 7. Current Processing Location Does Not Have Additional Capacity

Images is a recycling collection and processing facility that is centrally located in the City. The location of Images is landlocked, and the company cannot expand to ensure adequate space for the collection vehicle to tip material. The City and Images have successfully engineered a system to regularly tip material at this location; however, the location is not intended for nor is it ideal for the tipping of a collection vehicle. The following lists SAIC's key findings and recommendations regarding the City's recycling processing.

- If the City increases the volume of material accepted in the curbside program, the City's recycling program will require a larger processing facility. Based on discussions with Images and City staff, the capacity of the current processing location is limited to accepting the current curbside program's level of recyclables. If the City increases the volume of material collected the processor will need to expand to accommodate the increased volume or the City will need to utilize a different recycling processor.

- The facility is limited to accepting source-separated material. Curb-sort collection allows material to be collected source-separated, which is consistent with the processor's operation; however, if the City were to pursue a different collection method a different processing facility would need to be identified.
- The City should pay a processing fee and receive revenue sharing from its recyclable processor for the recyclable materials collected. The City currently does not pay a processing fee nor does the City receive revenue sharing from the sale of recyclable materials. This ensures that the City has no risk relative to the recycling commodity market; however, simultaneously the City receives no benefit from the sale of the collected recyclables. The sharing of the revenue generated from the recyclables is an advantage to the City as it provides a direct financial incentive for the City to increase recycling.

## 1.9.2 Yard Waste Program Key Findings and Recommendations

The City operates a curbside collection program to divert yard waste from the landfill. The City diverts approximately 10 to 13 percent of the material annually generated by City residents. Although the yard waste program is successfully diverting a healthy volume of material from the landfill, this diversion of material adversely affects the City's landfill disposal cost per ton. SAIC's findings are as follows.

### 1. The Current Cost of Providing Curbside Yard Waste Collection is High

The current cost of yard waste composting per month is reasonable at \$0.42 per household. The cost of yard waste collection of \$2.10 per household per month is the driving factor of the high cost for curbside yard waste collection.

### 2. Increasing the Type and Level of Materials Accepted Will Decrease Cost

If the City were able to increase the volume of yard waste diverted to Kanza by 347<sup>3</sup> tons annually, the City's collection operations would realize a savings of \$11,995 on disposal cost. By increasing the volume of tons diverted from the landfill, the City's landfill disposal cost will increase by \$0.16 per ton. The City can achieve an increase in tons diverted by decreasing the occurrence of yard waste being comingled with refuse collection and pursuing the possibility of Kanza accepting larger yard waste, such as branches and brush.

### 3. Yard Waste Material Could Be Cost Effectively Landfilled

If the City landfilled the 1,808 tons of yard waste currently diverted to Kanza, the City would realize an annual savings of approximately \$23,930 on disposal cost since it would not incur a cost at Kanza. Increasing the volume of tons disposed of in the landfill by disposing of the 1,808 tons of yard waste currently diverted would decrease the landfill disposal cost by \$0.80 per ton. Although the City can experience savings in disposal cost and reduce the landfill disposal cost per ton by landfilling the City's yard

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<sup>3</sup> Based on the analysis shown in Table 1-17, the volume in which the organics processing cost per ton is less than the disposal cost per ton (2,155 tons) minus the average volume of organics historically diverted in the City (1,808 tons).  $2,155 \text{ tons} - 1,808 \text{ tons} = 347 \text{ tons}$

waste material, disposing of the City's yard waste will drastically decrease the City's current recycling rate. The diversion or disposal of yard waste material is a policy decision to be made by the City Manager and City Commission.

#### **4. Yard Waste Could be Cost Effectively Mulched at City Landfill**

As an alternative to Kanza or disposing of the City's yard waste, the City can mulch the yard waste material at the City landfill. The annual cost of processing the material at the City landfill would be approximately \$23,044 as compared to the annual cost of \$72,765 to process the material at Kanza, or the annual cost of \$62,522 to dispose of the material. It is important that City identifies a use or a market for the mulch that would result from this operation.

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## Section 2

# ALTERNATIVE RESIDENTIAL RECYCLING OPTIONS

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### 2.1 Overview

In this section SAIC provided an analysis of alternative options for the City to provide curbside recycling service to residential customers. SAIC analyzed both collection and processing options. SAIC estimated the costs for the following collection options:

- **Curb-sort (source separated) recycling, using 18-gallon bins:** In a curb-sort program, residents would be required to separate material according to each material type when they set out material in their recycling bins. The driver would sort material set out by residents into different compartments on the collection vehicle. This would be similar to the current subscription-based program being operated by the City.
- **Dual-stream recycling, using 18-gallon bins:** In a dual-stream program, residents would set out material in two categories within their recycling bins. All paper materials, including newspaper, magazines, cardboard, and other paper would be set out together and all other materials (e.g. containers), such as plastic, aluminum, and glass, would be set out together. The collection crew would collect material at the curb and place paper material into one side of a split-bodied truck and containers into the other side.
- **Single-stream recycling, using 96-gallon carts:** In a single-stream program, residents are not required to pre-sort material. They place all recyclable materials commingled into their recycling cart. Collection crews place all recyclable material into the body of the collection vehicle.

SAIC assumed that the collection options would be City-wide programs (i.e. universal). In a universal program, all residents automatically receive recycling service and the fee is included in their monthly sanitation bill. Residents may elect to not participate in the program, but their monthly sanitation bill will not change. SAIC compared the cost of the alternative collection options to the status quo program of subscription-based, curb-sort recycling, as evaluated in Section 1 of this report.

Recyclable materials must be processed at a Material Recovery Facility (MRF) before being sold to end users. The three alternative collection options (source separated, dual-stream, and single-stream) all require a different type of MRF to process material. Some cities utilize MRFs that are owned and operated by private companies whereas other cities choose to develop and operate city-owned facilities. In Table 2-1, SAIC summarizes the processing options that SAIC evaluated for each collection option and outlines whether a private or City-owned MRF was evaluated for each collection option.

**Table 2-1**  
**Summary of Collection and Processing Options Evaluated**

Collection Option	City MRF	Private MRF	Description
Curb-sort	Yes	Yes	SAIC evaluated use of the current contractor (Images) to process material. SAIC also evaluated the cost for a City-owned source separated processing facility for curb-sort.
Dual-stream	Yes	No	SAIC evaluated the cost for a city-owned, dual-stream MRF. There are no private dual-stream MRFs within hauling distance for the City.
Single-stream	No	Yes	SAIC identified two private, single-stream MRFs within a 115-mile radius of the City. Because of the availability of private facilities, as well as the significant capital cost to develop a single-stream MRF, SAIC did not evaluate the cost for a City-owned, single-stream MRF.

SAIC summarized the cost estimates for all options at the conclusion of this section and provided key findings and recommendations based on the results of the analysis.

## 2.2 Collection Options

SAIC utilized its Proprietary Collection Model to project the collection costs for curb-sort, dual-stream and single-stream collection. SAIC compared the cost of these alternative collection options to the cost of the status quo system. Table 2-2 summarizes the three alternative options as well as the status quo system.

**Table 2-2**  
**Collection Options**

Option	Enrollment	Container	Frequency	Vehicles
Status quo	Subscription	18-gallon bin	Weekly	Kann curb-sort truck
Curb-sort	Universal	18-gallon bin	Weekly	Kann curb-sort truck
Dual-stream	Universal	18-gallon bin	Weekly	Manual, split bodied truck
Single-stream	Universal	96-gallon rolling cart	Every-other-week	Fully-automated truck

For this analysis, SAIC evaluated both the collection cost and administrative cost for each collection option. A detailed description of the collection vehicles required for each collection option may be found in Section 2.2.1.

### 2.2.1 Assumptions

SAIC utilizes a variety of assumptions to project the cost for solid waste collection service. The majority of these assumptions are based on SAIC's industry knowledge and experience in completing solid waste collection work for numerous local governments nationwide. The assumptions include items, such as:

- Financing costs;

- Collection vehicle costs;
- Staffing costs;
- Number of daily routes; and
- Disposal costs.

All of the assumptions used to model the City's recycling collection operation are based on the most up-to-date information available. It is important to note that the solid waste industry is operating within a dynamic environment and as assumptions change in the future, the collection costs are likely to also change. For instance, in the event there is a change in the cost of collection vehicles, the model assumptions would need to be adjusted. Key assumptions are discussed in the following sections.

### Household Account Information

SAIC developed the model to give a cost overview of the different options at a specific point in time. According to data provided by the City, the City provided service to 14,604 households in 2011, which represents approximately 85.7 percent of the households City-wide. SAIC used this household number as the basis for the cost estimates in the model. Because the report is presented as a snapshot, it does not incorporate growth projections for the City. However, SAIC discusses the impact of population growth on the collection and processing system in subsequent portions of this section.

### Recovered Material

SAIC made assumptions regarding the quantity of material that would be recovered through universal curbsort, dual-stream and single-stream programs based on industry experience and working with recycling programs in the Central region of the United States.<sup>1</sup> The model accounts for a low, high, and average tonnage volume for each collection option. Table 2-3 provides the volume of material SAIC included in the model.

In SAIC's experience, the ease of participation on the part of the resident has a direct impact on the volume of recyclables generated by the recycling program. As such, SAIC assumed that the highest recyclable tonnage would be generated by the single-stream option and the lowest recyclable tonnage would be generated by the source separated curbsort option.

The recycling volumes shown in the table include contamination, which is also called residue. Contamination, or residue, consists of material that is mistakenly set out by residents that is not recyclable. In addition, residue includes the portion of the recyclable stream that cannot be recovered and sold due to inherent inefficiencies in the processing system.

Source separated and dual-stream programs typically have low residual rates since drivers are able to identify and reject contaminated set outs at the curb. Dual-stream

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<sup>1</sup> Specifically SAIC has evaluated recycling programs in Kansas, Oklahoma, Arkansas, Louisiana, Texas and Arizona.

programs typically have a slightly higher contamination rate than curb-sort source separated programs due to the automated nature of the sorting process. Single-stream programs typically have the highest residue rates since collection crews are not able to identify contaminated set outs at the curb. However, even though single-stream programs have a higher residual rate than other types of programs, they normally still result in higher recycling rates since more material is set out.

**Table 2-3  
Annual Material Recovery Assumptions**

Recovery	Status Quo	Curb-Sort	Dual-Stream	Single-Stream
Participation	Subscription	Universal	Universal	Universal
Contamination Rate <sup>1</sup>	<1%	2%	5%	13%
Recovered material (lbs/household) <sup>2,3</sup>	349 - 433	100 - 300	250 - 450	300 - 500
Recovered material (total tons) <sup>2</sup>	149 - 153	730 - 2,191	1,826 - 3,286	2,191 - 3,651
Curbside Recycling Rate <sup>4</sup>	0.9-1.0%	4.5% - 13.6%	11.0% - 19.8%	12.1% - 20.2%

1. Contamination rate assumptions are based on SAIC industry experience
2. Recovered material assumptions shown here include contamination
3. The recovered material in the Status Quo is reflective of historical City data. All other scenarios are assumptions based on SAIC's industry knowledge.
4. The curbside recycling rate is determined using the following calculation for each recycling collection operation: (Program Recyclables)/ (Program Recyclables + Yard Waste + City Collected Refuse). Table 2-23 provides a detailed explanation of the City's recycling rate, including the diversion of yard waste collected.

### Collection Efficiency

SAIC determined the number of required routes using the Proprietary Collection Model. The model includes the assumptions listed below regarding how drivers spend their day.

- Pre-trip inspection – 10 minutes
- Morning meeting – 5 minutes
- Time to route and from route to yard – 24 minutes (12 minutes each)
- Lunch – 30 minutes
- Breaks – 30 minutes
- Post-trip inspection – 15 minutes
- Re-fueling – 20 minutes
- Hours worked per day – 8 hours

Based on the current schedules kept by the City's collection crews, the crews do not take breaks or stop collection for lunch. This is a result of the City's incentive program wherein drivers are paid on a task-based system. The drivers may leave for the day when all routes have been completed and are guaranteed pay for 40-hours of work. SAIC accounted for two 15 minute breaks and a 30 minute lunch for drivers, although it is the collection workers option to not take time for breaks or lunch. Based on the current daily schedules of the collection crews, SAIC identified the amount of time

available for daily collection to adequately develop the route size for each collection option. Table 2-4 provides the size of routes for the different collection options. This information is a key factor in determining the route sizing and cost for different collection operations.

**Table 2-4**  
**Number of Daily Routes Needed Based on Different Collection Systems**

	Status Quo	Curb-Sort	Dual-Stream	Single-Stream
Average route size	231	551	1,044	835
Collections/route <sup>1</sup>	178	248	574	584
<b>Routes needed</b>	<b>0.7</b>	<b>5.3</b>	<b>2.8</b>	<b>1.8</b>
<b>Routes rounded</b>	<b>1.0</b>	<b>6.0</b>	<b>3.0</b>	<b>2.0</b>

1. Based on a 45% set out rate for curb-sort, a 55% set out rate for dual-stream and a 70% set out rate for single-stream. The amount shown accounts for the number of customer served per route, per day, accounting for the varying set out rates of each program.

A task-based program is beneficial for collection configurations that are manual and physically demanding. The incentive program encourages efficiency among workers and helps attract quality personnel. However, the current task-based program is not common for automated single-stream recycling programs, as automated collection is not as physically demanding.

### Staffing

Table 2-5 shows SAIC's staffing cost assumptions.

**Table 2-5**  
**Staffing Cost Assumptions (per employee) <sup>1</sup>**

Position	Salary	Benefits <sup>2</sup>	Total
Driver	\$32,968	\$13,411	\$46,379
Worker/ Driver	\$31,408	\$12,777	\$44,185
Worker	\$28,496	\$11,592	\$40,088
Enforcement Personnel <sup>3</sup>	\$32,968	\$13,411	\$46,379

1. Based on 2011 actual salary data for the City's Sanitation staff.

2. Based on the City's historical and planned costs the employee benefits are 41% of the salaries.

3. SAIC assumed an enforcement officer would have the same compensation as a driver.

The table summarizes the cost per employee by type of position. Assumptions regarding the number of staff per position are listed below.

**Table 2-6  
Staffing Requirements (per daily route)**

Position	Status Quo	Curb-Sort	Dual-Stream	Single-Stream
Driver	1	1	1	1
Worker	-	-	2	-

In addition to the staff shown in Table 2-6, SAIC accounted for one full time enforcement personnel for the single-stream program. As previously discussed, single-stream programs do not allow for collection crews to inspect set outs prior to collection. Therefore, many communities have implemented enforcement measures to ensure that residents are properly informed of the requirements of the recycling program. Enforcement personnel visually inspect carts for contaminated material. For one-time offenders, enforcement personnel typically leave educational information. However, cities have also elected to remove containers from certain households if they repeatedly contaminate the recyclable stream.

SAIC assumed that no enforcement personnel would be needed for curb-sort or dual-stream because drivers and workers can reject contaminated material at the curb.

### Vehicles

There is a possibility that the current rear loaders in the City's fleet could be retrofitted to accommodate single-stream collection, but this would be an interim solution until new vehicles could be purchased. If the City pursues this interim scenario, the City may utilize the current rear loaders to collect single-stream material. SAIC would like to note that utilizing the same vehicles for both refuse and recycling collection will require vehicles to be washed out after refuse routes. SAIC included capital cost for new vehicles in the cost estimates for the collection options.

As noted in Table 2-2, SAIC assumed the City would utilize Kann curb-sort vehicles for curb-sort collection, manual split body rear-loaders for dual-stream collection and fully-automated vehicles for single-stream collection. Figure 2-1 shows an example of these vehicles.



**Figure 2-1: Examples of Curb-Sort, Split Body and Fully-Automated Vehicles**

Table 2-7 shows the capital cost and maintenance cost estimates for the collection vehicles.

**Table 2-7**  
**Vehicle Cost (per vehicle)**

Vehicle	Curb-Sort	Split Body Rear-Loader	Fully- Automated
Purchase Price	\$210,000	\$165,000	\$255,000
Useful Life	7	7	7
Amortized Annual Cost <sup>1</sup>	\$30,000	\$23,571	\$36,429
Annual Maintenance Cost	\$7,900	\$8,400	\$16,800
Annual Vehicle Cost	\$37,900	\$31,971	\$53,229

1. The City generally purchases vehicles with cash. Therefore, SAIC did not include interest in the amortization of the collection vehicles.

SAIC estimated the purchase price of each vehicle based on historical vehicle pricing. SAIC utilized the City's historical vehicle maintenance cost and SAIC's industry experience to develop the annual maintenance costs shown in Table 2-7.

The City will need back-up vehicles to run routes consistently, allowing for front-line vehicles to experience downtime due to vehicle repair and maintenance time. SAIC assumed a 25 percent back-up ratio for the recycling collection vehicles. Additionally, SAIC assumed that used vehicles would be used for back-up and that back-up vehicle purchase and maintenance costs would be 50 percent of the new vehicle purchase and maintenance costs.

SAIC also developed assumptions for the cost of fuel per recycling route. SAIC utilized the actual fuel cost of the City's solid waste and recycling operation to develop a fuel assumption. Based on the City's historical fuel cost, SAIC assumed a fuel cost of \$11,700 per single-stream and dual-stream route and \$8,000 per curb-sort route. The cost for the curb-sort route is expected to be less than more automated routes because the vehicle has less moving parts and idles for a majority of the curb-sort route.

The City will incur an increased insurance cost per vehicle. SAIC developed annual insurance costs for the proposed recycling operations by utilizing quotes from the City's insurance provider. Based on the proposed vehicles for each operation, SAIC assumed an insurance cost per vehicle of \$1,087 per automated side loader, \$763 per split body rear-loader, and \$916 per manual Kann curb-sort truck.

### Containers

For a curb-sort or dual-stream program, SAIC assumed the City would continue to use the 18-gallon bins from the current program. However, the City would need to purchase additional bins for customers that are not currently participating in the curb-sort program. SAIC assumed that 16 percent of the residents would require more than one bin, based on the current portion of households utilizing multiple bins for the status quo program. The City's current recycling bins cost approximately \$10.50 each, including the lid. SAIC amortized the cost of the recycling bins over a five year period for an annual cost of \$41,236. SAIC assumed the City will use debt to initially

purchase the bins needed to start a universal collection program; correspondingly SAIC included a five percent interest rate on debt.

For a single-stream program, SAIC assumed the City would provide each household with a 96-gallon rolling cart. SAIC assumed a per-cart cost of \$56.50, based on the City's current cost of carts.<sup>2</sup> The carts are amortized over a ten-year period, as most industry carts include a ten-year warranty. SAIC assumed the City will use debt to initially purchase carts needed for a universal collection program, and accounted for a five percent interest rate on debt.

Alternatively, the City has a fund for solid waste management incentives that could be utilized to purchase capital items, such as bins and carts for the curbside recycling operation. For every \$100,000 of capital cost for the curbside recycling program that is sourced from the solid waste management incentives fund, the residential monthly cost of recycling service decreases by \$0.07 per household for the first ten years of the program. For example by funding the full cart purchase cost of \$866,382 from this fund the City can decrease the monthly cost of service by \$0.64 per household. If the City pursues a dual-stream or curb-sort program the City can fund the full bin purchase cost of \$178,532 from the solid waste management incentives fund and decrease the residential monthly cost of service by \$0.24 per household for the first five years of the programs. Utilizing the solid waste management incentive fund to decrease the initial impact of capital cost on rates will only affect the cost of service in the recycling programs in the first five to ten years, but will be incurred in later years of the program to account for bin and cart replacement. The recycling program costs provided in this report section assume the City will use debt to purchase recycling containers and has not assumed any funding contributions from the solid waste management incentives fund.

### Administration Costs

SAIC included administrative costs in the cost estimates in order to provide a full understanding of the costs for the alternative recycling programs. SAIC assumed the administrative cost will remain the same as under the current program, with the exception of including one enforcement personnel for the single-stream program and increased public education budget to raise awareness about programmatic changes for all three alternative programs. The analysis accounts for \$3.00 annually per household for public education for all alternative options.

## 2.2.2 Collection Summary

SAIC identified the personnel and equipment levels needed to provide universal collection service under the three alternative recycling options. Table 2-8 provides a summary of the operational requirements of each program.

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<sup>2</sup> SAIC used the City's historical cart purchase cost of \$56.50 per-cart. SAIC would expect if the City were to purchase a large volume of carts for the roll-out of a new recycling program the cart cost would be closer to \$50.00 per cart. SAIC utilized the City's historical cart cost to ensure the financial analysis was conservative.

**Table 2-8  
Operational Requirements**

Cost	Curb-Sort	Dual-Stream	Single-Stream
Daily Routes <sup>1</sup>	6	3	2
Personnel <sup>2</sup>			
Driver	7	4	3
Laborer	-	7	-
Enforcement Personnel	-	-	1
Vehicles <sup>1</sup>			
Front-line	6	3	2
Back-up	1 <sup>3</sup>	1	1

1. The routes and vehicle counts were rounded up, leaving some excess routing and vehicle capacity. For example, SAIC projects the universal curb-sort program will use 5.3 front-line vehicles a day, allowing 0.7 of a vehicle's time to serve as a back-up.
2. Includes front-line personnel and a 25 percent back-up ratio.
3. SAIC assumed the back-up vehicle in the universal curb-sort operation would be curb-sort vehicle currently being operated in the status quo program.

SAIC organized the collection cost into three different cost categories:

- Personnel
- Vehicles and Equipment
- Administration

Table 2-9 summarizes the collection cost associated with the three alternative collection options.

**Table 2-9  
Annual Collection Cost**

Cost	Curb-Sort	Dual-Stream	Single-Stream
Personnel	\$324,655	\$466,134	\$185,517
Front-line Vehicles	\$227,400	\$95,914	\$106,457
Back-up Vehicles	\$ -	\$15,986	\$26,614
Containers	\$41,236	\$41,236	\$112,200
Vehicle Fuel and Insurance	\$53,496	\$38,764	\$26,661
Administration and Office Supplies	\$23,722	\$23,722	\$23,722
Public Education	\$43,812	\$43,812	\$43,812
<b>Annual Cost</b>	<b>\$714,322</b>	<b>\$725,569</b>	<b>\$524,984</b>
Monthly Cost/ Household	\$4.08	\$4.14	\$3.00

As shown in Table 2-9, single-stream provides a collection cost savings as compared to curb-sort and dual-stream collection. However, processing cost must be taken into account when evaluating a recycling program's financial feasibility. Processing costs are discussed in the following section.

## 2.3 Processing Options

SAIC also analyzed the cost for private and municipal processing options for the City's alternative recycling options. This section includes cost for the City to process material through private processors as well as the cost to develop a MRF to process materials as a City operation. SAIC based these costs on SAIC's industry knowledge, conversations with regional processors and transportation estimates from local trucking companies.

SAIC evaluated multiple processing options including:

- **City-owned Single-Stream MRF-** Based on the City's proximity to private single-stream MRFs and the City's projected volume of recyclable materials, SAIC did not complete a detailed financial evaluation of a City-owned single-stream MRF.
- **Private Single-Stream MRF-** SAIC conducted market research of the processing cost for single-stream options in the Salina area. Additionally, SAIC evaluated the cost of long-hauling material to single-stream private MRFs. SAIC identified two single-stream MRFs within 115 miles of the City. The volume of recyclable material that will be generated by the City is not sufficient for the City to develop an internal long-haul operation for transport to these facilities.
- **City-owned Dual-Stream MRF-** SAIC evaluated the cost for the City to construct and operate a City-owned MRF. SAIC accounted for the facility construction, equipment, personnel, and operation and maintenance (O&M) costs of the facility.
- **Private Dual-Stream MRF-** SAIC did not include the processing cost for a dual-stream private MRF since the closest dual-stream MRF to the City is located in Tulsa, Oklahoma. Based on SAIC's industry experience, long-hauling material 260 miles is not a financially feasible option for processing recyclables.
- **City-owned Source Separated MRF-** SAIC evaluated the cost for the City to construct and operate a City-owned MRF. SAIC accounted for the facility construction, equipment, personnel, and operation and maintenance (O&M) costs of the facility.
- **Private Source Separated MRF-** SAIC evaluated the cost of processing the material at the City's current recycling processor, Images. The projected volume for the universal curb-sort collection is likely too much for the current location; however, Images would be able to process the City's material if it were able to locate a larger area to stage and process material.

Based on SAIC's assessment of the possible processing options for the City, four processing options were identified and evaluated in detail. As shown in Table 2-1 SAIC evaluated four different viable processing options for the City.

- Private Single-Stream MRF
- City-owned Dual-Stream MRF
- City-owned Source Separated MRF
- Private Source Separated MRF

The subsequent sections provide a comparison of these processing options.

### 2.3.1 Processing Assumptions

#### Materials Included

SAIC developed assumptions regarding the material that would be included in the alternative programs. The following commodities were assumed to be included in the alternative options:

- Paper (Newspaper, Magazines and Mixed Paper/Mish Mosh)
- Aluminum
- Steel Cans
- Plastic (#1 to #5)
- Glass (Clear, Brown and Green)
- Old Corrugated Cardboard (OCC) and Chipboard

The source separated processor may not be able to accept all of the items listed above, based on the processor's sorting restrictions. For example, the source separated processor may require certain colors of glass to be delivered source separated and therefore each category of glass will require a unique compartment on the curb-sort truck. The curb-sort collection operation is limited to collecting ten separate materials based on the number of compartments on the vehicle.

SAIC conducted this analysis with the assumption that glass would be included as part of the City's program. Glass is a material that historically has not been included in some curbside collection programs but has become more widely accepted in recent years. The processors interviewed by SAIC indicated that they would be willing to accept glass as part of the City's program.

#### Quantity of Material

Each community's curbside recycling program yields a different volume of material as a result of program design, public interest in recycling, and the City's public education efforts. SAIC assumed the average of the volumes listed in Table 2-3 would be generated from the respective curbside collection operations. SAIC based the financial projections on annual residential recycling volume shown in Table 2-10, on the following page.

**Table 2-10**  
**Quantity of Recyclable Material**

	Curb-Sort	Dual-Stream	Single-Stream
Recovered material (lbs/household)	100 - 300	250 - 450	300 - 500
Number of households	14,604	14,604	14,604
Recovered material generated annually (tons)	730 - 2,191	1,826 - 3,286	2,191 - 3,651
Average recovered material generated annually (tons)	1,460	2,556	2,921

These projections include varying levels of contamination, as shown in Table 2-3. The analysis accounts for a contamination level of 13 percent for single-stream, five percent for dual-stream and two percent for curb-sort collection.

### Value of Material

In order to determine the amount of revenue that would be generated from the different collection options, SAIC developed assumptions based on historical commodity pricing in the Southwest region.

## 2.3.2 Processing at a Single-Stream Private MRF

SAIC identified two private single-stream MRFs within a 115 mile radius of the City that are willing and able to accept the City's projected volume of recyclable material.

### Processing Fees

In conversations with single-stream private processors in the area, SAIC obtained planning-level estimates of the processing fees that would be charged to the City. These companies estimated that the processing fees for single-stream material would be between \$0.00 and \$62.50 per ton based on the revenue sharing the City would like to receive. Based on SAIC's experience, these processing cost estimates are reasonable in the Central region of the United States.

### Revenue Sharing

The sale of recyclable materials generates revenue, and it is typical for private MRFs to share a portion of this revenue with the cities that generate the material. The private MRF typically subtracts the processing fee from the revenue generated by the material and shares a portion of the remaining revenue with the city. SAIC developed estimates for the percentage of revenue sharing between the City and private processors based on conversations between SAIC and regional processors. SAIC would expect that revenue sharing for single-stream and dual-stream programs would be between 50 and 60 percent.

### Hauling to Single-Stream MRF

The single-stream MRFs are between 70 and 115 miles away from Salina. SAIC evaluated the transportation cost of long-hauling recyclable material to the private single-stream MRFs. SAIC considered two options, including if the private MRF transported the material or if a local trucking company transported the material. The projected volume of recyclable material is not sufficient for the City to invest in running a long-haul operation; therefore, cost for a City-operated long-haul operation is not included in this analysis.

SAIC estimated that long-haul transportation cost for single-stream material would be as follows:

- Private MRF: \$78,497 annually
- Local Trucking Company: \$83,863 annually

It is important to note that the transportation costs are based on the high volume of recyclables projected to be generated from the single-stream program. SAIC assumed the City would select the lowest cost option and use a private MRF to haul material; however, for a marginal additional cost the City can choose to haul recyclable material with a local trucking company.

### Summary of Processing Cost and Revenues

Table 2-11 summarizes the projected processing cost and revenue if the City were to enter into a service agreement with a private company for processing of single-stream recyclables. SAIC based this analysis on the average projected volume of recyclables to ensure that the financial analysis was conservative.

**Table 2-11**  
**Private MRF Single-Stream Annual Processing Revenue/(Cost)**

Description	Single Stream
Market Material Revenue	\$311,100
Processing Cost	(\$91,275)
MRF Revenue	\$219,825
City Revenue Share (%)	55%
City Revenue Share (\$)	\$120,904
Transportation Cost	(\$78,497)
<b>Single-Stream Processing Revenue/ (Cost)</b>	<b>\$42,407</b>
Revenue/ (Cost) per Ton	\$14.52
<b>Monthly Revenue/ (Cost) per Household</b>	<b>\$0.24</b>

The projected annual revenue of \$42,407 from the sale of recyclables can be applied to offset the cost of the collection operation; although the decision on how allocate the revenue from the sale of recyclables is ultimately up to the City Manager and City Commission.

### 2.3.3 Processing at Source Separated Private MRF

SAIC evaluated the potential for the City to continue to utilize its current processor, Images, under a source separated program. Images is a privately owned source separated MRF in the City. Currently, Images' location inhibits the operation from accepting the volume of material a City-wide curb-sort collection program would capture. However, if the City initiates a competitive procurement process, Images could propose to be the processor, assuming they elect to re-locate or re-organize and increase the company's capacity to process material.

#### Processing Fees and Revenue Sharing

Currently Images does not charge the City a processing fee or provide the City with any percentage of the revenue generated from the City's recyclables. SAIC assumed these current terms between the City and Images would continue under the alternative source separated recycling option

#### Summary of Private MRF Processing Cost and Revenues

Table 2-12 summarizes the projected processing cost and revenue if the City were to enter into a service agreement with Images for processing of source separated recyclables. As shown in the table, the City would neither incur a cost nor receive any revenue based on the assumption that the agreement with Images would remain unchanged in a City-wide program.

**Table 2-12**  
**Private MRF Source Separated Processing Revenue/(Cost)**

Description	Source Separated
Market Material Revenue	\$281,848
Processing Cost	\$ -
MRF Revenue	\$281,848
City Revenue Share (%)	0%
City Revenue Share (\$)	\$ -
Transportation Cost	\$ -
<b>Source Separated Processing Revenue/ (Cost)</b>	<b>\$ -</b>
<b>Revenue/(Cost) per Ton</b>	<b>\$ -</b>
<b>Monthly Revenue/(Cost) per Household</b>	<b>\$ -</b>

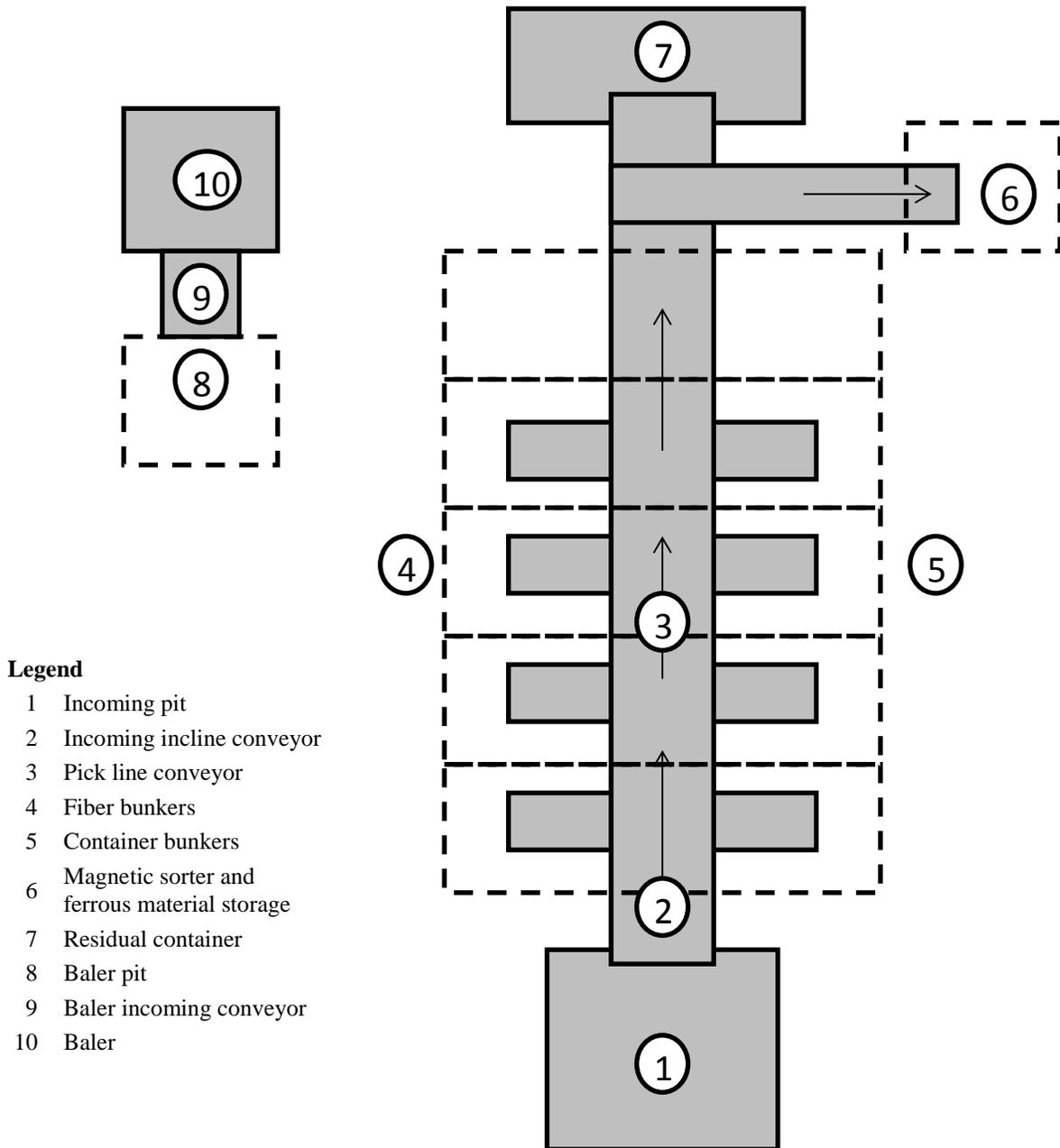
### 2.3.4 Processing at City-Owned MRF

In this section, SAIC provides the City with a cost estimate to own and operate a dual-stream and source separated MRF. The cost estimates in this section are conceptual estimates and are intended to provide the City with an appreciation of the magnitude of costs for a MRF.

The general trend for MRFs across the United States is single-stream. However, since there are two, large-scale, privately owned single-stream MRFs near the City, SAIC limited this analysis to cost estimates for a dual-stream MRF and a source separated MRF.

**Description of Dual-Stream MRF Material Flow**

Figure 2-2 provides a layout and process flow description for a potential City-owned dual-stream MRF. The figure provided is a conceptual layout used to develop a conceptual cost estimate for a dual-stream MRF. Figure 2-2 is not reflective of the detailed engineering design work that would be needed to develop a City MRF.



- Legend**
- 1 Incoming pit
  - 2 Incoming incline conveyor
  - 3 Pick line conveyor
  - 4 Fiber bunkers
  - 5 Container bunkers
  - 6 Magnetic sorter and ferrous material storage
  - 7 Residual container
  - 8 Baler pit
  - 9 Baler incoming conveyor
  - 10 Baler

Figure 2-2: Dual-Stream City-Owned MRF Layout

Due to the City's relatively low current and projected volume of recyclable tonnage, the dual-stream MRF design shown in Figure 2-2 has a manual sorting line. A more automated MRF would allow the facility to process more tons per hour; however, based on the City's projected tonnage volumes, an automated MRF configuration would not be fully utilized.

### Description of Source Separated MRF Material Flow

A source separated MRF would be utilized if the City chooses to operate a curb-sort collection program. The implementation of source separated MRF would not require a sorting operation, as the materials would be sorted by the collection staff at the curb. The source separated MRF would require multiple bunkers for the loose material to be stored until enough quantity is collected for the material to be baled. Figure 2-3 illustrates the general facility layout necessary for a source separated MRF.



Figure 2-3: Source Separated MRF Loose Material Bunkers, Baler Pit and Baler Conveyor

For both the dual-stream and source separated MRFs the City will need to store the baled material until a large enough volume accumulates to market, sell and haul the material to end users. SAIC recommends that aluminum material be kept inside the secure MRF facility, as aluminum is a high-value commodity that can be subject to theft. Bales of fiber material should be stored under cover to prevent the material from potential degradation from exposure to the elements. SAIC recommends that plastics and steel also be stored in a covered area; however, these materials are less susceptible to environmental factors and can be stored in an open-area if needed. Figure 2-4 provides an example of covered material storage.



Figure 2-4: Covered Baled Material Storage

### Capital Cost

According to the *Materials Recycling and Processing in the United States Yearbook and Directory, 2007-2008* (MRF Directory), the average cost to construct a single-stream MRF is \$101,000 per ton of daily processing capacity (in 2006 dollars). This is based on an average of over 236 facilities across the United States. The cost of constructing a dual-stream MRF is less than a single-stream MRF due to the decreased level of sorting and automation. On average, single-stream MRF capital costs are 10 to 20 percent more than dual-stream facilities of similar size. For this analysis SAIC assumed the dual-stream MRF capital costs were 15 percent lower than single-stream capital costs, resulting in a dual-stream construction cost of \$85,850 per ton of daily processing capacity (in 2006 dollars). Adjusting the number to 2012 dollars, using an inflation rate of 2.5 percent, results in a dual-stream capital cost of \$99,560 per ton of daily processing capacity.

Capital costs for a source separated MRF would be less than a dual-stream MRF due to a decreased level of automation and sorting equipment. The material accepted at a source separated MRF is sorted when accepted and requires minimal sorting by the facility. SAIC developed the source separated facility cost by decreasing the dual-stream MRF cost by 20 percent, resulting in a source separated construction cost of \$79,648 per ton of daily processing capacity.

Table 2-13  
Capital Cost Estimate – High Tonnage

Year	Dual-Stream			Source Separated		
	Annual Tonnage	Daily Tonnage	Total Capital Cost <sup>1</sup>	Annual Tonnage	Daily Tonnage	Total Capital Cost <sup>1</sup>
2011	3,286	12.6	\$1,254,452	2,191	8.4	\$669,041
2015	3,341	12.8	\$1,274,364	2,227	8.6	\$684,971
2020	3,410	13.1	\$1,304,232	2,274	8.7	\$692,935
2025	3,482	13.4	\$1,334,100	2,321	8.9	\$708,865

1. Land costs were not accounted for in this cost. This analysis is based on the facility being built on existing City-owned property.

Based on the information in Table 2-13, SAIC would expect a dual-stream facility to cost approximately \$1,334,100 and a source separated facility to cost approximately \$708,865. SAIC based the capital cost of the facility on the projected volume the facility will process in 2025, in order to ensure the facility will be adequately sized over its useful life. While the useful life of the building and site may exceed 15 years, a 15-year useful life is typical for processing equipment. The annualized number for the facility was reached using a 15 year amortization and a 5.0 percent interest rate. The annual payment for a dual-stream facility would be \$128,530 and the annual payment for a source separated facility would be \$68,294.

### Rolling Stock

Both MRF processing operations will need a skid steer with a bucket to transport loose material from the bunkers to the baler. A fork-lift will also be needed to transport the baled materials to the baled material storage area. Based on the low volume of material the City-owned MRF would process, SAIC accounted for a single skid-steer with interchangeable attachments so the one piece of machinery can serve as a skid-steer with a bucket and a fork-lift. Operationally, SAIC does not anticipate a problem with using one piece of equipment for processing material; however, this assumption may need to be revisited with increased volumes of material.

**Table 2-14**  
**City-Owned MRF Rolling Stock Cost**

Equipment	Purchase Cost	Useful Life	Annual Cost
Skid-steer with Bucket and Fork-lift	\$32,600	10	3,260

### Personnel

SAIC prepared an estimate of the personnel needed to operate a dual-stream and source separated MRF. Based on SAIC's industry knowledge and internal database of city-owned MRFs in the United States, SAIC assumed a processing rate of five tons per hour for dual-stream processing and 13.4 tons per hour for source separated processing. SAIC developed the processing rates by utilizing other city-owned MRF processing rates and industry experience. Table 2-15 provides the time per week the MRF needs to operate in order to process the material collected by the City.

**Table 2-15**  
**MRF Level of Operation**

	Dual-Stream	Source Separated
Processing Speed (tons/ hour)	5.0 tons/hour	13.4 tons/hour
Volume of Material (2011 tons) <sup>1</sup>	2,556 tons	1,460 tons
Annual Sorting Hours	511 hours	109 hours
Operating Days Per Week	1.2 days	0.3 days

1. Tonnage volumes based on average material projection.

The MRF facility will need to maintain a minimum of one staff during the week to supervise and manage the acceptance of curbside recyclable material. However, depending on the level of material collected the facility will only need to process

material for an average of 1.2 days per week under the dual-stream operation and less than half a day per week for the source separated operation. These levels of personnel are reflected in the cost provided in Table 2-16.

The challenge with staffing the MRF operation is that the processing demands do not require full-time staffing. For operating the dual-stream MRF, the City can utilize temporary staff for weekly pick line sorting. SAIC recommends that temporary staff are used exclusively for sorting activities. Temporary workers should not operate machinery as a safety and liability precaution.

To effectively staff the source separated MRF, the City can potentially source staff from other operations or divisions within the City. If City staff does not have the availability or flexibility to operate the MRF as needed, the City can staff a part time equipment operator at the MRF who can also work on other Department of Public Works projects when not needed at the MRF.

**Table 2-16**  
**City-Owned MRF Personnel Cost**

Personnel	Quantity	Days Worked/ Week	Annual Cost
<b>Dual-Stream MRF</b>			
MRF Supervisor/ Equipment Operator <sup>1</sup>	1	5.0	\$56,328
Pick line Sorters <sup>2</sup>	5	1.2	\$29,391
Annual Dual-Stream MRF Personnel Cost			<b>\$85,719</b>
<b>Source Separated MRF</b>			
MRF Supervisor <sup>1</sup>	1	5	\$56,328
Equipment Operator <sup>3</sup>	1	0.3	\$3,033
Annual Source Separated MRF Personnel Cost			<b>\$59,361</b>
<ol style="list-style-type: none"> <li>1. Based on the average salary and benefits for a Solid Waste Supervisor</li> <li>2. Based on the cost per hour for Sanitation Temporary Workers. The hourly cost of a City Sanitation Temporary Worker \$11.50 including salary and benefits.</li> <li>3. Based on average salary and benefits of a Sanitation Worker/Driver.</li> </ol>			

### Hauling to End Markets

The City will incur cost for hauling baled material to end users. SAIC assumed the City would haul material in a 48 foot transfer trailer. The volume of material will not produce full transfer trailers of each commodity on a regular basis. As such, SAIC assumed that transfer trailers would on average be 80 percent full. Based on these inputs and the high material projections, SAIC developed the following transportation cost for hauling material to end markets.

**Table 2-17  
Annual Transportation Cost**

	Source Separated	Dual-Stream
Annual Tons of Recyclables <sup>1</sup>	2,147	3,122
Transfer Trailers		
Annual Number of Bales	3,116	4,532
Total Number of Transfer Trailer Loads	98	143
Cost per Transfer Trailer Load	\$475	\$475
Transfer Trailer Cost Subtotal	\$46,747	\$67,974
Glass Loads <sup>2</sup>		
Number of Glass Loads	25	37
Cost per Load	\$459	\$459
Glass Cost Subtotal	\$11,620	\$16,897
<b>Total Annual Transportation Cost</b>	<b>\$58,367</b>	<b>\$84,871</b>

1. Volume is net of residual since residual material will not be transported to end users.

2. Assume glass is transported in 40 cubic yard containers as glass cannot be baled.

As shown in Table 2-17 the hauling cost of dual-stream material to end users would be approximately \$84,871 annually and the hauling cost for source separated material would be approximately \$58,367 annually. The glass material is not able to be baled and is best transported via a 40 cubic yard container. SAIC recommends that the material be taken to a regional single-stream MRF since the closest glass processor is approximately 175 miles away in Kansas City.

### Other Operating and Maintenance Expenses

SAIC provided estimates of operating and maintenance (O&M) cost for a MRF. These conceptual costs provided by SAIC represent a high-level understanding of the cost involved with operating a MRF facility.

**Table 2-18  
Annual MRF O&M Cost**

Cost	Source Separated	Dual-Stream
Equipment Maintenance and Repair	\$47,260	\$88,940
On-site Fuel Usage	\$3,300	\$3,300
Utilities	\$5,280	\$6,600
Miscellaneous Supplies and Maintenance	\$12,000	\$15,000
<b>Total</b>	<b>\$67,840</b>	<b>\$113,840</b>

For this analysis SAIC assumed a disposal cost per ton of residue of \$30.50. Table 2-19 summarizes the disposal cost for source separated and dual-stream residuals.

**Table 2-19  
Residue Disposal Costs**

	Source Separated	Dual-Stream
Residue (tons)	29	128
Disposal Fee	\$30.50	\$30.50
<b>Total Residue Disposal Fee</b>	<b>\$891</b>	<b>\$3,897</b>

### Summary of Private MRF Processing Cost and Revenues

Table 2-20 summarizes the projected processing cost and revenue if the City was to build and operate a City-owned MRF for processing of dual-stream or source separated recyclables. Based on the analysis shown in Table 2-20, a City-owned MRF will not generate processing revenue but will result in a net processing cost for the City.

**Table 2-20  
City-owned MRF Processing Revenue/ (Cost)**

	Source Separated	Dual-Stream
Material Revenue	\$218,848	\$344,685
Operating Cost		
Facility Capital	(\$68,294)	(\$128,530)
Rolling Stock	(\$3,260)	(\$3,260)
Personnel	(\$59,361)	(\$85,719)
O&M	(\$67,840)	(\$113,840)
Residue Disposal	(\$891)	(\$3,897)
Transportation	(\$58,367)	(\$84,871)
Operating Cost Subtotal	(\$258,013)	(\$420,117)
<b>City Processing and Transportation Revenue/(Cost)</b>	<b>(\$39,165)</b>	<b>(\$75,432)</b>
<b>Revenue/(Cost) per Ton</b>	<b>(\$ 26.82)</b>	<b>(\$ 29.52)</b>
<b>Monthly Revenue/(Cost) per Household</b>	<b>(\$0.22)</b>	<b>(\$0.43)</b>

## 2.3.5 Processing Summary

Table 2-21 provides a summary of the processing cost associated with four processing options evaluated.

**Table 2-21**  
**Processing Revenue/ (Cost) Summary**

Material Processing	Source Separated	Source Separated	Dual-Stream	Single-Stream
	Private	City	City	Private
Market Material Revenue	\$218,848	\$218,848	\$344,685	\$311,100
Processing Cost	\$ -	(\$199,645)	(\$335,246)	(\$91,275)
MRF Revenue/ (Cost)	\$218,848	\$19,202	\$9,439	\$219,825
City Revenue Share (%)	0%	100%	100%	55%
City Revenue/(Cost) Share (\$)	\$ -	\$19,202	\$9,439	\$120,904
Transportation Cost	\$ -	(\$58,367)	(\$84,871)	(\$78,497)
<b>Total Processing Revenue/ (Cost)</b>	<b>\$ -</b>	<b>(\$39,165)</b>	<b>(\$75,432)</b>	<b>\$42,407</b>
<b>Revenue/(Cost) per Ton</b>	<b>\$ -</b>	<b>(\$26.82)</b>	<b>(\$ 29.52)</b>	<b>\$14.52</b>
<b>Monthly Revenue/(Cost) per Household</b>	<b>\$ -</b>	<b>(\$0.22)</b>	<b>(\$0.43)</b>	<b>\$0.24</b>

As shown in Table 2-21, by processing the City's material with a private MRF, the City is able to avoid processing cost and generate revenue from the sale of recyclable material. Under both of the City-owned MRF processing options, the City incurs a processing cost.

## 2.4 Options Summary

Below is a financial summary of all the options evaluated by SAIC.

**Table 2-22**  
**Recycling Options Cost Summary**

	Source Separated			Dual-Stream	Single-Stream
	Status Quo	Universal	Universal	Universal	Universal
	Private MRF	Private MRF	City MRF	City MRF	Private MRF
Collection Cost	\$132,202	\$714,322	\$714,322	\$725,569	\$524,984
Processing and Transportation Cost	\$-	\$-	\$39,165	\$75,432	(\$42,407)
<b>Total Cost</b>	<b>\$132,202</b>	<b>\$787,365</b>	<b>\$753,487</b>	<b>\$801,001</b>	<b>\$482,577</b>
Monthly Cost/ Household	\$12.89	\$4.08	\$4.30	\$4.57	\$2.75
Cost /Ton	\$869	\$489	\$516	\$313	\$165

Table 2-22 shows that the City can provide universal collection to City residents at a cost lower than the status quo. Single-stream is the most cost effective program on a per household basis and a per ton basis.

## 2.4.1 Impact on Recycling Rate

Table 2-23 summarizes the effect that the alternative options would have on the City's recycling rate.

**Table 2-23**  
**Projected Residential Recycling Rate**

	Status Quo	Curb-Sort	Dual-Stream	Single-Stream
Recyclables (curbside)	152	716 - 2,147	1,734 - 3,122	1,906 - 3,176
Yard Waste	1,657	1,657	1,657	1,657
Refuse	13,940	13,376 - 11,945	12,358 - 10,970	12,186 - 10,916
<b>Residential Generation <sup>2</sup></b>	<b>15,749</b>	<b>15,749</b>	<b>15,749</b>	<b>15,749</b>
<b>Residential Recycling Rate</b>	<b>11.5%</b>	<b>15.1% - 24.2%</b>	<b>21.5% - 30.3%</b>	<b>22.6% - 30.7%</b>

1. Analysis assumed yard waste collection will continue at its historical volume.
2. Residential generation represents all material generated by residents for disposal or diversion, including refuse, recyclables and yard waste collected by City collection crews. This amount excludes material collected from special collections or collected by other City departments.

SAIC projects that the recycling rate would increase by transitioning residential recycling to one of the three universal curbside programs. The largest potential increase in the City's recycling rate is with a single-stream program.

## 2.4.2 Effect on Other Solid Waste Operations

SAIC evaluated the potential savings the City could experience in other solid waste operations with the implementation of a curbside collection program. There are two areas the City can realize increased efficiencies through residential curbside recycling collection: disposal costs and vehicle efficiency from economies of scale.

### Disposal Cost

Operating a landfill involves mostly fixed costs. Therefore, the disposal cost per ton is affected by the annual volume accepted at the landfill. As recyclable tonnage is diverted from the landfill, the disposal cost per ton at the landfill will increase. Although diversion of recyclable material can have a negative effect on the landfill disposal cost per ton, the curbside refuse collection operation will experience a decrease in annual disposal cost by reducing the annual volume of refuse disposed. Table 2-24 provides a financial analysis of the effect of diverting additional recyclables from the landfill for both the City's landfill and the City's refuse collection operation.

**Table 2-24**  
**Effect of Recycling on Landfill Disposal Cost and Sanitation Disposal Cost**

Costs	Status Quo	Projected Landfill Tonnage Based on	
		Low Recycling	High Recycling
Curbside Recycling Volume	152 tons	716 tons	3,176 tons
<b>Landfill Disposal Cost</b>			
Annual Landfill Operating Cost	\$2,625,909	\$2,625,909	\$2,625,909
Annual Landfill Tonnage	75,940 tons	75,377 tons	72,916 tons
<b>Disposal Cost/ Ton</b>	<b>\$34.58</b>	<b>\$34.84</b>	<b>\$36.01</b>
<b>Change in Disposal Cost/ Ton</b>	<b>N/A</b>	<b>\$0.26</b>	<b>\$1.43</b>
<b>Curbside Refuse Disposal Cost</b>			
Annual Curbside Refuse Tonnage	13,940 tons	13,376 tons	10,916 tons
<b>Annual Disposal Cost</b>	<b>\$482,019</b>	<b>\$465,994</b>	<b>\$393,102</b>
<b>Decrease in Annual Disposal Cost</b>	<b>N/A</b>	<b>\$16,024</b>	<b>\$88,917</b>

Despite the increase in the disposal cost per ton at the landfill, it is SAIC's opinion that diversion of recyclables from the landfill is a positive activity. As shown in Table 2-24, by diverting recyclable material from the landfill, the curbside operation's disposal cost will decrease by \$16,024 to \$88,917. Additionally, diverting recyclable materials will prolong the life of the City's landfill.

### Vehicle Efficiency

The City can achieve an increased level of efficiency by utilizing similar vehicles in multiple collection operations. The recycling operation that will allow collection operations to cross-utilize vehicles is single-stream collection. On a back-up and emergency basis, the single-stream recycling collection operation can share automated side-load vehicles with an automated refuse collection operation. By having two collection operations with similar trucks, the City can achieve efficiencies by sharing back-up personnel and equipment.

### 2.4.3 Recycling Incentive Programs

Some communities in the United States have introduced recycling incentive programs as part of their curbside recycling programs. A recycling incentive program is implemented in order to increase participation in the recycling program and capture a greater volume of recyclable material. These programs can be successful with proper public education and community interest. However, it is important to note that including a recycling incentive program can increase the cost of the recycling program by approximately \$0.50 to \$1.00 per household per month. For example, the City of Wichita, Kansas historically had a recycling incentive program that costs approximately \$1.00 per household per month.

Based on the alternative recycling options projected costs, a recycling incentive program would increase the monthly cost per household to approximately \$3.25 to \$5.57 depending on the option. In a public outreach survey of Salina residents

completed by SAIC and Fort Hays University, which is discussed in more detail in Section 3 of this report, residents indicated they were unlikely to support a cost of more than \$4.00 for curbside recycling. Based on the cost estimates for the alternative recycling options in this section, by including an additional cost for a recycling incentive program, the monthly cost of curbside recycling becomes financially unattractive to residential customers.

The public outreach survey also measured interest in various recycling incentive programs such as pay-as-you-throw or a rebate program. A pay-as-you-throw system is designed to allow residents to pay a lower refuse rate for disposing of less. In a pay-as-you-throw program, typically, residents have the option to choose between two to three different sizes of refuse carts. Smaller refuse cart customers pay less per month, and residents can transition to a smaller refuse cart by recycling more. Alternatively, a rebate system is a program that rewards customers that recycle to earn credits on their solid waste bill. For instance, residents can receive a monthly or quarterly rebate if they participate in the program. The results of the public outreach survey shows that City residents are more inclined towards a pay-as-you-throw or rebate system rather than a rewards system.

Based on the results of the public outreach survey SAIC recommends that if the City chooses to implement a recycling incentive program, the City implements a rate structure that reflects a pay-as-you-throw or recycling rebate design rather than investing in a recycling rewards program.

Below SAIC has provided a table that summarizes key aspects of the different recycling incentive programs.

**Table 2-25  
Recycling Incentive Program**

Recycling Incentive Program	Program Capital Requirements	Advantages	Disadvantages
Pay-as-you-throw	Multiple refuse cart sizes Universal curbside recycling	Associates cost of disposal with high waste generation	City must maintain larger variety of cart inventory Manage rate structure with multiple base rates
Recycling Rebate	RFID reader	Provides opportunity for rate decrease for recycling	City must manage data Rebate will change annually based on commodity pricing
Recycling Rewards	RFID reader	Typically managed by external company Involves local companies	Requires high level of customer involvement and participation

## 2.5 Key Findings and Recommendations

### 2.5.1 Universal Collection Decreases Cost of Service

The current subscription curb-sort program has a cost of service of \$12.89 per subscribing household per month. The City charges subscription curbside recycling customers a \$10.00 start-up fee and \$5.15 per month. The City is currently under recovering the cost of providing the subscription curbside recycling program. As shown in Table 2-22 the City can provide a universal recycling program at a decreased monthly cost per household of between \$2.75 for single-stream and \$4.57 for dual-stream. Implementing a universal recycling program allows the collection operation to achieve a greater level of efficiency and provide curbside recycling to City customers at a lower cost of service than the subscription curb-sort recycling program.

### 2.5.2 Single-Stream Provides Benefits Over Curb-Sort or Dual-Stream

All of the alternative recycling options are feasible for the City and provide curbside recycling at a decreased cost from the current system. **SAIC recommends that the City move toward a universal single-stream recycling program.** Single-stream provides recycling to residents at the lowest cost and can provide many non-financial benefits to the City, such as:

- Single-stream recycling with rolling carts provides greater potential to maximize material recovery and the recycling rate in the City.
- Single-stream provides greater flexibility to service multi-family and commercial customers with rolling carts if the City chooses to expand in this area.
- Automated recycling vehicles provide greater operational efficiency as well as increased safety for recycling drivers.
- The general trend of recycling programs in the United States is towards single-stream. Therefore, if the City transitions to universal curb-sort or to dual-stream, there is a risk that further program changes will be needed in the future.
- There are currently two privately owned and operated single-stream MRFs in the area, eliminating the need for the City to invest in designing and building a City-owned MRF.

### 2.5.3 Contracting with a Private MRF is the Recommended Option

Because of the City's relatively low recycling volumes, it is financially beneficial for the City to contract with a private MRF rather than construct and operate its own MRF. By utilizing a private MRF to process City recyclables, the City has the potential to generate revenue from recyclable materials. On the other hand, SAIC's financial analysis reflects the City will incur a net cost to process and transport the City's recyclable materials at a City-owned and operated MRF.

## 2.5.4 Multiple Material Transportation Options Available

Based on SAIC's analysis and market research, there are two options to long-haul single-stream material to a private MRF. SAIC evaluated the transportation cost of long-hauling recyclables to the private MRFs using the private MRF's transportation and local trucking companies. The transportation cost provided by the private MRFs is more competitive than the local truck company; however the variation in price between the two transportation providers was marginal. SAIC recommends the City contract with the lowest cost option, a private MRF. However, the City can make a policy decision to support a local trucking company at a marginal additional cost.

## 2.5.5 Increased Diversion Will Affect Other Solid Waste Departments

The disposal cost per ton at the landfill varies based on the volume of tonnage annually accepted. As shown in Table 2-24, an increased level of diversion in the City will increase the landfill disposal cost per ton. The landfill disposal cost per ton is projected to increase by \$0.26 under a curb-sort collection program and \$1.43 per ton under a single-stream collection program, representing approximately a 0.7% to a 4.1% increase in the landfill disposal cost per ton.

The diversion of the recyclable materials collected through a universal recycling program, will positively affect the annual disposal cost of the City's refuse curbside collection operation. As shown in Table 2-24, the curbside refuse operation will save between \$16,024 and \$88,917 in annual disposal cost from diverting recyclable material, depending on the recycling collection program implemented.

The City is in a unique position, in which it must decide the importance of the cost of disposal at the landfill relative to a reduction in the City's curbside refuse cost and the City's recycling efforts. This decision is ultimately a policy decision and is up to the discretion of the City, City Manager and the City Commission.

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## Section 3

# PUBLIC OUTREACH RESULTS

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### 3.1 Overview

SAIC and the Docking Institute at Fort Hays University (Docking Institute) worked together to develop and implement a survey to gauge Salina residents on their current recycling practices and their interest in changes to the City's recycling program. This report section describes the survey efforts by SAIC and the Docking Institute and summarizes the findings of the public outreach survey. A copy of the survey instrument is provided in Appendix A of this report.

### 3.2 Survey Design

SAIC and the Docking Institute coordinated to develop the survey instrument. The survey was designed based on SAIC's and the Docking Institute's previous survey experience and SAIC's solid waste industry knowledge. The survey instrument measured the following:

- Current Refuse Provider
- Participation in Current Curbside Recycling Program
- Participation in Recycling Drop-off
- Interest in the Program Configuration of:
  - Curb-sort
  - Dual-stream
  - Single-stream
- Interest in a Three Cart Program for Collecting Refuse, Recycling and Yard Waste
- Acceptance of a Universal Recycling Program
- Financial Sensitivity to Increased Costs for Curbside Recycling
- Interest in Programs to Incentivize Recycling including:
  - Recycling Rewards
  - Pay-as-you-throw
  - Rebate Program
- Sources of City Education and Outreach Information

### 3.3 Survey Execution

The Docking Institute completed a telephone survey from June 19, 2012 to July 5, 2012 of 703 randomly selected households in the Salina city-limits. Of the 703 households contacted, 421 participated in the survey, representing a 60 percent response rate. The survey's level of participation and the survey sample size represent a margin of error of +/- 4.8% based on a 95 percent confidence level.

### 3.4 Analysis

This section provides the survey results and supplementary analysis.

#### 3.4.1 Current Recycling Practices

##### Current Hauler

Initially, the survey identified if residents received collection from the City or a private hauler. Figure 3-1 provides the survey results from this question:

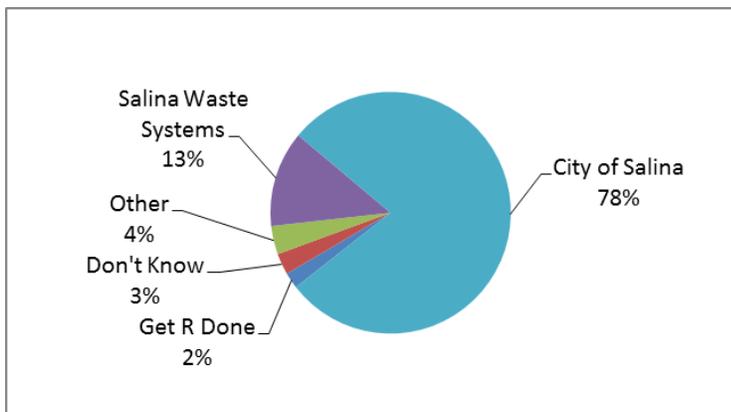


Figure 3-1: Refuse Hauler

It was important to gain insight from City customers but also private hauler customers. Currently approximately 14 percent of City residents are served by a private hauler. The City residents surveyed reflected a proportionate amount of City and private hauler customers based on the current market shares in the City. This metric supports that the survey results are representative of City residents.

##### Curbside Recycling Participation and Set-out Frequency

As part of the survey it was important to gain an understanding of the current level of involvement in recycling from survey participants. Figure 3-2 shows that 11 percent of respondents are currently participating in the City's subscription curb-sort program.

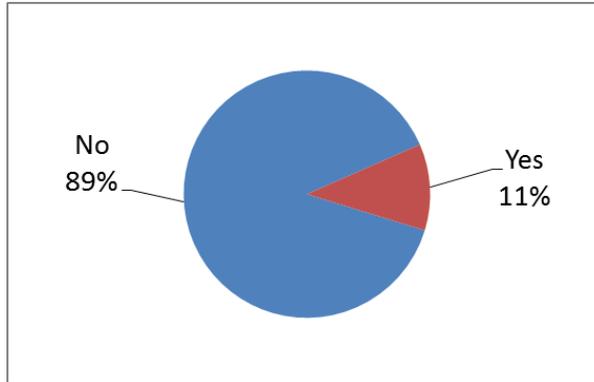


Figure 3-2: Subscription Curbside Recycling Participants

Of survey respondents currently participating in curbside recycling, a follow up question was asked to gauge set-out frequency in the current recycling program. Figure 3-3 provides a graph reflecting the set-out frequency of the current curbside recycling participants.

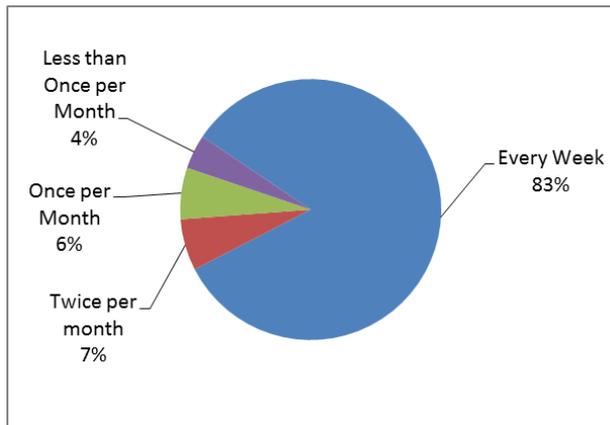


Figure 3-3: Recycling Set-out Frequency

The survey results reflect that 83 percent of the citizens participating in the subscription curbside recycling program set-out material every week. This set-out level is typical for a subscription program as residents that sign up and pay to receive the service have shown an interest in recycling by subscribing to the program.

### Recycling Drop-off Participation

Citizens that do not participate in the current curbside recycling program have the ability to take their recyclable material to local drop-off locations. The City's current processor, Images, has a centrally located drop-off facility that is open to the public. In addition, other drop-off locations are available in the community for various materials. The survey measured the number of residents that utilize local drop-off locations, without specifying which locations are utilized by residents. The result is shown in Figure 3-4.

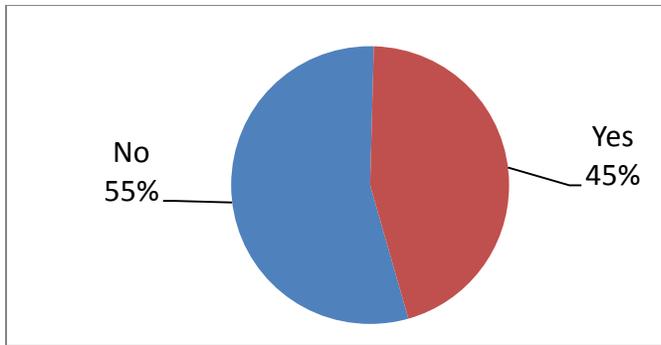


Figure 3-4: Residents Utilizing Recycling Drop-off

As shown in Figure 3-4, 45 percent of residents surveyed utilize local recycling drop-off locations. This information provides the City with the residents' level of interest in recycling. Based on the level of residents currently recycling, SAIC believes a City-wide recycling program would be well received by residents.

To gain further insight into the residents current level of recycling, the survey asked residents who are currently using recycling drop-off locations about the frequency with which they take material to a local recycling drop-off location.

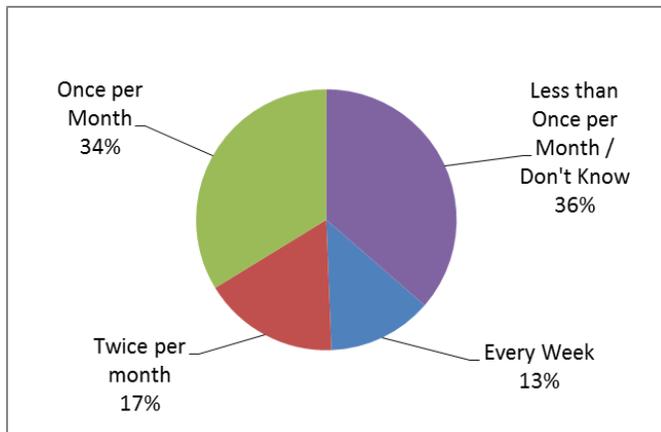


Figure 3-5: Recycling Drop-off Frequency

Based on the survey responses shown in Figure 3-5, 64 percent of the residents participating in recycling drop-off visit the drop-off locations once a month or more. This data does not provide information regarding the volume of material each resident takes to the recycling drop-off per trip; however, it is likely the volume taken by the drop-off customers is more than an average curbside set-out, based on the additional effort by the customer to drop material off. Based on the information gathered on the participation and frequency of recycling drop-off by residents, SAIC anticipates a universal curbside recycling program would have a healthy level of participation by transitioning the current recycling drop-off customers to curbside customers.

### 3.4.2 Interest in Curbside Recycling Programs

In order to get an understanding of interest in the various programs being assessed by the City in this City-wide Recycling Study, questions were included to gauge residents interest in the various curbside recycling programs.

#### Alternative Program Design

The program options presented to the residents included the following:

- **Curb-sort program** – A recycling bin would be provided and residents would be asked to separate the recyclable material into seven different material types within the bin.
- **Dual-stream program** – One to two recycling bins would be provided to residents where paper and other fibers would be separated from all other recyclable materials.
- **Single-stream cart-based program** – One additional cart would be provided where all recyclable material would be comingled in the cart.
- **Three cart program** – Three carts would be provided to all residents, one for refuse, one for recycling and one for yard waste.

Survey participants were asked to gauge their like or dislike of the various programs based on a one to five scale. Figure 3-6 summarizes the results of the survey questions regarding alternative recycling collection programs.

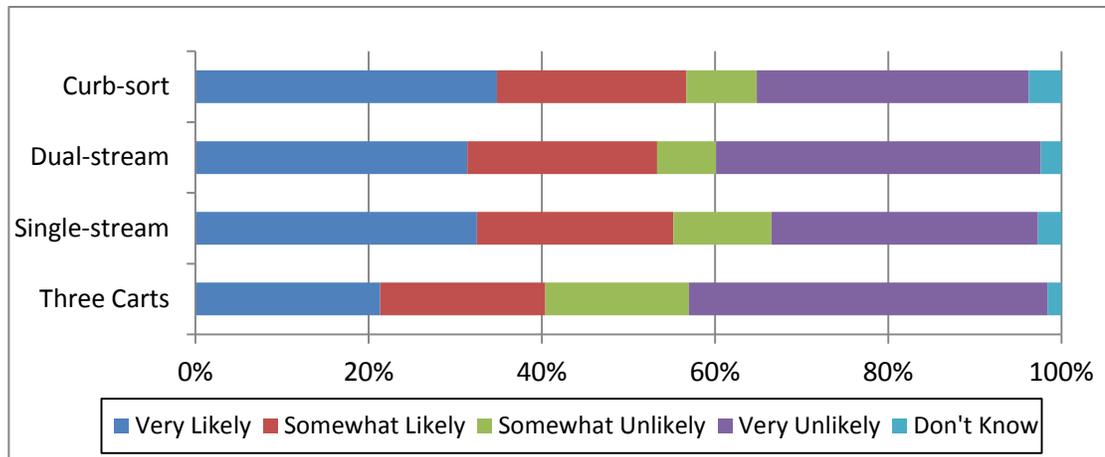


Figure 3-6: Interest in Alternative Collection Programs

Figure 3-6 shows that residents expressed the most support for a curb-sort or single-stream curbside recycling program. SAIC would expect the residents to be comfortable and support a curb-sort system as the City currently operates a curb-sort collection, giving the residents familiarity with the program design. Additionally residents showed a relatively equal amount of support for a single-stream collection program. Resident support of a single-stream collection operation is typical as the

collection method requires the least amount of effort from residents, as no pre-sorting is required.

Dual-stream and a three cart program received the least support from residents. Based on the lack of residential support for this operation and the declining number of dual-stream recycling collection programs in the United States, SAIC would recommend that the City pursue a different curbside program. The three cart program also received the lowest amount of support from residents. The three cart program is a collection configuration that has been developing in the United States in the last five years as it allows recyclables, yard trimmings/organics and refuse to be collected separately. The goal of a three cart program is to divert an increased level of organic material from the waste stream. The City may have interest in implementing the three cart program at a later date; however, based on the unenthusiastic response from residents SAIC does not recommend the City transition to a universal three cart program at this time.

### Universality

As presented in Section 1 and Section 2 of this report, the City can implement a cost effective curbside recycling program if the program is offered on a City-wide basis (i.e. a universal system). A question was included in the survey to determine City residents' reaction to the City providing curbside recycling as part of the base collection service.

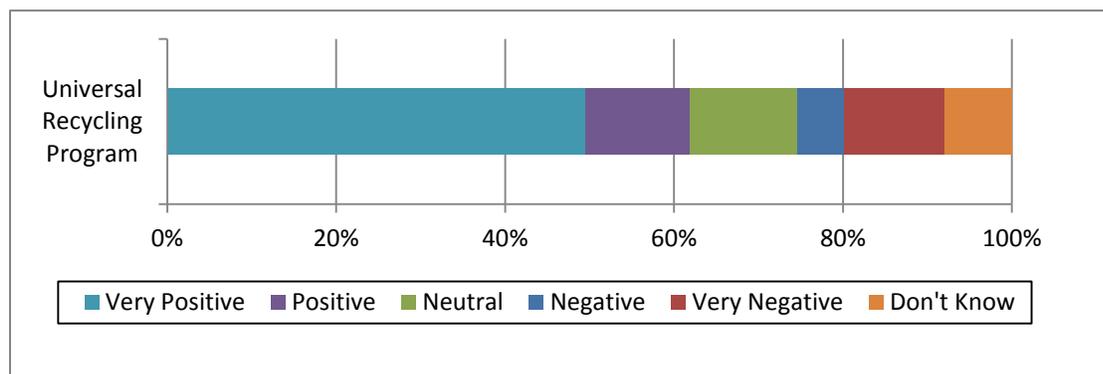


Figure 3-7: Universality of Recycling Program

Survey respondents expressed strong support of a universal recycling program being included as part of the basic collection program offered in the City. As shown in Figure 3-7, approximately 62 percent of residents reported being very positive to positive and 13 percent reported being neutral about curbside recycling being included as part of the City's base collection service. Based on these survey results SAIC believes a universal program would be mostly well received among City residents.

### Program Cost

The City currently operates in an competitive market, in which price is very important to customers. Adding additional services, such as curbside recycling, incurs an added cost to the collection operation which must be passed on to the customers and recovered through rates. The survey inquired on the level of a rate increase residents

would be willing to pay for the addition of a curbside recycling program. Figure 3-8 summarizes residents' responses.

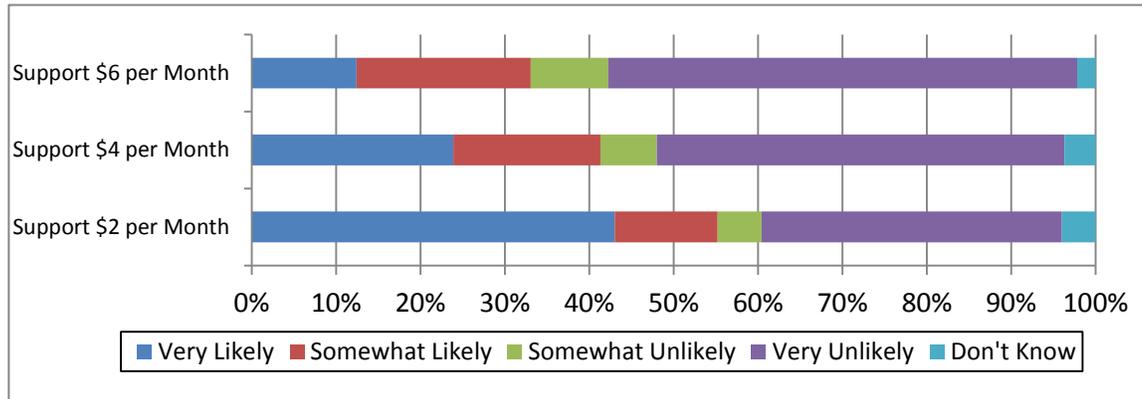


Figure 3-8: Curbside Recycling Program Financial Sensitivity

The responses received from residents indicate that over 50 percent of residents surveyed would be willing to pay an additional \$2.00 per month for a curbside recycling program. With a cost of \$4.00 per month for a curbside recycling program, residents' support drops to approximately 40 percent. Based on the data shown in Figure 3-8, the City can successfully implement a curbside recycling collection program if the monthly cost of the program is around \$2.00 per household per month. Based on the analysis provided in Section 2, the lowest cost at which the City can provide a residential curbside recycling program is \$2.75 per household per month. As shown in Figure 3-8, public opinion indicates between 41 and 55 percent of residents would be very likely to somewhat likely to support a universal recycling program at a cost of \$2.00 to \$4.00 per month.

### Recycling Incentive Programs

The City wishes to evaluate the interest in recycling programs that provide financial incentives for residents to participate in recycling. The survey measured the residents' interest in the following programs:

- **Recycling Rewards** – Provides residents with gift cards at local restaurants for their participation in the curbside recycling program (ex. RecycleBank).
- **Pay-As-You-Throw** – All residents are provided with curbside recycling, and, as residents recycle more material, the volume they dispose will correspondingly decrease. Each resident will have the option to decrease the size of their refuse container and pay a lower cost for a smaller refuse container. Historically, the larger variation in price between the different refuse rates, based on containers sizes, the more incentive residents have to recycle more and dispose of less. However, implementing a large variation in rates results in higher rates to the customers. Implementing a pay-as-you-throw program allows the City to better align the cost of disposal to the residents' monthly rate, and affords residents the opportunity to decrease their refuse bill by increasing the volume of recyclables.

- **Rebate Program** – Residents that participate in the recycling program are provided a credit to their monthly bill, based on the recycling rebate the City receives from the sale of recyclable commodities. It is important to note that to implement a rebate program, the City should conduct a thorough financial analysis to determine the amount of rebate to be awarded. Several key issues to be addressed by the City before implementing a recycling rebate program include:
  - Amount of rebate;
  - Eligibility requirements to receive the rebate;
  - Enforcement actions to ensure proper participation; and
  - Personnel responsible for enforcement.

Figure 3-9 provides a summary of residents' interest in the various recycling incentive programs.

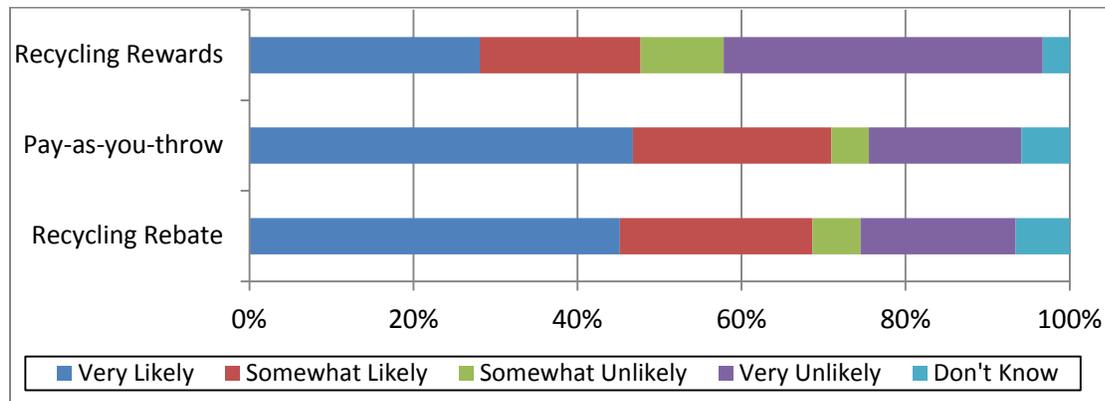


Figure 3-9: Recycling Incentive Programs

Residents expressed the greatest level of interest in a pay-as-you-throw program, with 71 percent of residents supporting a pay-as-you-throw program. Pay-as-you-throw programs are typically implemented in conjunction with a single-stream recycling program. In a pay-as-you-throw rate structure, each resident is provided a 90 to 95 gallon recycling cart and is able to choose from varying sizes of refuse carts (i.e. 32, 65 or 95 gallon). The program encourages people to set-out large volumes of recyclables and small volumes of refuse. This type of program would require the City to maintain multiple sizes of refuse carts and increase the number of refuse customer billing categories.

Recycling rebates received a similar level of support from residents. As shown in Figure 3-8, approximately 69 percent of residents expressed they would be very likely to somewhat likely to support recycling rebates. This program would require collection staff to track the participation of residents in recycling on a house by house basis. This program would be able to be implemented in any of the alternative recycling program options.

The program that received the least amount of support from residents was the recycling rewards program. Based on the data shown in Figure 3-8, SAIC

recommends that if the City implements a recycling incentive program that the City institute a pay-as-you-throw or recycling rebate program.

Implementing a recycling incentive program, such as recycling rewards or pay-as-you-throw, is a rate design decision of how to recover cost and share savings and revenues with residents. The recycling incentive programs discussed in this section are methods on how to incentivize residents to recycle a greater volume of material.

It is important to note that there are additional operating costs associated with implementing a recycling incentive program. Increased operational needs and cost associated with recycling incentive programs include:

- **Data Tracking and RFID tags.** There is an increased level of data collection and processing in order to effectively run a recycling incentive program, which as a result increases the recycling program costs. With the use of radio frequency identification (RFID) tags the labor of collecting the data is significantly diminished; however including RFID tags in containers and installing RFID tags on collection vehicles will provide an added cost to the recycling program. Based on SAIC's previous experience, the cost of carts with RFID tags is typically an additional \$1.00 more than a typical rolling cart cost.
- **Varying Container Sizes and Larger Inventory.** In a pay-as-you-throw program the City will need to maintain an inventory of all container sizes offered in the program. The City would need to maintain a larger inventory of the various sized carts to accommodate the various customer options.
- **Increased Enforcement.** Implementing and monitoring recycling incentive program participation will require an increased level of involvement City staff.

### Public Outreach

If the City decides to make a programmatic change, it will be imperative to the success of the collection program to effectively communicate any changes to City residents. Currently the City uses multiple media to communicate changes and notices to the City residents. To better understand the most effective communication media, the survey asked residents how they receive information from the City. Figure 2-9 provides a summary of residents' responses.

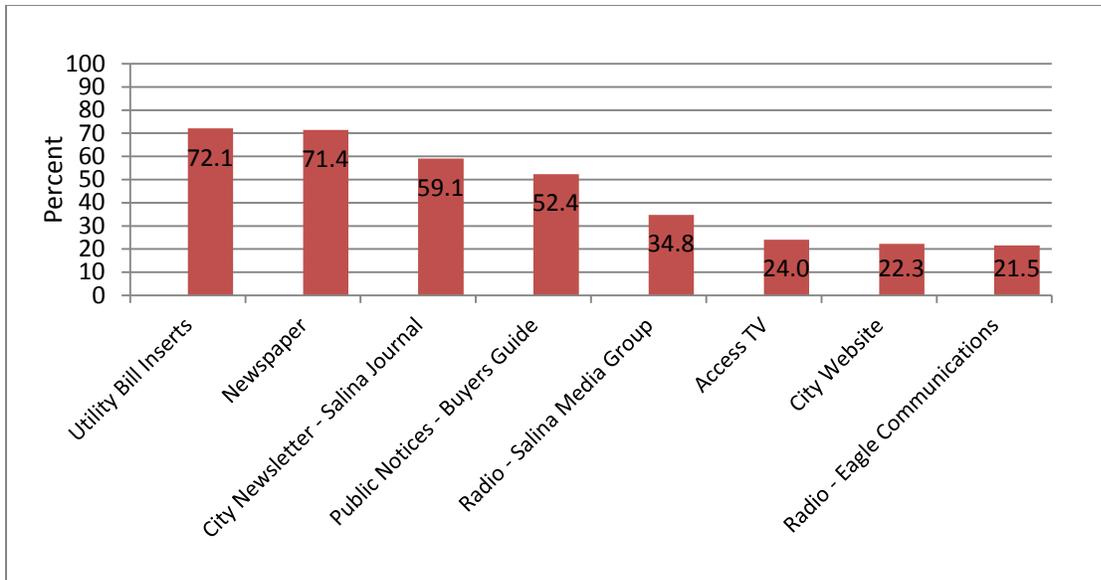


Figure 3-10: Effectiveness of City's Communication Mediums

Public information distributed through utility bill inserts and the newspaper are the most effective methods for the City to communicate information to residents, as both communication methods reach approximately 70 percent of residents. Based on residences' responses, the City is also effectively communicating to residents through the City Newsletter- Salina Journal and Public Notices – Buyers Guide. It is important for the City to utilize various channels of communication when notifying residents of programmatic changes; however, it is important for the City to focus its funds on the most effective means of communication. The public outreach information can be utilized by the City when making programmatic changes and developing an implementation plan.

## 3.5 Key Findings

The public outreach survey has provided valuable insight into the City residents' interest of various recycling programs and financial sensitivity to implementing these programs. SAIC has summarized the key findings from the public outreach survey in this section.

### 3.5.1 Interest in Recycling

The City residents currently have an interest in recycling, which is supported by the current level of subscription curbside recycling in the City and the 45 percent of survey respondents that utilize the recycling drop-off locations. The residents currently utilizing local recycling drop-off locations can be transitioned into a curbside recycling program.

### **3.5.2 Strong Support For Universal Recycling Program**

Survey respondents indicated a strong interest in a universal curbside recycling program, with 62 percent of residents reporting being very positive to positive and 13 percent reporting being neutral to implementing a universal curbside recycling program. This data further validates that City residents have a strong interest in curbside recycling. Based on the results of residents' response to universal recycling, SAIC would anticipate the City could experience a curbside recycling participation rate of up to 75 percent in curbside recycling.

### **3.5.3 Residents Prefer Single-Stream or Curb-Sort Program Design**

Residents expressed the most support for a single-stream or curb-sort recycling program. Resident support for a curb-sort program is likely due to familiarity with the curb-sort program design, as the City currently operates a subscription curb-sort program. Resident support of a single-stream operation is typical as the collection method requires the least amount of effort from the perspective of residents as no presorting is required. Based on the information gathered in this public outreach survey, SAIC expects that a single-stream or curb-sort program would be well accepted by City residents.

### **3.5.4 Residents are Sensitive to Program Pricing**

As discussed previously, 62 percent of residents reported being very positive to positive and 13 percent reported being neutral to including curbside recycling as part of the basic collection program. The survey indicates that 55 percent of residents are very to somewhat likely to pay \$2.00 a month for curbside recycling and 41 percent of residents are very to somewhat likely to pay \$4.00 a month for curbside recycling. The information gathered indicates that to effectively implement a universal curbside recycling program with a majority of City residents' support, the program cost needs to be approximately \$2.00 monthly per household to attain public support from approximately 55 percent of City residents, and should not exceed \$4.00 monthly per household as the public support of the program is forecasted to decrease to 41 percent. Based on the financial analysis presented in Section 2 of the report, a single-stream recycling program's cost at \$2.75 is in line with the \$2.00 to \$4.00 range identified by City residents.

### **3.5.5 Consider Implementing Pay-As-You-Throw or Recycling Rebate Rate Structure**

There was considerably more interest shown by residents in a pay-as-you-throw or recycling rebate rate structure, as compared to a recycling rewards program. This information reflects that residents are willing to participate in recycling and reduce their refuse generation to receive a lower monthly sanitation bill. Recycling incentive programs do require an increased amount of data collection and would require capital

investments to implement, which will result in an increase in operational cost. SAIC has provided discussion on the various recycling incentive programs available in Section 2.4.3 of this report. Based on the cost estimates for the alternative recycling options provided in Section 2, by including additional cost for a recycling incentive program, could make the monthly cost of curbside recycling becomes financially unattractive to residential customers. The decision for the City to pursue a recycling incentive program is ultimately a policy decision to be decided on by the City, City Manager and City Commission.

## Section 4

# IMPLEMENTATION PLAN

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### 4.1 Introduction

Following the analysis conducted in Sections 1 through 3 of this report, SAIC met with a City Project Task Force (PTF) on August 30, 2012. In the workshop SAIC and the City PTF discussed the various collection options and identified the universal single-stream curbside recycling program as the preferred option for the City. SAIC and the City PTF discussed items to be addressed in an implementation plan. This section includes implementation plans to implement a single-stream curbside recycling program, convert the current semi-automated refuse system to a fully-automated collection operation and to make changes to yard waste processing. This report section includes the specific roles, responsibilities, schedules, costs and other organizational issues associated with the recycling implementation plan and the automation of the City's refuse routes.

### 4.2 Development of Recycling Implementation Plan

During the PTF workshop, SAIC presented PTF members with a series of issues that would need to be addressed in an implementation plan. These key issues included:

- Policy decisions;
- Ordinance development;
- Service implementation;
- Vehicle purchase;
- Cart purchase;
- Processing procurement; and
- Public education.

SAIC addressed the general implementation needs of the City as it relates to each of these issues and facilitated discussion among PTF members regarding the specific roles, responsibilities, schedules, costs and other organizational issues associated with each issue. This collaborative process served as the basis for developing the following implementation plan.

The following sections outline the various elements of the implementation plan and the specific implementation steps associated with those elements. At the end of this report section, SAIC has provided a Gantt chart summarizing each action item to be completed in sequence over a specified period of time for the recycling implementation plan.

Based on the time required to complete each of the implementation steps outlined within this section of the report, SAIC would expect a total implementation time

needed for the City-wide recycling program to be a minimum of 18 months once the updated ordinance is adopted.

On July 1, 2011 The State of Kansas passed State Statutes 12-2035 and 12-2036 which outlines the state mandated steps required to initiate a collection operation. The actions required in these Kansas statues include:

- Announce intent to adopts ordinance for universal recycling collection 180 days before adoption of ordinance;
- Provide public notice and hold a public hearing to discuss ordinance 30 days before adoption of ordinance;
- Develop implementation plan 90 days after adoption of ordinance. All local haulers must be permitted to participate in all planning meetings;
- Provide 30 days notice of recycling planning hearings to all local haulers; and
- Commence organized recycling collection service a minimum of 18 months after the adoption of the recycling ordinance.

The implementation plan provided by SAIC in this section is consistent with the requirements outlined in Statues 12-2035 and 12-2036.

## 4.2.1 Policy Decisions

### Developing City Recycling Rate Goal

In recent years, a trend has emerged of states, counties and cities developing recycling rate goals. A City recycling rate goal is an important aspect of a successful recycling program. In Figure 4-1 SAIC has proposed potential recycling rate goals for the City based on the City implementing a single-stream curbside recycling program.



Figure 4-1: Potential Recycling Rate Goal Timeline

In the recycling rate timeline shown above, SAIC based the recycling rate goals on increased recovery through curbside recycling. If the City chooses to implement a more aggressive yard waste program to divert an increased level of organic materials (e.g. yard trimmings, brush, grass, leaves, etc.), the City can revise the recycling rate goals to be more aggressive. Setting a City recycling rate is ultimately a policy decision to be made by the City Manager and City Commission.

### *Roles and Responsibilities*

Development of the City's recycling rate goal will ultimately be up to the City Manger and City Commission. SAIC recommends the City involve the Public Works Department throughout the development of the recycling rate goals as the Public

Works Department will ultimately be responsible for carrying out the work necessary to achieve the recycling goal.

### *Timeline*

The time necessary to develop a recycling rate goal is highly dependent on the amount of discussion the City would like to have regarding the recycling rate goals. SAIC recommends the City have a finalized recycling rate goal by the second month of the implementation plan process.

### *Cost*

The cost of developing a City recycling rate goal is dependent on the amount of staff hours and/or consultant hours the City chooses to utilize in developing a City recycling rate goal.

### **Including Private Haulers in Recycling Implementation and Recycling Contracts**

The City is a competitive market for residential refuse collection. The City competes against private haulers for residential accounts, and the City serves approximately 85 percent of the City. During conversations with the private haulers operating in the City, SAIC noted a mixed level of interest in a universal residential recycling program. A private hauler expressed concern about being able to maintain market share with the added requirement to provide City residents with curbside recycling service. To mitigate the loss of any private hauler's market share from implementing universal recycling, SAIC recommends the City offer a public-private partnership to all of the City's private haulers for collection and/or processing of recyclables. For example, the City would extend private haulers with the option for the City to collect recyclables on behalf of the private hauler if they are unable to collect the material, and the City would be compensated accordingly.

In order to provide a smooth transition to the universal recycling program for both the City and private haulers, SAIC recommends the City include a "piggyback" clause in the City's recycling contracts, allowing the private haulers operating in the City to benefit from the same contract terms. Examples of contracts that could include "piggyback" clauses include; recycling processing contract, long-haul transport of recyclable material contract, vehicle purchase contract, and cart purchase contract.

### *Roles and Responsibilities*

The Public Works Department and the City Attorney should jointly be responsible for considering the potential for any private-public contracts, public-private collaboration or "piggy back" clauses with the City's private haulers throughout the implementation process.

### *Timeline*

SAIC recommends the City communicate to the private haulers the City's interest in collaboration prior to initiating the recycling implementation plan. In the interest of smoothly transitioning the City to a universal recycling program, it is important to invite the private haulers to be involved, when appropriate, during the implementation

plan. This policy issue will need to be considered throughout the duration of the recycling implementation plan.

### *Cost*

SAIC anticipates the City will incur a minimal cost, if any, to collaborate with the City's private haulers throughout the recycling implementation process and allow the private hauler to "piggyback" on the City's public-private recycling contracts.

### **Utilizing Solid Waste Funds for Initial Capital Cost**

The City has a fund for solid waste management incentives that could be utilized to purchase capital items, such as rolling-carts for the curbside recycling program. By using the City's solid waste management fund to finance \$100,000 of the cart capital cost, the City can decrease the residential monthly cost of recycling service by \$0.07 per household for the first ten years of the single-stream program. Utilizing the solid waste management incentive fund to decrease the initial impact of capital cost on rates will only affect the cost of service in the recycling program the first ten years, and will be incurred in later years of the program to account for cart replacement.

### *Roles and Responsibilities*

This is ultimately a policy decision to be made by the City Manger and the City Commission.

### *Timeline*

SAIC recommends the City identify if the solid waste funds will be utilized for cart purchase prior to the ordinance adoption. Cost is a central aspect of public education and outreach and this policy decision will have a direct impact on the monthly program cost to residents.

### *Cost*

SAIC anticipates the City will incur a minimal cost to address the funding source of the recycling carts. By funding \$100,000 of the recycling cart capital cost from the solid waste management initiatives fund, the City can decrease the monthly residential cost of recycling service by \$0.07 per household for the first ten years of the program. The total capital cost for 15,334 recycling carts is estimated at approximately \$866,382. If the City funds the total recycling cart capital cost of \$866,382 with solid waste management incentives funds, the monthly residential cost of recycling service will decrease by \$0.64 per household for the first ten years of the program.

## **4.2.2 Ordinance Development**

The City will need to update or develop a recycling ordinance to address key collection and billing issues related to all recycling services. The ordinance will need to address a variety of issues including, but not limited to, the following:

- Required customer service level;
- Billing practices;

- Container storage and placement;
- Collection times;
- Set-out rules;
- Prohibited actions and materials;
- Quantity limits; and
- Senior/ American Disability Act (ADA) discounts.

There are many existing municipal recycling ordinances that are publicly available and may be of help in developing the framework for the City's ordinance. For example, SAIC has helped North Central Texas Council of Governments develop a "Recycling Ordinance and Building Design Guidelines" report that is publicly available.<sup>1</sup>

#### *Roles and Responsibilities*

Development of a recycling ordinance will primarily be the responsibility of the City's attorney and/or the City's consultant, with input and cooperation, where appropriate, by the Public Works Department, Finance Department, and City officials.

#### *Timeline*

Development of the ordinances would be expected to take three to four months to complete. The development of ordinances will need to occur prior to the procurement processes and should be finalized once the service agreements are officially executed. Adoption of the ordinance by the City Commission would be expected to take no more than an additional two months. The recycling ordinance should be officially adopted prior to the start of service.

#### *Cost*

The City attorney can develop recycling ordinances for the City, or the City can choose to utilize a qualified management consulting firm. The estimated cost for this service would be \$10,000 to \$20,000.

## 4.3 Service Implementation

This section provides the City with an indication of the efforts to implement the various services the City may procure as part of the proposed recycling collection system. There are three primary drivers in the recycling implementation schedule:

- Procurement of collection vehicles and carts;
- Routing of collection routes; and
- Access to processing.

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<sup>1</sup> [http://www.nctcog.org/envir/SEELT/documents/Final\\_Report-Ordinances\\_Guidelines\\_August\\_2009.pdf](http://www.nctcog.org/envir/SEELT/documents/Final_Report-Ordinances_Guidelines_August_2009.pdf)

### 4.3.1 Collection Vehicles

Based on conversations with City staff and collection vehicle manufacturers, the delivery of collection vehicles is anticipated to take six to seven months from the date the order is placed. The delivery date is subject to both the backlog of the chassis supplier (e.g. Peterbilt, Mack, Crane Carrier) and the body supplier (e.g. Heil, McNeilus, Labrie) at the time the order is placed. As the City currently operates a manual collection operation and the proposed recycling program is based on a fully-automated collection operation, SAIC recommends the City receive the vehicles one to three month in advance of the program start date to allow operators sufficient training time. Table 4-1 summarizes the equipment needs for a single-stream recycling collection operation.

**Table 4-1**  
**Estimate Number of Vehicles**

Automated Side Loaders	Number of Vehicles
Frontline Quantity	2
Back-up Quantity	1
<b>Total</b>	<b>3</b>

SAIC has noted that the City currently maintains multiple models and types of vehicles. The City has the potential to increase mechanical and operational efficiency by utilizing a similar or the same vehicle throughout the refuse and recycling collection operation. SAIC recommends the City acquire the same automated vehicles to streamline the City's operational and maintenance knowledge of automated collection vehicles.

#### *Roles and Responsibilities*

Developing the vehicle requirements for the recycling operation should be the responsibility of the Public Works Department, and more specifically the Sanitation Department. Once the specifications of the vehicles needed are developed, SAIC recommends the City's Public Works Department work the City Procurement Office to acquire the most competitive price for the necessary equipment.

#### *Timeline*

A vehicle procurement process can take up to six months to complete. SAIC recommends the City complete the procurement process and receive the vehicles one to three months before the recycling implementation date. This will allow the Sanitation Department sufficient time to test the vehicles and train drivers with the new vehicles.

#### *Cost*

The capital cost of the vehicles required to operate the collection operation are included in the financial analysis provided in Section 2 of this report. Historically the City has completed vehicle procurements at a minimal cost.

### 4.3.2 Carts

Collection carts can typically start being delivered 10 to 12 weeks after the order is placed, followed by another two to six weeks for assembly and delivery to all city residents.

SAIC recommends that the City contract with the container manufacturer to provide for assembly and delivery of the containers. The City would need to provide a secure, paved location where the containers would be staged and stored prior to delivery. The cost for assembly and delivery is typically \$4.00 to \$5.00 per container.

#### Container Purchase

There will be a need to purchase containers for each existing customer, as well as some additional containers to account for growth. Based on the 2011 customer count of 14,604, SAIC recommends the City purchase 15,334 recycling containers to allow for growth and additional containers.

#### Quality Container in a Standard Size

SAIC recommends that the City obtain standard sized containers for recycling services. Having a single size minimizes the actual number of containers that need to be purchased since it eliminates the need to project what size containers customers will select. SAIC recommends that the City use a 96-gallon container for recycling to maximize the volume of material collected from customers and allow the City the flexibility to implement an every-other-week collection schedule.

For residents (e.g. senior citizens or ADA) that prefer a smaller container, the City could offer a smaller size container (e.g. 32 or 48 gallon). However, SAIC recommends the City establish a policy concerning the basis for residents to obtain a smaller container.

#### Utilize Formal Procurement or an Existing Cooperative Purchase Agreement for Purchase of Containers

Procurement options for the City to purchase carts include a City-managed procurement process or utilization of an existing contract for the purchase of containers. For example, there are at least two governmental cooperative purchasing agreements that allow local governments to purchase materials and services (including containers) based on competitive purchasing processes completed by these organizations.

SAIC is familiar with cooperative purchasing agreements for containers through the Houston-Galveston Area Council Buy (H-GAC Buy)<sup>2</sup> and the National Intergovernmental Purchasing Alliance (National IPA)<sup>3</sup>. Cities are able to utilize cooperative purchasing agreements as a contract mechanism to streamline the

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<sup>2</sup> The H-GAC program is available to local governments throughout the United States.

<sup>3</sup> The National IPA contract for containers was based on a formal procurement process completed by the City of Tucson, Arizona. This procurement process also included a detailed review of container performance.

procurement process and obtain a competitive price. SAIC has typically found that the pricing offered through these cooperative purchasing programs are as, or more, competitive than separate procurement processes. It is important to note that the prices listed in these cooperative agreements represent the maximum prices, and can be negotiated. SAIC discusses the process of a City-managed procurement in Section 4.5 if the City prefers to procure carts through a formal procurement process.

### *Roles and Responsibilities*

The Public Works Department should be primarily responsible for developing the cart specifications needed for the City. Once the specifications of the carts are developed, SAIC recommends the City's Public Works Department work with the City Procurement Office to acquire the most competitive price for the necessary quantity of carts.

### *Timeline*

The City should identify the container specifications prior to procuring the necessary carts. If the City chooses to use a cooperative purchasing agreement, SAIC expects this effort would take no more than two months to complete. Alternatively, if the City chooses to procure carts through a formal City-managed procurement process, SAIC expects this effort would take between four and six months.

### *Cost*

There are few direct costs associated with using an existing purchase agreement. The City would need to define its specifications for the cart to ensure whichever cart selected meets the needs of the City. If the City conducts a formal procurement for the carts, SAIC estimates the cost for consultant assistance would be \$10,000 - \$15,000.

## **4.3.3 Routing**

Each collection route should be planned to collect material in the most efficient manner possible. The City may choose to develop macro-level routes, where only the area to be collected for each route is determined. The City may also use routing software, or other methods, to develop detailed daily routes (also known as micro-level or street-level routing). SAIC would expect the routing process to take two to six months, depending on how the City chooses to develop the routes.

### *Roles and Responsibilities*

Developing fully-automated routes for the recycling operation should be the responsibility of the Public Works Department, more specifically the Sanitation Department. The City can choose to utilize a macro-level routing process or a micro-level routing process involving more computer based routing software. Depending on the routing process the City chooses to use, the City may want to involve the City Planning Department, procure routing software or hire routing consultants.

*Timeline*

SAIC recommends the City allow six months to complete the routing process. The City can continue to refine routes after vehicles have been received based on feedback from recycling drivers running practice routes.

*Cost*

The cost of route development will vary depending on the routing processed used by the City. Developing macro-level routes would involve little to no additional cost. A micro-level routing approach could require the City to procure routing software and/or consultants to develop routes. The cost of routing software and/or a routing study can range from \$20,000 - \$60,000.

**4.3.4 Hire Staff**

Collection staff will need to be hired prior to the start of the collection operation to allow drivers to complete necessary City training and fully-automated collection training. SAIC recommends the City hire collection staff one month to two weeks prior to starting the recycling collection operation. Table 4-2 provides the level of staff the City will need to operate an automated single-stream collection program.

**Table 4-2  
Estimate Number of Personnel**

Staff	Number of Full Time Employees (FTE)
Drivers	3
Enforcement Personnel	1
<b>Total</b>	<b>4</b>

*Roles and Responsibilities*

Hiring recycling drivers should be managed by a combination of the Public Works Department and the City's Human Relations Department. If the City pursues automating the refuse operation, the City can consider transitioning the current sanitation worker to recycling drivers.

*Timeline*

To ensure that recycling drivers have sufficient training operating the fully-automated vehicles and are able to become comfortable with the recycling routes, SAIC recommends the City begin the hiring staff one to two months prior to the recycling implementation date.

*Cost*

SAIC anticipates the cost to hire and train the recycling staff needed would be minimal to none.

### 4.3.5 Recycling Processing

Once recyclables are collected curbside in the City, they must be taken to a facility designed to accept the mixed recyclables. Based on SAIC's analysis in Sections 1 through 3, the City's projected level of material is not sufficient for a City operated MRF. There are two single stream MRFs in the region; one single-stream facility is in Hutchinson, Kansas and one is being constructed in Shawnee County, Kansas. Both facilities are between 70 and 115 miles from Salina and will require material to be transported via long-haul transfer trailers. The City can structure the recycling procurement to allow proposers to bid on the recycling processing and the long-haul of the material as individual proposals or as bundled proposals. This will allow the City to capture any cost savings from the same company providing both services.

As part of the recycling processing operation, the City will need to identify a location in the City where recyclable materials can be loaded into transfer trailers or the City can require the hauler to provide a transfer location. The area will need to be covered to protect the material from the elements and spacious enough to accommodate the transfer operation. SAIC identified sufficient space and grading at the City landfill citizen drop-off that can be retrofitted to accommodate transfer trailers. SAIC recommends the City identify the transfer area in advance of the procurement to enable the proposing companies to provide more complete operational plans in the submitted proposals.

#### *Roles and Responsibilities*

Procurement processes involve multiple steps, which are outlined in Section 4.5. The procurement of a recycling processing contract and recycling long-hauling contract will involve a number of City departments. SAIC recommends the Public Works Department work closely with the City's Purchasing Department, the City Attorney and the City Manager's Office throughout the recycling processing procurement.

#### *Timeline*

A formal recycling processing procurement process will typically take between six and nine months. It is imperative to establish a recycling processor and long-haul transportation provider for the recyclables before beginning the implementation of the collection operation. As shown in Figure 4-3, it is important to complete the long-haul and processing procurement with sufficient time for potential contractors to plan and implement any capital and operational aspects of the processing and long-haul contract.

#### *Cost*

Depending on the specific tasks the City requires of a consultant as well as the complexity of options being considered, the cost to conduct a processing procurement cost varies. The amounts shown below are reflective of typical consultant cost for the respective procurements.

- Processing Contract/ Material Recovery Facility: \$30,000 - \$60,000
- Hauling Material Contract: \$15,000 - \$30,000

The costs provided above are reflective of each procurement being completed separately; however, some cost savings can be achieved by completing the two procurements together. In addition to the procurement cost, if the City chooses to provide a transfer station location for transferring recyclable materials (e.g. citizen's drop-off at City landfill), the City may incur some cost to modify or retrofit the area.

## 4.4 Procurement Process

This section provides an overview of the procurement and implementation process for services the City chooses to privatize, such as recycling processing or long-hauling of material. This section can also serve as a guide for equipment procurement, such as the procurement of collection vehicles and carts.

### 4.4.1 Selection Process and Timeline

One substantial challenge for a successful transition to the proposed recycling collection system will be the procurement process that is required in order to select the City's recycling processing provider. The procurement process involves many steps and has many details that must be considered regarding collection and processing services. The process is of critical importance due to the fact that it will frame the City's long-term relationship with the selected service and equipment providers.

Due to the importance of this process, its complicated nature, and the long-term impact of the outcomes, SAIC strongly recommends that the City contract with a qualified management consulting firm to assist with the procurement process. The role of the consultant in this process would be to provide guidance and address specific recycling related details and process throughout the procurement, while the City would be responsible for developing the standard language used within the bid documents and contract.

The general action items that the City will need to complete as part of the overall procurement process are:

- Request for Proposal document development;
- Issue Request for Proposal;
- Pre-proposal meeting;
- Proposal evaluation and negotiation;
- Contract award; and
- Contract implementation.

The procurement process is expected to take approximately six to nine months to complete for a recycling processing contract. SAIC anticipates a procurement process for collection vehicles and carts would take approximately four to six months. Following the procurement period and the award of a contract to a service provider, there will be an implementation period needed by the service provider before services will actually begin. Similarly with equipment providers, a period of time after the

award of the contract will be required before the equipment can be delivered. Figure 4-2 provides a general overview of a typical procurement process.

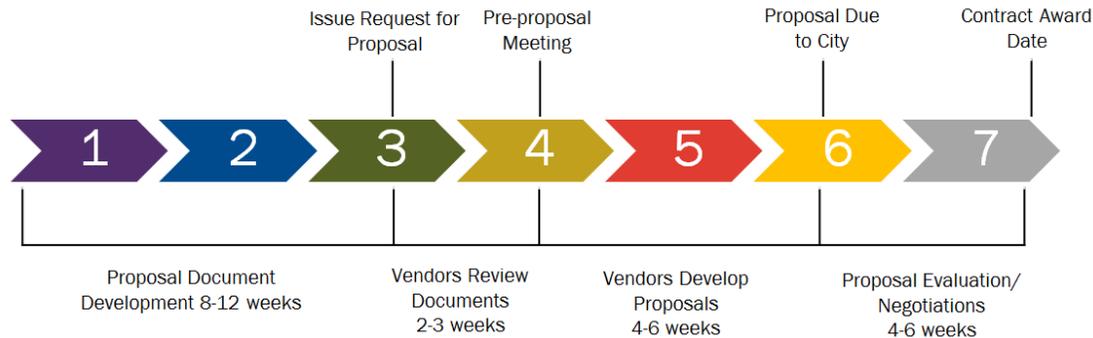


Figure 4-2: Procurement Process Timeline

## 4.4.2 Procurement Considerations

### General Procurement Considerations

The following list provides some of the general procurement considerations that will need to be addressed in the procurement documents.

- **Standard Language** – Each City has its own standard language and requirements to be included in all contracts.
- **RFB versus RFP** – City may elect to issue a Request for Bid (RFB), Request for Qualifications (RFQ) or a Request for Proposal (RFP). For complex or open-ended procurements, such as recycling processing, SAIC typically recommends that cities use an RFP process to allow flexibility in proposal development and evaluation. For more straightforward procurements, such as for carts and vehicles, an RFB process can be appropriate.
- **Separate versus Open-ended Procurement** – A separate procurement approach refers to a process where each service is addressed with a separate procurement process. An open-ended procurement allows the City to solicit proposals as “bundled” or “un-bundled”, allowing the City to consider a single contractor or multiple contractors.
- **Bid Bonds** – Bid bonds can be required to protect the City in the event that a bidder reneges on the bid to provide service after submission.
- **Performance Bonds** – Performance bonds or letters of credit can be required to protect the City in the event that a contractor breaches the contract.
- **Safety and Environmental Compliance** – Contractor must comply with all applicable laws relating to the transportation, storage and processing of recyclables.
- **Insurance** – Contractor should carry insurances relating to: general liability, automotive liability, worker’s compensation, environmental impairment liability, professional liability and excess commercial general liability.

- **Adjustments to Contract** – Contract should be designed to adjust to changes in the value of goods and services over time, including fuel.

### Processing Specific Considerations

The following list provides some of the processing- specific issues that will need to be defined in the bid documents.

- **Contract Term** – The term of processing contracts is typically between five and 20 years.
- **Service Requirements** – Operational performance, such as maximum turnaround time, should be defined by the contract.
- **Contamination** –The processor should be responsible for contamination, up to a certain level. It is reasonable that the City should share in the cost of contamination disposal cost after a certain level. It is important the City and processor identify a fair contamination level in which the City will begin to share responsibility for contamination disposal cost. Placing a reasonable amount of contamination responsibility on the processor provides an incentive for the processor to invest in efficient equipment and contribute to public education.
- **Capacity** – Processor must have the capacity to process all of the City’s recyclable tonnage throughout the term of the contract.
- **Public Education** – City may require or encourage processor to contribute to public education.
- **Other Processing Contract Provisions** – Processor must be able to accept materials after start date and provide sufficient amount of staff to fulfill contract. City has right to perform audits on processor.

### *Roles and Responsibilities*

As mentioned earlier in this section, SAIC recommends the City utilize a qualified management consulting firm to assist with the procurement process. This will provide an objective evaluation of the proposals submitted to the City and help ensure the City enters into equitable agreements. SAIC has estimated the cost for this consultant service for the procurement packages that will likely need to be developed. The cost provided are the cost based on the procurement packages being individually developed; however, there are financial benefits to conducting more than one of the procurement processes simultaneously. For example, there could be one pre-proposal meeting instead of multiple individual meetings.

### *Timeline*

SAIC has provided a timeline for the procurement process, shown in Figure 4-2. The timeline for a formal procurement of recycling processing services or long-hauling services is typically six to nine months. If the City is formally procuring collection vehicles and carts, the timeline needed is typically shorter, ranging from four to six months.

### *Cost*

As mentioned earlier in this report section, depending on the specific tasks the City requires of a consultant as well as how many variations of the proposed service the City allows, the procurement cost will range. The cost shown below are reflective of typical consultant cost for the respective procurements.

- Processing Contract/ Material Recovery Facility: \$30,000 - \$60,000
- Hauling Material Contract: \$15,000 - \$30,000
- Procurement of Carts: \$10,000 - \$15,000

## 4.5 Public Education

Public education will be critical to ensure a successful transition to the proposed recycling program. There will be a need to develop a systematic approach to notify residents of the City's plans and how it will impact them. The following section presents specific public education action items that will need to be addressed as a part of the implementation process.

There will be a need to effectively communicate to all residents the reasons for the change in collection services, the benefits of this change, how it will affect each resident and the specific timeline over which implementation of the new collection system will occur. As the City moves toward implementation, there will also be a need to communicate with all residents regarding exactly how to participate in the new collection system. These communications would include details such as:

- Specific collection days and times;
- Rules and restrictions regarding set-outs;
- Lists and descriptions of recyclable and non-recyclable materials; and
- Customer service contact information.

It will be critically important to begin actively educating customers on these specific items well in advance of the new service start date. There are a wide variety of ways to communicate important information. Based on the public outreach survey discussed in Section 3, the most effective media for the City's residents are:

- Utility bill inserts;
- Newspaper;
- City newsletter; and
- Public notices.

There are multiple ways to communicate with the public, but it is important to maximize public education funds to reach the most customers. SAIC would like to note the City also has a website that can be updated to reflect programmatic changes.

While not all households in the City fall under a Homeowner's Association (HOA), communication with the HOAs is often an effective way to communicate changes to

residential neighborhoods. The HOA can then assist in educating its residents as questions arise. The City may consider utilizing a number of different methods for communication with HOAs, including, but not limited to, the following:

- Public meetings;
- In-person visits with HOA groups;
- Phone calls to property managers and HOA officers; and
- Direct mailings.

### *Roles and Responsibilities*

Public education material should be developed in cooperation with the Public Works Department and City marketing and public relations staff. It is important that materials are accurate, easily understood by residents and consistent with City marketing initiatives.

### *Timeline*

Outreach to all residents regarding the upcoming collection changes will need to begin as soon as an official decision is reached by the City Commission to move forward with implementation of the proposed recycling program. However, the major outreach effort to educate residents on the specifics of participation in the program will need to begin in earnest approximately three months prior to the start of services.

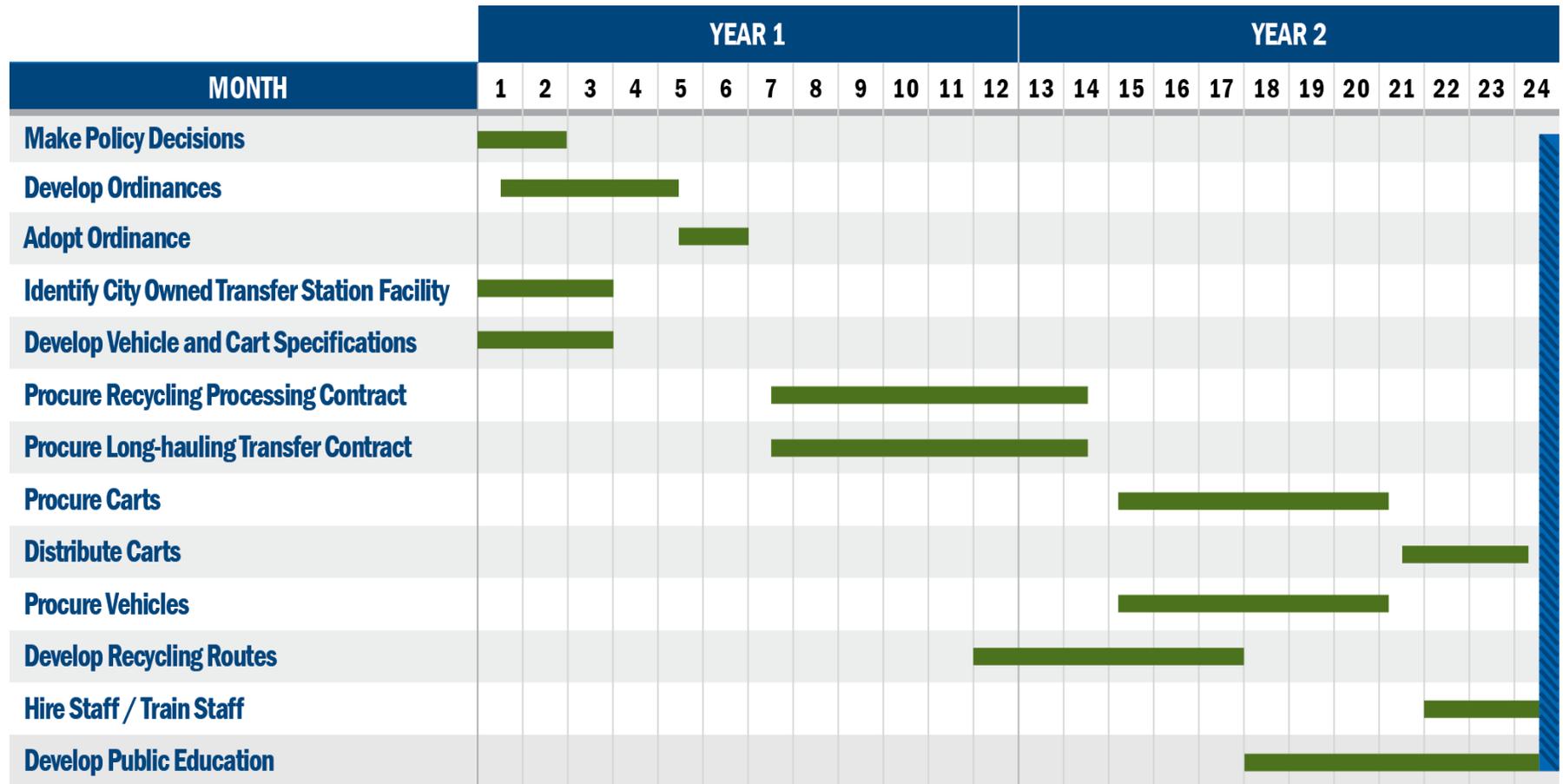
### *Costs*

In Section 2, SAIC discussed the annual cost of \$3.00 per household per year to fund recycling public education. This cost has been included in the financial analysis in Section 2.

In addition to this annual amount, SAIC would expect the City to experience an additional public education cost in the first year of the system, especially in the months leading up to the start date. SAIC anticipates the City would need to spend an additional \$45,000 to \$75,000 in the first year for the development and distribution of public education materials. The City could either recoup these initial cost by adjusting the monthly residential rate or by utilizing money available in the reserve fund. The City may also fund some of these cost through contributions from the private recycling processor.

## **4.6 Summary of Recycling Implementation Schedule**

The schedule shown in Figure 4-3 summarizes the timeline discussed in the recycling implementation sections. This summary timeline assumes that the new single-stream recycling operation will be rolled out all at one time. The schedule provides the City with an understanding of how long each implementation step will take before the recycling service can begin. Assuming some task can overlap, SAIC estimates a minimum timeline of 18 months after the City ordinance is updated.



**LEGEND**

 **Curbside Recycling Start Date**

Figure 4-3: Recycling Implementation Timeline

## 4.7 Fully-Automated Refuse Collection Implementation Plan

In SAIC's review of the City's current recycling operation, SAIC identified a potential operational and financial benefit of the City converting both refuse and recycling operations to fully-automated collection. The analysis evaluating the benefits of converting the current refuse collection operation to fully-automated collection is provided in Section 1.7 of this report. In this section SAIC provides the various elements to be considered in implementing a fully-automated refuse collection operation.

### 4.7.1 Transition to Automated Refuse Collection

As the City currently has a fleet of functioning rear loaders, the City can look to transition the current solid-waste fleet to a fully-automated collection operation over a five-year period. Transitioning the refuse collection operation over a period of five-years allows the City to temper the capital investment needed to transition the operation to a fully-automated collection operation and allows the City to slowly transition the current staff to fully-automated driver positions.

Although SAIC recommends the refuse fleet is transitioned over a multi-year time period, SAIC recommends the fully-automated program be implemented at the same time so all customers will experience programmatic changes simultaneously. Implementing the program at the same time will allow synergies in cart distribution and public education.

Alternatively, the City could also choose to implement fully-automated collection in phases, by dividing the City into multiple zones. For example, the City could implement one-half of the City in fiscal year 2014 and the remaining half of the City in fiscal year 2015. This method will allow the City to distribute the purchase cost of carts over several years, but can simultaneously create operational inefficiencies with a mixed cart inventory. If the City is operating with both semi-automated and automated carts only portions of the City would be able to receive fully-automated collection, resulting in varying service levels throughout the City.

It is important that the City decide if the City would like to implement a pay-as-you-throw program prior to transitioning the refuse collection operation to fully-automated. If the City would like to implement a pay-as-you-throw rate structure, the City will need to identify the distribution of cart sizes City residents will require under a pay-as-you-throw program to ensure the City procures an appropriate cart inventory.

#### *Roles and Responsibilities*

Transitioning the refuse operation will involve many of the same implementation steps as the recycling operation including updating City ordinances, procurement of carts, procurement of vehicles and public education. The implementation of an automated refuse collection operation will primarily be the responsibility of the Public Works

Department but will require cooperation from the City Manager's Office, the City Attorney and the Finance Department. The City may choose to utilize a consultant throughout the implementation of an automated refuse collection operation to further supplement the implementation team.

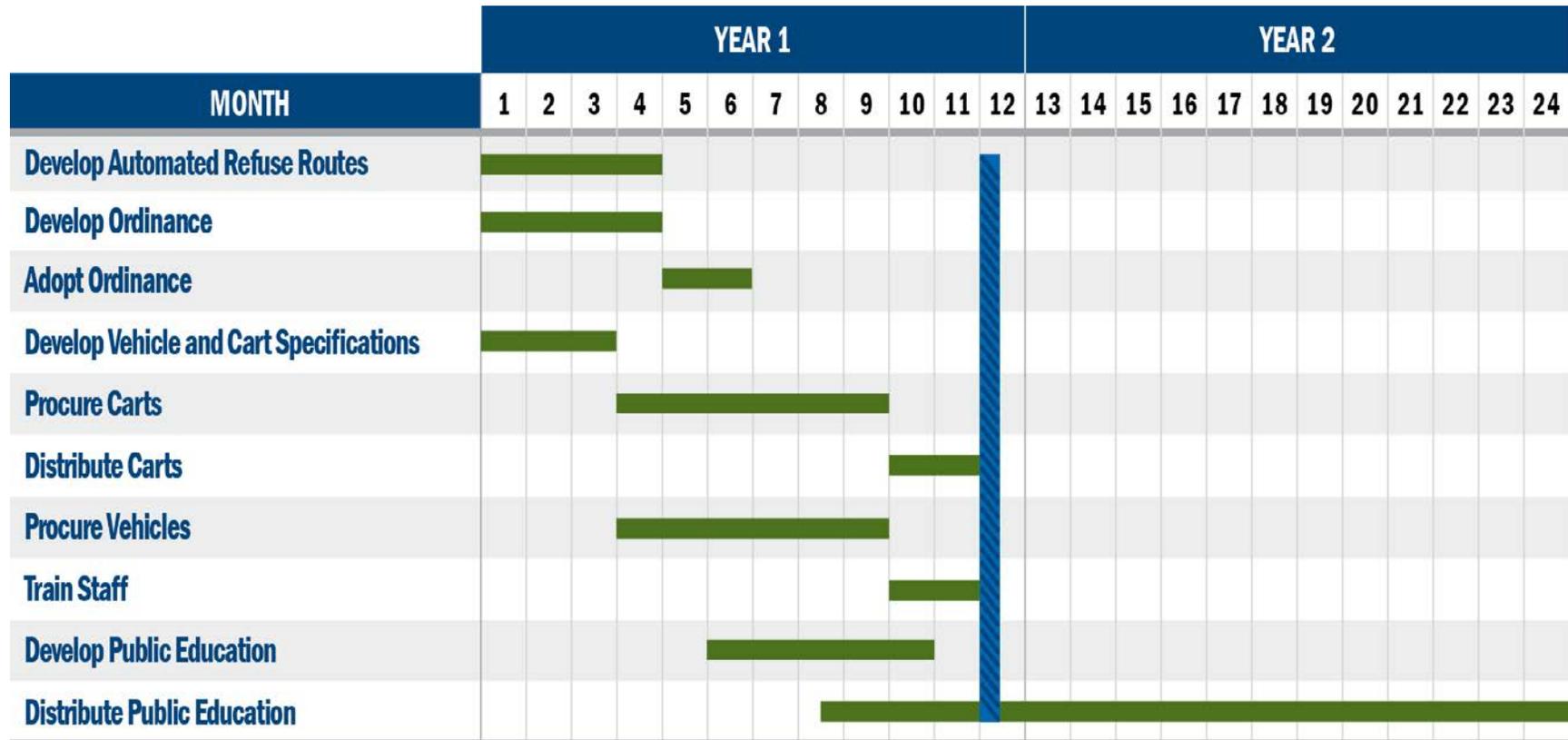
#### *Timeline*

SAIC has illustrated the implementation steps needed to transition the semi-automated refuse collection operation to a fully-automated refuse collection operation in the Gantt chart provided in Figure 4-4. Assuming some task can overlap, SAIC estimated a minimum timeline of 11 months.

#### *Cost*

Transitioning the refuse collection operation to a fully-automated collection system can include the following cost:

- Updating ordinance: \$10,000 - \$20,000
- Cart procurement: \$10,000 - \$15,000



**LEGEND**

 Fully -Automated Refuse Start Date

Figure 4-4: Refuse Implementation Plan

## 4.8 Yard Waste Processing Implementation Plan

The City's current agreement with Kanza allows the City to take an unlimited amount of yard waste material to Kanza for a fixed annual price. This agreement can be beneficial if the City is collecting and diverting a large amount of green waste. However, Kanza's current restrictions on the type of green waste accepted makes it difficult for the City to divert enough green waste to the facility to make the current green waste processing agreement financially competitive.

Based on the analysis provided in Section 2 of this report. If the City continues to collect and divert green waste material, the City will benefit financially by paying Kanza on a volume basis or if the City mulches the material at the City Landfill. The green waste currently being collected by the City contributes substantially to the City's recycling rate. However, the City's decision to collect and divert additional material is ultimately up to the City Manger and City Commission.

### *Roles and Responsibilities*

The future of the City's yard waste program and green waste diversion is ultimately a policy decision. The program goals should be decided by the City Manager's office in conjunction with the City Commission.

### *Timeline*

SAIC recommends the City consider the findings in this report and identify changes to yard waste program's collection and diversion operations as soon as feasible.

### *Cost*

There is a potential for cost savings to be realized by making changes to the current yard waste collection and diversion methods. Changes made to the City's diversion location and method will generate cost savings, including paying Kanza on a volume basis, mulching material at the City landfill and disposing of material. If the City pursues changes to increase the operation efficiencies of yard waste collection (i.e. including workers on route to increase collection efficiency) there is a potential for the City to incur additional operational cost.

## 4.9 Summary of Implementation Cost

SAIC has provided a table summarizing all of the cost identified in this report section to successfully implement a universal recycling operation, automating the City's refuse collection and implementing a change to the City's yard waste processing.

**Table 4-3  
Summary of Implementation Cost**

Implementation Action	City Action	City Action Cost	Consultant Action	Consultant Action Cost
<i>Recycling Curbside Program</i>				
Policy Decisions	✓	Internal Cost		
Developing Recycling Rate Goal	✓	Internal Cost		
Including Private Haulers in Recycling Implementation and Recycling Contracts	✓	Internal Cost		
Utilizing Solid Waste Funds for Initial Capital Cost	✓	Internal Cost		
Ordinance Development	✓	Internal Cost	✓	\$10,000 - \$15,000
Service Implementation				
Collection Vehicles	✓	Internal Cost		
Carts	✓	Internal Cost	✓	\$10,000 - \$15,000
Routing	✓	Internal Cost	✓	\$20,000 - \$60,000
Hire Staff	✓	Internal Cost		
Recycling Processing				
Processing Contract/ MRF Procurement	✓	Internal Cost	✓	\$30,000 - \$60,000
Hauling Material Contract Procurement	✓	Internal Cost	✓	\$15,000 - \$30,000
Public Education				
First Year Implementation Cost	✓	\$45,000 - \$75,000	✓	\$45,000 - \$75,000
<i>Automation of Refuse Collection</i>				
Updating Ordinance	✓	Internal Cost	✓	\$10,000 - \$20,000
Cart Procurement	✓	Internal Cost	✓	\$10,000 - \$15,000
<i>Yard Waste Processing</i>				
Changes to Yard Waste Processing Contract or Location	✓	Savings in Processing Cost		
Changes to Yard Waste Collection Operation	✓	Potential Additional Operational Cost		

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