

Appendix B
SOLID WASTE AND RECYCLING ASSESSMENT

SOLID WASTE & RECYCLING ASSESSMENT

1.1 Background

In developing the Sustainability Master Plan (SMP) for the City of Sioux Falls (City), SAIC (formerly R. W. Beck) conducted a solid waste and recycling assessment of the existing solid waste management programs in the City and the surrounding five-county region (Region). As part of this assessment, SAIC benchmarked the City's solid waste management programs to a select set of municipalities in other states in an effort to evaluate the City's collection system, diversion programs, per capita disposal and recycling rates, and other relevant program standards. Recommendations for program improvements can be found at the end of this section.

1.2 Existing Solid Waste Management System

With assistance from City staff, SAIC gathered data to characterize how solid waste is managed within Sioux Falls and the surrounding Region. The five counties that make up the Region's watershed include Lake, McCook, Minnehaha, Turner, and Lincoln. Their locations are highlighted in Figure 1.

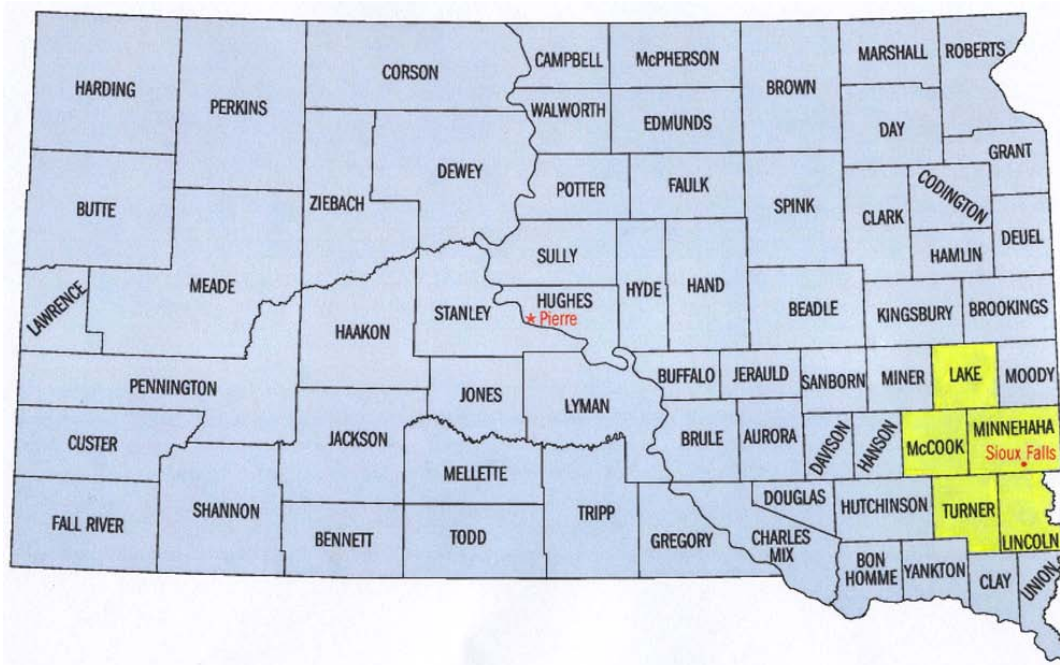


Figure 1. The Five-County Region Served by the Sioux Falls Regional Sanitary Landfill.

Every two years, the five counties as well as approximately 34 municipalities within the counties, sign a Solid Waste Disposal Agreement with the City to use the Sioux Falls Regional Sanitary Landfill (Landfill) which is owned and operated by the City. The City agrees to, among other things, operate the facility to meet all applicable

federal and state requirements; provide and maintain adequate disposal capacity; and provide environmentally sound waste disposal. In return, the counties and cities agree to, among other things, pay landfill user fees; maintain registration of solid waste haulers and recycling facilities within their jurisdiction; provide recycling opportunities for their residents; and comply with environmental and statutory standards and mandates.

The primary components of the current solid waste management system include:

1. Municipal solid waste (MSW) collection;
2. Transfer station;
3. Landfill and Landfill Gas to Energy (LFGTE);
4. Recycling;
5. Yard waste;
6. Source reduction;
7. Reuse;
8. Household hazardous waste (HHW) management; and
9. Public education.

The sections below provide an overview of the current systems and programs in place to properly manage the Region's solid waste.

1.2.1 MSW Collection

1.2.1.1 City of Sioux Falls

All companies that collect, remove, dispose, and/or transport MSW and recyclable materials in the City must be licensed. The cost for an annual Garbage Hauler Business License and Permit Application is as follows:

- New or transferred license, \$100
- Renewal license, \$50
- Licenses renewed within 30 days of expiration, \$100

In 2011, 33 haulers received Garbage Hauler Business Licenses from the City. The majority of the licenses belong to companies that service residential and commercial accounts; others include roll-off companies, transfer operations, and special waste (medical and grease) haulers. The City does not presently have a limit on the number of haulers it licenses.

Residential Collection

In the City of Sioux Falls, the collection of residential MSW (and recyclable materials) from single-family residences is provided by the private sector. Currently (2012) there are twenty-seven (27) licensed haulers collecting residential MSW and recycling in the City.

The residents subscribe to weekly¹ garbage collection service from the hauler of their choice and pay the hauler directly for the service. All MSW haulers must offer recycling collection service, at least twice per month². The fees charged to residents for MSW collection and disposal are set by the individual haulers. MSW collection fees must be volume- or weight-based per City Ordinance Chapter 18, Article IV, Section 18-59:

All licensed garbage haulers shall file, as a part of their application for a license, a general statement of their use rate structures and billing systems consistent with the city's comprehensive plan of solid waste reduction and recycling program which shall include the following elements:

- (1) A rate to reward people who reduce their level of solid waste collection service based either upon volume or weight.
- (2) A rate to provide customers with adequate options and incentives to reduce their weekly level of solid waste collection service and the amount of solid waste collected as a result of their participation in waste reduction and recycling programs.
- (3) A rate that includes the combined cost of solid waste, using the above elements, and recycling collection services.

In October 2011, Section 18-59 was revised and item number one now reads as follows:

- (1) A Pay As You Throw (PAYT) rate to reward people who reduce their level of solid waste collection service based either upon volume or weight. Haulers must provide at least two levels of service based on volume or weight. For each volume increase of at least 1.4 times over a lower level of service the rate of each higher level of service must be at least 1.25 times the corresponding lower level of service.

Copies of both the original and the amended Garbage and Recycling Ordinances are attached as Attachment 2 and Attachment 3, respectively.

The average monthly fees for the basic service levels are shown in Table 1.

¹ Per City Ordinance Chapter 18, Article II, Section 18-19.

² Per City Ordinance Chapter 18, Article II, Section 18-21, revised October 2011.

Table 1
Residential MSW & Recycling Collection Service – 2011 Average Monthly Rates¹
City of Sioux Falls

Container Size	Price Range per Month ²	Average Price for One MSW Container ³
32 to 35-gallons	\$7.50 - \$21.00	\$16.92
64 to 65-gallons	\$12.00 - \$29.00	\$19.94
95 to 96 gallons	\$13.50 - \$33.00	\$22.20

¹ Source: 2011 City of Sioux Falls' Garbage Hauler Business License applications. Prices do not include collection of extra MSW, bulky items, appliances, yard waste, etc.

² Monthly prices include weekly MSW collection and, at a minimum, monthly recyclable materials collection.

³ Recycling collection is included and the quantities of recyclables allowed for setout are typically unlimited.

Per City Ordinance,³ residents must provide their own containers for the waste and recyclable materials they accumulate, however some haulers provide wheeled carts to their customers for garbage collection (for collection using semi-automated or fully-automated collection vehicles).

Multi-family building owners are required to provide adequate MSW and recycling collection service and container capacity for tenants. (Depending on the size of the building and the type of collection containers, multi-family dwellings may be collected on residential routes or commercial routes.)

Another City ordinance requires garbage and recycling containers be kept near the house. City Ordinance Chapter 18, Article II, Section 18-17 states, “the garbage and recycling containers shall be kept in an inconspicuous place beside or behind the structure which is reasonably accessible to the licensed commercial garbage hauler.”⁴ Residents are not allowed to place MSW containers at the curb or in the street on collection day. Instead, haulers retrieve the garbage container(s) from the side or back of the house, bring the containers to the collection vehicle, empty the containers, and return the containers back to the house.

Residential haulers are not restricted to collecting on certain days of the week or in certain areas of the City.

Commercial Collection

In the City of Sioux Falls, the weekly collection of commercial MSW and twice monthly collection (at a minimum) of recyclable materials from businesses, industries and institutions is provided by the private sector.

Commercial generators of MSW contract for weekly collection service from the hauler of their choice and pay the hauler directly for the service. The fees charged for MSW collection and disposal are set by the individual haulers and must be volume- or weight-based.

³ Chapter 18, Article II, Section 18-17, revised October 2011.

⁴ The reference to recycling containers was added to Section 18-17 of the ordinance language in October 2011.

Per City Ordinance Chapter 18, Article II, Section 18-22, non-residential (commercial and business establishments, government facilities, entertainment facilities, and schools) recyclable materials specified in Ordinance Section 18-32, must not be disposed at the Landfill. The list of materials banned from the Landfill is discussed in Section 1.2.3 of this report.

1.2.1.2 Five-County Region

The five counties in the region that use the Landfill have disposal agreements with the City that are renewed every two years. Some of the requirements of the disposal agreement that pertain to MSW and recycling collection and waste diversion include:

- Maintain registration of solid waste haulers and recycling facilities within their jurisdiction to:
 - Ensure the sources of waste and the wastes delivered;
 - Assist in mandated reporting requirements; and
 - Implement volume-based collection rates to promote solid waste reduction and recycling.
- Provide recycling opportunities for residents.
- Comply with environmental and statutory standards and mandates by initiating rules or programs to provide for:
 - Waste reduction;
 - Safe handling and disposal of hazardous or unacceptable wastes; and
 - Banned wastes.

In an effort to gather information on regional recycling efforts, SAIC surveyed the five counties that have Landfill disposal agreements with the City.

Of the five counties, Lake County has the most progressive recycling program as evidenced by the City of Madison. The following bullets describe the City of Madison's recycling and waste diversion efforts.

- The City of Madison has established solid waste and recycling ordinances;
- The City offers both curbside and drop-off collection of recyclable materials;
- Municipal crews and one private hauler collect curbside residential MSW weekly and recycling twice per month;
- The City issues only one private hauling license, per ordinance, and the private hauler must collect MSW and recycling (residents choose their service provider);
- Residential curbside MSW collection rates are currently \$12 per month for 65-gallon service and \$13.50 for 95-gallon service (includes recycling service);
- Curbside recycling is collected in three streams: Newspaper, Mixed Paper, and Cans/Plastic;
- The City of Madison owns and operates a materials recovery facility (MRF); and

- The City of Madison has an annual solid waste and recycling budget of \$80,000.

In 2009, the City of Madison collected and processed 827 tons of recyclable materials and realized approximately \$40,000 in revenue from the sale of recyclable materials, which they sold to end markets using a broker.

1.2.2 Transfer Stations

There is one transfer station in the Region that transports MSW to the Landfill via transfer trailers. It is owned and operated by Lincoln County and is located in the city of Worthing (approximately twenty miles south of Sioux Falls). Lincoln County transports approximately 100 tons of MSW per week to the Sioux Falls Landfill however, this does not represent all of Lincoln County's MSW. The current (2011) transfer station tipping fees are shown in Table 2.

Table 2
2011 Tipping Fees
Lincoln County Transfer Station

Cars	\$8.50
Station Wagons & Misc.	Min. \$12.50 & Up
Vans	Min. \$12.50 & Up
Pickups & Wheel Trailers	Min. \$12.50 & Up
Pickups Above Sides & 4-Wheel Trailers	Min. \$15.60 & Up
Large Items (e.g., couch, recliner, mattress, box spring)	\$16.75
Burning Barrels (each)	\$7.50

The transfer station also accepts recyclable materials (paper, plastic, aluminum and tin), as well as used motor oil, automotive batteries and corrugated cardboard.

1.2.3 Sioux Falls Regional Sanitary Landfill

The Landfill is owned and operated by the City of Sioux Falls and is permitted under the South Dakota Department of Environment and Natural Resources. It is located approximately 7.5 miles west of the City and has a total permitted area of 709 acres. The Landfill serves the City as well as Lake, McCook, Minnehaha, Turner, and Lincoln Counties.

The Landfill disposal areas include the following:

- The closed, lined landfill located on the eastern portion of the property;
- The active, lined landfill located on the western portion of the property; and
- The Construction and Demolition Debris Landfill located on the south-central portion of the property.

Within the closed landfill, leachate (the liquid that has drained through the MSW) is collected through a dual phase leachate and landfill gas (LFG) extraction system. Leachate is pumped out of the Landfill through vertical wells and into a system of lateral and header pipes that distribute the leachate into a perimeter manifold pipe running along the northeastern and eastern perimeter of the property. Leachate within the active Landfill site is collected by leachate collection piping located within the bottom of the cells and transferred to a header pipe located to the south of the cells. The leachate from both areas collects in a series of lift stations, where it is pumped into either a 20,000 gallon underground storage tank (UST), or one of two leachate storage and treatment ponds (Pond 1 or Pond 2). The leachate from the East MSW Area is transferred offsite for management or evaporates. The leachate from the West MSW Area is either surface applied or recirculated into the West MSW Area, transferred offsite for management, or evaporates. The City has requested a permit modification to allow surface application of leachate to reed canary grass.

In 2010, the Landfill generated an estimated 25,205 gallons of leachate per day. A total of 9.2 million gallons of leachate was transported to the City's wastewater treatment plant in 2010.

LFG management currently includes the dual phase leachate and LFG extraction wells located in the closed Landfill area, horizontal gas collection (HGC) laterals located in the active Landfill area, a LFG flare, a compressor building, and associated LFG piping to transport the gas to the POET-Biorefining Ethanol plant (POET) located in Chancellor, SD. The pipeline consists of eleven miles of 12-inch diameter, low-pressure High Density Polyethylene (HDPE) piping that runs from the Landfill to POET. The majority of the pipeline route is in the public right-of-way of two townships both located in Turner County. The current LFG collection system flow rate is approximately 2,300 cubic feet per minute (cfm) with a 54% methane concentration. POET currently uses the LFG to offset natural gas usage by as much as 30 to 60 percent. The environmental benefit from the collection of LFG and using it to replace natural gas at POET, or from its destruction when not sent to POET, is equivalent to removing 52,000 vehicles from the road.

Per City staff, the Landfill currently accepts an estimated 550 tons per day of MSW. In 2010, the Landfill received approximately 147,500 tons of MSW (not including industrial waste such as sewage sludge and ash). The estimated breakdown of 2010 MSW tons, by County in the Region, is provided in Table 3.

Table 3
2010 MSW Tons Disposed by County
(Estimated)¹
Sioux Falls Regional Sanitary Landfill

County	2010 MSW Tons
Lake	6,407
Lincoln	10,461
McCook	3,695
Minnehaha	125,774
Turner	1,190
Total:	147,527

¹ Because of the location of certain County borders, some haulers' loads contain MSW from more than one county. The tons listed in this table are best estimates.

Approximately 250 tons per day of construction and demolition (C&D) debris is brought to the Landfill for disposal in a separate area (i.e., C&D is not disposed with MSW). In addition, the Landfill has a yard waste collection site and composting operation; an asbestos disposal area; a contaminated soil treatment area; and separate areas each for wood waste, appliances, scrap metal, propane tanks, batteries, and used tires.

Table 4 shows the quantities of materials diverted from disposal at the Landfill during 2010, by waste stream.

Table 4
2010 Tons Diverted by Waste Stream¹
Sioux Falls Regional Sanitary Landfill

Material	Quantity (Tons)
Yard Waste	6,343
Wood Waste	2,300
Appliances & Scrap Metal	979
Tires	400
Electronics	474
HHW	208
Asbestos ²	154
Contaminated Soil	1,825
Biosolids	2,307
Total:	14,990

¹ Tons processed by the City of Sioux Falls; does not include tonnage from private processors.

² Conversion factor used: 1 cubic yard = 400 pounds.

Per City Ordinance Chapter 18, Article III, Section 18-32, the following materials “shall be excluded from the solid waste deposited at the landfill site:”

- Office paper
- Corrugated cardboard and chip board
- Plastic containers #1 and #2
- Metal containers
- Automobile bodies or other bulky articles
- Oils, gasoline and other petroleum products
- Hazardous materials
- Hazardous waste
- Yard waste
- Wood waste, unless hauled by a licensed commercial garbage hauler as municipal solid waste
- Lead acid batteries
- Waste tires
- White good appliances
- Regulated medical waste
- Radioactive materials
- Large and hand-held electronics
- Magazines
- Newspaper
- Bulk-rate mail

The Landfill conducts random load inspections and “if excluded materials are discovered during the inspection, the City may refuse the entire load and charge the person attempting to deposit the materials the cost of the inspection,” per the Ordinance.

SAIC conducted a waste characterization study of the Landfill’s waste stream in 2006 to identify the quantities of recyclable materials disposed that have the potential for landfill diversion. Figure 2 depicts the overall composition of the MSW (excluding industrial processed wastes, special wastes, and dedicated C&D).

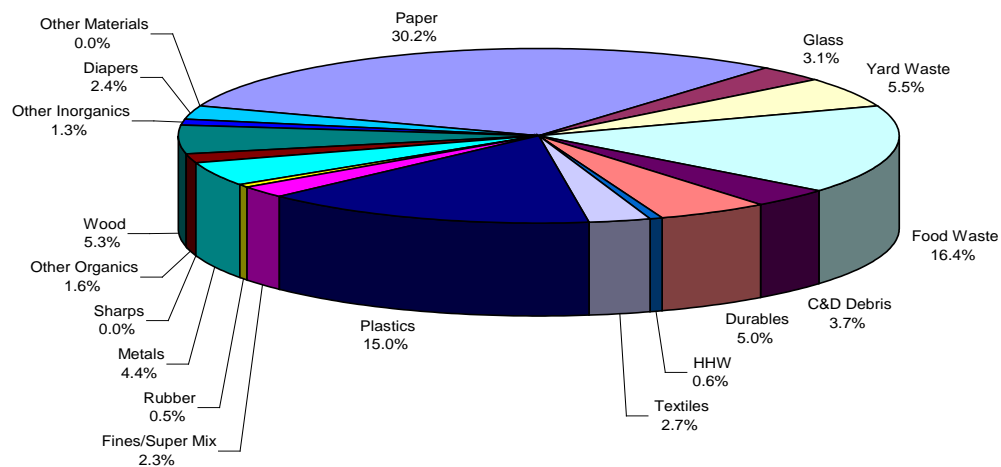


Figure 2: Sioux Falls Regional Sanitary Landfill - MSW Composition (by weight), 2006

Solid Waste & Recycling Assessment

The results of the waste characterization indicated that the composition of the Landfill's waste stream was comparable to national averages. As part of the 2006 waste characterization report, SAIC provided the City with a comparison of the Landfill's waste composition to Iowa's 2005 and Minnesota's 1999 statewide MSW compositions, as shown in Table 5.

Table 5
Sioux Falls Regional Sanitary Landfill
MSW Composition – Comparison to Iowa and Minnesota Statewide Studies

Material Group	Mean (by weight)		
	Sioux Falls 2006	Iowa 2005	Minnesota 1999
Total Paper	30.16%	33.00%	34.30%
Total Plastics	15.00%	14.90%	11.40%
Total Metals	4.42%	4.70%	5.10%
Total Glass	3.08%	1.70% ¹	2.80%
Total Yard Waste	5.51%	1.60%	2.30%
Total Food Waste	16.40%	10.60%	12.40%
Total Wood	5.29%	8.00%	7.50%
Total Construction & Demolition Debris	3.74%	5.50%	5.20%
Total Durables	5.00%	5.10%	5.30%
Total Textiles and Leathers	2.67%	4.90%	2.70%
Total Diapers	2.37%	2.40%	2.10%
Total Rubber	0.55%	0.50%	0.80%
Total Household Hazardous Waste	0.63%	0.40%	0.60%
Total Sharps	0.01%	0.00%	0.10%
Total Other Organics	1.60%	1.50%	1.40%
Total Other Inorganics	1.28%	2.40%	0.00%
Total Fines/Super Mix	2.30%	2.40%	0.00%
Total Other Materials	0.00%	0.50%	6.20% ²
GRAND TOTAL	100.00%	100.10%	100.20%

¹ Iowa has a Beverage Containers Control Law, also known as the "Bottle Bill". Consumers pay a five-cent deposit when purchasing a beverage container and receive a five-cent refund when returning the container to a store or redemption center. The Bottle Bill has resulted in a decrease in the number of glass, aluminum, and plastic beverage containers found in the state's waste stream. Because these means are based on weight, the effect of the Bottle Bill is less apparent in the aluminum and plastic categories as compared to glass.

² The Minnesota study did not have "Other Inorganics" or "Fines/Super Mix" categories, but rather, had a "Miscellaneous" category.

From the analysis in 2006, the following diversion opportunities⁵ were highlighted:

⁵ For the waste characterization, MSW was sorted by material type; the cleanliness of the materials that might affect their recyclability was not assessed.

- **Recyclable paper.** Approximately 30 percent of the MSW stream contained paper: 21 percent was recyclable (newsprint, magazines, office paper, cardboard, and mixed paper), 6 percent was compostable,⁶ and 3 percent was considered non-recyclable. It was recommended that mixed paper be targeted for recycling and cardboard diversion emphasized.
- **Food waste.** At 16 percent, food waste made up the second largest portion of the MSW, after paper. Collecting and processing food waste can be costly, so it was recommended the City consider conducting a pilot program to determine the feasibility of targeting large generators of food waste such as grocery stores, schools and institutions. Other options included composting food waste with yard waste, or developing a food waste-to-livestock program.
- **Plastics.** In 2006, plastics composed of approximately 15 percent of the Landfill’s MSW stream. The largest percentage of plastics, by weight, was made up of film, shrink wrap, and plastic bags, combined for a total of 6.6 percent. Because end markets for this material existed at that time (and they still exist), it was recommended that the City expand drop-off opportunities for plastic bag recycling.
- **Construction and Demolition Debris.** Loads of dedicated C&D debris were visually characterized at the Landfill. Potential diversion opportunities were discussed for the material categories that made up the largest portion of the waste stream, by weight, including:
 - Drywall/Gypsum;
 - Non-treated wood; and
 - Shingles.

The current tipping fee paid by the private haulers and other commercial vehicles at the Landfill is shown below in Table 6.

Table 6
Commercial Tipping Fees per Ton¹
Sioux Falls Regional Sanitary Landfill

Type of Waste	Price per Ton if Generated in 5- County Region	Price per Ton if Generated Outside 5-County Region
MSW	\$33.00	\$96.50
C&D	30.00	96.50
Yard Waste	10.00	22.00

¹ This is not a complete list. Additional fees are charged for the following items: tires, special waste, electronics, animal carcasses, wood waste, etc.

⁶ Compostable paper was defined as “Paper products including wax-coated paper, napkins, paper towels, frozen food packaging, tissues, paper plates, cups, and pizza boxes.” These materials are compostable in certain composting operations. The viability of composting these items in the Sioux Falls region was not analyzed in the 2006 waste characterization study.

Not including residential flat fees, the minimum tipping fee charge for any load is a three cubic yard or one ton charge.

1.2.4 Recycling

1.2.4.1 Residential Recycling Collection

In the City of Sioux Falls, the collection of residential recyclable materials from single-family residences is provided by private MSW haulers. Currently (2011) there are twenty-five (25) licensed haulers collecting residential MSW and they must offer recycling collection service, at least twice per month,⁷ to their customers.

The manner in which recyclable materials are to be prepared for collection varies by hauler, but the three basic procedures include:

1. Single-stream – all materials (paper fiber and rigid containers) commingled in one container;
2. Dual-stream – fiber separated from rigid containers; and
3. Source separated – each material category separated from other materials.

There are three methods typically used for the collection of residential recyclable materials including:

- **Manual, using curbside bins.** Collection drivers and/or laborers manually empty the curbside bins into a side-loading or trough-loading collection vehicle that has two or more compartments for either dual-stream or source separated collection programs. This method has also been used with rear-loading vehicles for single-stream collection.
- **Semi-automated, using wheeled carts.** Collection drivers and/or laborers manually wheel the carts to a collection vehicle that has been fitted with lifters or cart tippers. The tipper automatically empties the contents of the cart into the collection vehicle. This method can be used for single-stream collection or dual-stream if the vehicle has a split body.
- **Fully-automated, using carts** - Collection drivers use a vehicle with an automated arm to empty the carts, without having to exit the cab of the collection vehicle. This method is typically used for single-stream collection.

Most haulers provide curbside recycling bins or wheeled carts to their customers. Similar to garbage collection, the City requires that recyclable materials and containers “be kept in an inconspicuous place except when placed for collection.”⁸

The frequency of residential recyclable materials collection in Sioux Falls varies by hauler and can be weekly or every-other-week, but must be at least twice per month. Haulers are not restricted to collecting recyclable materials on certain days of the week or in certain areas of the City.

⁷ Per City Ordinance Chapter 18, Article II, Section 18-21, revised October 2011.

⁸ Ibid.

The City does require that all haulers collect the following recyclable materials:

- All paper, including newspaper, magazines, catalogs, phone books, junk mail, white or pastel office paper, shredded paper (contained in a clear plastic bag), and paper bags
- Plastics #1 & #2
- Tin, steel and aluminum cans
- Corrugated cardboard and chipboard

Other recyclable materials collected by some haulers, but not all, include:

- Plastics #3 through #7
- Glass jars and bottles
- Aluminum foil and trays
- Empty plastic grocery and trash bags
- Empty aerosol cans
- Cardboard egg cartons

1.2.4.2 Commercial Recycling Collection

As mentioned previously, the collection of recyclable materials from businesses, industries and institutions is provided by private haulers licensed by the City. Commercial generators contract for collection service from the hauler of their choice and pay the hauler directly for the service.

Per City Ordinance Section 18-22, commercial and business establishments, government facilities, entertainment facilities, and schools must not dispose of certain recyclable materials (specified in Ordinance Section 18-32) at the Landfill.

Most businesses that generate recyclable materials contract with a private hauler for collection, however they do have the option to self-haul their materials to one of the drop-off sites listed in Section 1.2.4.4 of this report. Most haulers deliver the recyclable materials to a local MRF for processing and marketing.

Large retailers and businesses that generate significant quantities of recyclable materials such as corrugated cardboard or plastic shrink wrap, often manage the materials in-house by baling the material and then backhauling it to their warehouse or directly to an end-user.

1.2.4.3 Recyclable Materials Processing

There are three MRFs in the Region where residential and commercial recyclable materials are delivered for processing:

- Millennium Recycling, Inc. in Sioux Falls;
- Advanced Recycling Systems in Sioux Falls; and
- The City of Madison Recycling Center in Madison.

These MRFs sort and bale the recyclable materials and prepare them for transport to brokers or end-users. Both Millennium and Advanced Recycling provide revenue from the sale of recyclable materials to some of their larger-volume customers. In 2010, approximately 36,900 tons of recyclable materials from the Region were processed and marketed from these three MRFs.

1.2.4.4 Drop-off Recycling Sites

Within the five-county region, there are at least five drop-off locations available for residents to dispose of recyclable materials including:

- Millennium Recycling
- Advanced Recycling Systems
- Sioux Falls Regional Sanitary Landfill
- City of Madison Recycling Center
- Lincoln County Transfer Station

Some of the drop-off sites are accessible 24 hours a day while others are open only during business hours. Millennium Recycling accepts recyclable materials commingled, in a single-stream. The Landfill, Advanced Recycling Systems, the Lincoln County Transfer Station, and the City of Madison require materials to be separated into more than one material category (typically paper is kept separate from rigid containers).

1.2.4.5 Other Recycling/Diversion Programs

In addition to the recycling programs currently in place to recover the basic post-consumer materials (i.e., paper, plastic, metal, glass), other waste streams are being diverted from disposal in the five-county region, however the City does not currently track these tons or require private processors to report recycling tonnages.

- Scrap Metal Recycling. There are several businesses in the region that accept a variety of metals for recycling such as propane tanks, appliances, scrap metal, copper, brass, lead, automobiles, etc. Many scrap metal businesses pay by the pound for scrap metal. As mentioned previously, the City accepts scrap metal at the Landfill.
- Batteries. The City's HHW Facility accepts certain types of batteries for recycling including lead-acid, button, nickel-cadmium, nickel metal hydride, lithium and lithium ion, as well as any rechargeable battery. In addition, many businesses accept lead-acid batteries for recycling. South Dakota retailers who sell lead-acid batteries must accept batteries on a one-for-one exchange basis.⁹
- Electronics. The City accepts electronic items for recycling at its HHW Facility. Section 1.2.8 of this report includes an extensive list of the types of items

⁹ Source: South Dakota Codified Law, Chapter 34A-6-91.

<http://legis.state.sd.us/statutes/DisplayStatute.aspx?Type=Statute&Statute=34A-6-91>

accepted at the facility. In addition, there are a few private businesses in Sioux Falls that accept electronics for recycling.

Other select materials currently being recycled, reused, or diverted by private companies include:

- Restaurant Grease;
- EPS (expanded polystyrene) (e.g., Styrofoam™);
- Tires;
- C&D materials such as concrete, asphalt, wood, pallets, etc.; and
- Textiles (e.g., used clothing, carpeting, footwear, sheets, towels, etc.) which are also mentioned in the Reuse section of this report (Section 1.2.7).

1.2.5 Yard Waste

In 1995, the State of South Dakota banned yard waste from disposal at all landfills.

The City operates a 5-acre compost site at the Landfill. Yard waste is accepted for \$10.00 per ton, \$5.00 per pickup truck or trailer, and \$2.00 per car. The fee for yard waste generated outside the Region is \$22.00 per ton or \$3.00 per bag. In addition, the City designates seasonal leaf drop-off sites and charges \$2.00 per car, pickup truck, or two-wheel trailer (no commercial vehicles) for leaves generated in the City of Sioux Falls only.

Most licensed haulers provide yard waste collection to residents for an additional fee. Per City Ordinance, haulers must collect yard waste from residents at a minimum of once per week. In addition, the City requires that yard waste be set out for collection in “a Kraft-type paper bag designated for yard waste, or a 32-gallon rigid watertight container with a tightly fitted cover, and placed at a location, other than curbside, designated for collection by the licensed commercial garbage hauler contracted to remove the same. All yard waste and containers therefore shall be kept in an inconspicuous place except when placed for collection.”

The annual quantities of yard waste materials collected in recent years, as reported by the City, are shown in Table 7 below. The variation in tonnages year to year is typically attributed to the weather (i.e., the more precipitation received, the more yard waste collected, on average).

Table 7
Annual Yard Waste Amounts Received at the Compost Facility

Year	2006	2007	2008	2009	2010
Tonnage	5,432	6,135	6,914	9,895	6,343

In addition to the weather, another contributing factor to yard waste tonnage is related to the number of residents that leave grass clippings on their lawn instead of bagging it. The City promotes mulching in its “Residential Guide to Sustainability” by

informing readers that grass left on the lawn “shades the soil surface, prevents moisture loss, and provides nutrients through the decomposition process.”

Many states and municipalities, when calculating their recycling or diversion rate, apply a certain percentage or a source reduction credit to their tons diverted to account for mulching and backyard composting.

The City actively composts the yard waste during the spring, summer and fall months. The finished compost is given away to residents free of charge (residents must load it themselves at the Landfill compost site). The City does not sell the compost, and is able to get rid of it all through the residential giveaway program or by use in City projects.

1.2.6 Source Reduction

In its “Residential Guide to Sustainability,” the City promotes source reduction by encouraging its residents to purchase items that are recycled, recyclable, reliable, repairable, refillable, and reusable. They also encourage residents to buy in bulk to reduce their waste.

The City advocates that residents buy only materials needed in order to reduce their hazardous waste, or to choose more environmentally-friendly alternatives. In addition, the City promotes water conservation and offers rebates to residents who install high efficiency or water-conserving washers, toilets and rain-sensor irrigation systems.

1.2.7 Reuse

The City’s “Residential Guide to Sustainability” defines reuse as follows: “Reusing is simply using an item more than once, whether for the same purpose or a new one; recycling involves breaking down items to their raw components or materials which are then made into new materials; by taking useful products and reusing them without reprocessing, time, money, energy and resources are saved.”

The City encourages its residents to use reusable glasses, mugs, napkins, and rags rather than disposable plastic, paper, or Styrofoam.TM They also encourage residents to reuse shopping bags rather than throwing them or getting new ones each time they shop.

If residents have reusable household goods that they are not able to reuse themselves, there are a number of places those items can be donated rather than thrown away. Listed below are various reuse activities taking place in the Region:

- **Habitat for Humanity.** This non-profit organization accepts and reuses building supplies for low income housing construction projects. They also operate a thrift store (ReStore) in Sioux Falls to resell building supplies and other household goods.
- **Thrift Stores.** There are a number of thrift stores in the area that accept household goods, clothing, shoes, and accessories.

- **Animal Shelters.** Animal shelters in the area often accept items that can be used as pet bedding, such as rugs, towels, and blankets.

As part of its HHW Facility, the City offers a Reuse Room for residents of the five-county region to take, at no charge, household products that still have some use. Items, such as paint, cleaners, and fertilizers may be picked up at the HHW Facility's Reuse Room located between Rice Street and Benson Road off Cliff Avenue.

1.2.8 Household Hazardous Waste

The City owns and oversees the operation of its Household Hazardous Waste (HHW) Facility to collect and manage household hazardous materials. The HHW Facility is located within the City of Sioux Falls and is operated by a contracted environmental services company. The HHW Facility accepts HHW from the same five-county region as the Landfill: Minnehaha, Lincoln, Turner, Lake and McCook.

The facility currently accepts common household hazardous materials for recycling or disposal including:

- Oil-based or latex paint
- Antifreeze
- Fluorescent lamps and bulbs (no ballasts)
- Pool chemicals
- Contaminated/unusable fuels
- Wood preservatives
- Driveway sealer
- Unusable solvent-based products
- Ammunition
- Mercury (thermometers, old thermostats)
- Home fire extinguishers
- Used motor oil and oil filters
- CFLs (coiled, energy-saving bulbs)
- Home and garden pesticides
- Aerosol cans
- Specialty paints and coatings
- Propane cylinders
- Chlorinated and flammable solvents
- Corrosives (acids and bases)
- Unexploded fireworks or firecrackers

In 2004, the City banned electronics from disposal at the Landfill because many of these items contain heavy metals such as lead and cadmium. Since then, electronics have been accepted at the City's HHW Facility. The electronics are recycled or, in some cases, the parts are recovered for reuse.

The City accepts the following electronic items at the HHW Facility:

- Desktop PCs
- Monitors
- Cords & cables
- Modems
- Main frames
- CD ROM/zip/tape
- CD/DVD players
- Palm organizers
- CPUs
- Keyboards and mice
- Televisions
- Laptop PCs
- Hard drives
- Drives
- Word processors
- Printers (laser and jet)

- VCRs/laser Disc
- Video game players
- Joystick/game controls
- Camcorders
- Radios
- Typewriters
- Fax machines
- Scanners
- Paper shredders
- Answering machines
- CBs/two-way radios
- Players
- Record players
- Cameras
- Speakers
- Portable CD players
- Copy machines
- Adding machines
- Calculators
- Telephones
- Cell phones/pagers

1.2.9 Public Education

There is limited solid waste and recycling information provided at the County level in the five-county region. Most of the public education and outreach is provided by the larger cities in each County.

The City of Sioux Falls provides information to the public via local media, community events, and public speaking engagements. However the City's website is the main source of public information dissemination. Through the Public Works and the Leading Green web pages, the City offers disposal options and detailed recycling, waste reduction, and waste diversion information. The City's Residential Guide to Sustainability¹⁰ is a thorough on-line resource. In addition, brochures are available to download on topics such as electronics recycling, battery recycling, HHW, and yard waste & compost programs.

Two of the region's MRFs have websites that provide recycling information related to the types and preparation of materials they accept: The City of Madison¹¹ and Millennium Recycling.¹² Millennium also has a page titled "Where do I Take This?"¹³ that provides recycling and disposal information for numerous types of materials.

Per City Ordinance, Chapter 18, Article IV, Section 18-68, all licensed haulers in Sioux Falls are required to provide written information to their customers, at least once per year, regarding volume-based rates and MSW, recycling, and yard waste services.

The City oversees the Solid Waste Planning Board which is made up of representatives from each of the five counties that have agreements with the City of Sioux Falls to use the Landfill. One function of the Solid Waste Planning Board is to

¹⁰ Website: http://www.siouxfalls.org/green/documents/sustainability_guide

¹¹ Website: http://www.cityofmadisonsd.com/index.asp?Type=B_BASIC&SEC={0AFEB158-A9F2-4E0A-8A95-C89060C36763}

¹² Website: <http://www.millenniumrecycling.com/>

¹³ Website: <http://www.millenniumrecycling.com/where-do-i-take-this>

develop plans for public education programs for waste reduction and recycling. Per City Ordinance, Chapter 18, Article VI, Section 18-80, the members are appointed by the mayor of Sioux Falls and include:

- Three City employees - the Landfill Manager, the Sustainability Coordinator, and the Environmental Manager;
- Two representatives of the garbage hauling/recycling industry;
- One representative from the Minnehaha County Planning Office;
- Three citizens of the City of Sioux Falls who have no financial interest in the garbage/ recycling industry;
- Five members representing Lake County, Lincoln County, McCook County, Turner County, and the City of Madison; and
- A member of the South Dakota Multi-Housing Association.

In 2011, the Solid Waste Planning Board assisted City staff in revising the City's solid waste ordinances. The revisions were made in an attempt to strengthen the volume-based fee structure requirement and to provide for more enforcement of the recycling goal requirement of the haulers. The Chapter 18 Garbage and Recycling Ordinance revisions were passed by the City Council on October 3, 2011 and are attached as part of Attachment 3.

1.3 Benchmarking

As part of the Solid Waste and Recycling Assessment, SAIC benchmarked the City of Sioux Falls to other municipalities in an effort to evaluate and compare solid waste management programs. Benchmarking provides an opportunity to identify industry trends and best practices.

The cities and counties that were benchmarked included:

- City of Portland, Oregon
- City of Cedar Rapids, Iowa
- Olmsted County, Minnesota

Two of the communities, Cedar Rapids and Olmsted County, are of similar size to Sioux Falls and are located in the Midwest. While Portland is a larger city, it is known nationally for its progressive recycling and waste diversion programs. The results of the benchmarking task are outlined in a matrix attached as Attachment 1.

1.3.1 Findings

The findings from the benchmarking are listed below.

1.3.1.1 MSW-Related Findings

- The average quantities of MSW disposed per capita are similar among all communities reporting this information. For combined residential and commercial tonnages, the Region¹⁴ averaged 3.38 pounds per person per day, which falls between Olmsted County (3.27 pounds) and Portland (4.05 pounds per person per day). It should be noted that there are many factors that affect the quantity of MSW disposed per capita including, but not limited to, the affect of affluence on consumption in a community and the number and type of commercial industry in a community.
- Sioux Falls and Cedar Rapids have similar tipping fees - \$33.00 and \$38.00 per ton respectively. Both communities use landfills for disposal. Portland (\$89.53) and Olmsted County (\$83.00) have similar, but higher tipping fees. Portland's waste is delivered to multiple transfer stations where it is loaded into transfer trailers and hauled to one of eight regional landfills. Olmsted County's waste is delivered to a County-owned and operated waste-to-energy (WTE) facility.
- Sioux Falls has 25 licensed haulers which represented the most licensed residential/commercial haulers from those communities that were benchmarked. (Although 33 haulers received licenses in 2011, some collect special waste such as medical waste or restaurant grease and some are strictly transfer haulers). Portland also has a relatively high number of haulers with 19, however their residential haulers are assigned specific collection districts by the city as part of a franchise system. Portland's commercial business haulers are licensed and compete for customers similar to Sioux Falls' licensed haulers.
- Sioux Falls and Olmsted County both have open, subscription-based systems in which residents choose their MSW hauler. Portland has a franchise system in which haulers are assigned collection districts or territories by the City. The City of Cedar Rapids has a municipally-operated MSW (and recycling) residential collection program.
- All communities benchmarked have volume-based pricing for MSW collection.
- In Sioux Falls and Olmsted County the haulers set the monthly fees paid by residents. In Portland and Cedar Rapids, the individual cities set the fees.
- Sioux Falls and Cedar Rapids have similar average monthly rates for minimum residential service levels (32-gallon MSW plus recycling) at \$16.92/month and \$16.71 respectively. (However the pricing in Sioux Falls ranges from \$7.50 to \$21.00/month, and Cedar Rapids' fees include the additional service of yard waste collection.) Portland had the highest monthly fees at \$28.50 and \$32.60, respectively (different fees for east side and west side residents).
- Other noteworthy findings included:
 - Beginning October 31, 2011, the City of Portland's residential garbage collection service frequency changed from weekly to every-other-week. The

¹⁴ When calculating MSW disposed per capita, SAIC used the total tons of MSW disposed at the Landfill and the total population of the five counties in the Region.

City implemented a curbside food waste collection program in which food and other organic material can be placed in the yard waste cart to be collected weekly.

- The City of Cedar Rapids is currently encouraging commercial accounts to switch their collection containers and use their refuse dumpsters as a commingled recycling container and use their wheeled cart for garbage.

1.3.1.2 Recycling-Related Findings

- The average quantities of materials recycled per capita is quite varied due to the data available. Because Sioux Falls cannot presently differentiate recycling tons by generator type (residential versus commercial), it was not possible to compare the City to other communities' residential per capita recycling numbers. However, it was feasible to compare the per capita rates based on tons of residential, commercial, and drop-off materials combined. Olmsted County is estimated to be 1.85 while Portland is much higher at 4.78 pounds per person per day. Sioux Falls appears to be lowest of the communities benchmarked at 0.84 pounds per person per day recycled. This per capita rate is most likely underestimated because it does not include the quantities of materials recycled by the private sector (e.g., scrap metal, pallets, electronics, etc.) or materials generated in Sioux Falls that are backhauled from large retail stores that are not reported as recycled.
- Portland and Cedar Rapids both have single-stream “with glass collected separately” type recycling collection programs. These two cities allow residents to commingle all materials except glass, which must be set out in a separate container. Olmsted County's larger haulers offer single-stream recycling collection. Sioux Falls haulers offer a range of types of collection programs.
- The type of recycling collection container and level of automation of the collection vehicles varies among the benchmarked communities. Although Portland has single-stream recycling, not all residents have a wheeled cart. There are areas of the city where the height of the trees interferes with automated collection vehicles, so residents in those areas use 13- to 16-gallon curbside bins for recycling collection.
- The types of materials accepted for recycling are generally similar between the benchmarked communities.
- In all four communities, the hauler that collects the residential MSW also collects the recyclable materials.
- Portland requires haulers to provide recycling education materials to residents. The City of Cedar Rapids requires the local MRF operator, City Carton, to spend at least \$6,000 per month for community education as part of their most recent recycling agreement.
- Cedar Rapids and Olmsted County have calculated *residential* recycling rates at 20.64% and 22.1% respectively. Sioux Falls and Portland have calculated recycling rates based on *residential and commercial* recycling tonnages. Sioux

Falls estimated their 2010 recycling rate to be 23% using the U.S. Environmental Protection Agency's recycling measurement guide. The City of Portland estimated its 2009 recycling rate to be 61% and then adjusted it 6% to include a credit for backyard composting and education/outreach for an adjusted rate of 67%. Olmsted County did not provide details regarding its recycling rate calculation. SAIC is aware that in Minnesota yard waste tons are not added to the amount of recyclable materials collected. In order to give counties at least partial credit for their yard waste activities, a yard waste credit of up to 5 percent is added to county recycling rates if they engage in certain yard waste collection activities. In addition, a three percent source reduction credit is added to counties who engage in certain source reduction activities.¹⁵

- Overall, recycling/diversion/abatement goals are quite varied among the benchmarked communities.
 - The City of Sioux Falls has a recycling goal of 15%, by weight, for 2011.
 - Portland has a recycling goal of 75% by 2015 and estimated the rate to be 67% in 2009.
 - Cedar Rapids is using the state of Iowa's goal of 50% diversion by 2000, which was set in 1998 and has not been updated. For fiscal year 2011, the City's diversion rate was 50.93% which includes recycling and yard waste tonnages.
 - In 2010, Olmsted County set a waste abatement goal of 42.4% within five years. The County estimates its current recycling rate to be between 35 and 40% without yard waste and source reduction credits.

It is important to note that every solid waste management system is unique. None of the communities contacted has a solid waste and recycling program that is directly comparable to the Sioux Falls Region. The combination of collection methods, recyclable materials processing methods, recycling/diversion measurement, and other system parameters vary widely. Given this variation, it is important not to place too great an emphasis on comparisons between municipalities. Rather, the benefit in comparing is to identify the successful elements in other solid waste management systems that may be applicable to Sioux Falls as it considers improvements to its system.

1.3.2 Conclusions

The following conclusions are based on the benchmark findings as well as SAIC's industry experience.

- Although the haulers' monthly fees for collection services in Sioux Falls average \$16.92 and are comparable to Cedar Rapids at \$16.71, the range for monthly fees is quite varied, from \$7.50 to \$21.00 per month. Because the collection of MSW, recycling, and yard waste is house-side in Sioux Falls, we would expect the

¹⁵ Source: Minnesota Pollution Control Agency. <http://www.pca.state.mn.us/index.php/view-document.html?gid=4754>

collection fees on average to be higher because the service is considerably more labor intensive than in other communities.

- The City of Sioux Falls' average pounds of materials recycled per capita appears lower than the other benchmarked communities. However there are quantities of material recycled that are not currently being reported to the City, including scrap metal, carpeting, clothing, and materials (typically cardboard and plastic film) that are being backhauled from large retailers to processors and end-users. Nevertheless, the City's average pounds of MSW disposed per capita is comparable to the other benchmarked communities.
- Contributing factors to the City of Portland's high recycling rate and high per capita recycled numbers can be associated, in part, to the hauler requirements for collection from commercial generators. These licensed haulers are not franchised as the residential collection haulers, however they do need to be permitted which requires the following:
 - Offer recycling for a minimum of 14 principal recyclable materials.
 - Report to the city the quantities of MSW and recyclable materials collected.
 - Pay the city a permit fee of \$3.80 per ton of MSW collected, plus an annual fee of \$60 per hauler.
 - Offer food waste/compostable materials collection to customers that generate large amounts of food scraps and food-spoiled paper. This includes, but is not limited to, restaurants, grocery stores, hotels, institutions, etc.

Despite having over 50 hauling companies provide collection services to the businesses in Portland, the city says its commercial program is efficient because approximately "nine haulers are responsible for most of the hauling activity, handling about 83 percent of the commercial tonnage. These haulers capture the efficiencies that come with full, compact collection routes."¹⁶

1.3.3 Recommendations

We have developed, for the City's consideration, a set of draft recommended program improvements based on a combination of the benchmarking results and SAIC's industry experience.

- **Establish Collection Zones/Districts for the Licensed Haulers.** Similar to Portland and Olmsted County, the City should consider establishing geographical collection zones for each day of the week so licensed residential haulers are required to collect in specified areas of the City on specified days. This would reduce the amount of traffic on the residential streets by limiting collection in each zone to one day of the week. However, in order to accomplish this goal, the City would need to require that all haulers provide same day service to their customers for MSW, recycling, and yard waste.

¹⁶ Source: Portland Recycles! Plan, 2007.

- **Limit the Total Number of Haulers.** The City has a higher number of licensed haulers than most communities similar in size. While allowing many haulers to service the City provides customers a “choice” and may keep prices competitive, it also may accelerate wear and tear on the streets, generate more greenhouse gas emissions, and result in varied collection programs (e.g., frequency, material types, costs). The City should consider limiting the number of licensed haulers by capping the number of licenses it renews each year to the current number of haulers and by not accepting any new applications. Through attrition and consolidation, this number will naturally decrease over time. Between 2004 and 2011, fifteen haulers in Sioux Falls did not renew their hauler licenses because of retirement or acquisition.¹⁷
- **Mandate Curbside Collection vs. House-Side Collection.** Over the past three decades, the solid waste collection industry has moved away from backyard or house-side collection as a standard operating practice. In SAIC’s review of national benchmark communities, we did not find any municipalities that still provide house-side collection as a standard service. An additional fee is typically charged for offering this service. In the last ten years, SAIC has either provided consulting assistance to or benchmarked the following communities who have converted from house-side collection to curbside collection, primarily using wheeled carts for MSW, recycling, and/or yard waste: Rockville, MD; Fairfax County, VA; Cary, NC; Ocala, FL; and Athens-Clarke County, GA. Some of these communities chose to provide residents with an option of paying a higher fee for house-side collection. It should be noted that many municipalities across the country do offer house-side collection service at no extra charge to elderly residents and those with disabilities.

Curbside collection is a more efficient method of collecting MSW, recycling, and yard waste. The haulers save time per collection route and theoretically use less gas because of less truck idling time, which would reduce greenhouse gas emissions. In addition, there is the potential to reduce the number of work-related injuries because the haulers would have less distance to walk to collect the materials/containers. Curbside collection, paired with collection zones for certain days of the week, would ensure that containers would only be on the street one day per week in one section of the City at a time.

- **Standardize Collection Method and Recyclable Materials Collected.** Currently in Sioux Falls, not all haulers accept the same recyclable materials for collection (e.g., types of plastics collected varies by hauler). In addition, residential recyclable materials are set out for collection in a variety of forms including source separated, dual-stream, and single-stream. If the City were to standardize the recycling collection program so all residents set out materials in the same manner and all haulers collected the same materials, the City would have more control over public education efforts. This objective can be achieved through minimum service standards linked directly to the hauler licensing

¹⁷ Source: Data provided by City on Garbage Hauler License Issue Dates.

process. Successful recycling programs are often attributed to visible and effective public education campaigns.

- **Increase the Hauler License Fees.** The City should consider increasing the annual hauler license and renewal fees to generate adequate revenues to cover the administrative costs of managing the present and planned licensing program.
- **Transition from an Open Subscription System to an Organized Collection Program.** The City should consider the feasibility of moving to a collection program that provides for one or a limited number of haulers for each of the established collection zones through either 1) establishment of exclusive collection franchises, or 2) via direct contract(s) with hauler(s) for the selected services. Establishing exclusive collection franchises requires a public procurement of hauler(s) to provide the selected suite of collection services in each of the collection zones established through the process outlined above. Using this process, the City could limit the number of exclusive franchises provided to haulers. The City would need to evaluate state and local enabling legislation to determine if it has the authority to franchise solid waste collection services.

The State of South Dakota's most recent Solid Waste Management Plan (1991), references the utilization of private enterprise to assist regional planning districts in managing their solid waste.¹⁸ Each district has the right to establish their own guidelines regarding the use of private enterprises (i.e., contracting all operations to the private sector, maintaining some municipal operations, or operating an entirely municipally-run program). In addition, South Dakota Administrative Rule Chapter 74:27:17:02 (Collection, Transportation, Storage, and Processing),¹⁹ states that local governments are responsible for the standards and responsibilities of waste management. This rule, as written, implies that local governments are able to organize MSW collection or establish a franchise operation. The City may choose to investigate this option further with the help of its legal counsel.

In the alternative, the City could contract directly with one hauler City-wide to offer all or some of the targeted services. The most viable approach may be to contract with one hauler for City-wide recyclable materials collection providing for the licensed haulers to continue to offer other needed collection services via collection districts/zones. By contracting with one hauler, the City would have more control over the recycling program. The procurement process allows the City to explain, in detail, every aspect of the program including the types of materials to collect, the collection method, the collection schedule, reporting requirements, public education requirements, billing, etc. This type of arrangement is in place in many municipalities around the U.S., including St. Paul, Minnesota.

- **Require Private Businesses to Report Recycling Tonnages.** Currently the City receives annual tonnages of recyclable materials processed from the three MRFs

¹⁸ Source: South Dakota Administrative Rule 74:27:18, Appendix A, Chapter 4.5.

<http://legis.state.sd.us/rules/DisplayRule.aspx?Rule=74:27:18:0A&Type=Rule>

¹⁹ Source: <http://legis.state.sd.us/rules/DisplayRule.aspx?Rule=74:27:17:02>

located in the Region. In an effort to better track its recycling/diversion efforts, the City should consider asking for tonnage information from businesses that are collecting, processing, or reusing materials such as scrap metal, carpeting, clothing, pallets, concrete, asphalt, and any materials that are backhauled.

- **Apply for State Funding for Waste Diversion/Recycling Projects.** The State of South Dakota's Department of Environment & Natural Resources provides grants, loans, or a combination of grants and loans for solid waste disposal, recycling, and waste tire projects. It is recommended the City and/or counties in the Region pursue grants or loans for the purpose of expanding and enhancing recycling, waste reduction & reuse programs in the Region; fund pilot projects; and/or fund public education efforts.

To be eligible for funding consideration, an application must address:

1. How the project will advance the state's solid waste management hierarchy;
 - Volume reduction at the source;
 - Recycling and reuse;
 - Use for energy production; and
 - Disposal in landfill or combustion for volume reduction.
2. Potential cost savings, public health, or environmental benefits in solid waste management, waste tire management, or waste tire processing for energy production

Grant applicants must provide a minimum of 40 percent share of the total proposal cost. Matching funds may include public or private direct contributions, loans from private or public sources including state and federal agencies, and federal grants. In-kind contributions may also be considered as matching funds.