

RECYCLING PLAN & ANALYSIS

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Prepared for
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ABBREVIATIONS AND ACRONYMS

ABM	Alaska Building Maintenance
AFB	Air Force Base
AFS	Alaska Fire Service
ALPAR	Alaskans for Litter Prevention and Recycling
ASUAF	Associated Students of UAF
CES	Civil Engineer Squadron
CPI	Consumer Price Index
CPL	Central Peninsula Landfill
DoD	United States Department of Defense
DRMO	Defense Reutilization and Marketing Office
EAFB	Eielson Air Force Base
EPA	United States Environmental Protection Agency
FNSB	Fairbanks North Star Borough
FRM	Fairbanks Rescue Mission
GSIA	Green Star of Interior Alaska
HDPE	high-density polyethylene (#2 Plastic)
HTF	Homer Transfer Facility
KIB	Kodiak Island Borough
MSW	Municipal Solid Waste
OCC	old corrugated cardboard
PETE	polyethylene terephthalate (#1 Plastic)
QC	Quality Control
QRP	Qualified Recycling Program
RFP	Request for Proposal
RISE	Review of Infrastructure and Sustainable Energy
STF	Seward Transfer Facility
TOTE	Totem Ocean Trailer Express
TVSF	Tanana Valley State Fair
UAF	University of Alaska Fairbanks
USACE	United States Army Corps of Engineers
VCRS	Valley Community Recycling Solutions

GLOSSARY

Baler: Special equipment that compacts and binds recyclables to help reduce volume and transportation costs.

Commingled: Different types of recyclables mixed in one container – e.g., plastics, papers, metals – that are collected and processed together. Require sorting after collection.

Commodity: A raw material or primary agricultural product that can be bought and sold, such as copper or coffee.

Diversion Rate: The amount of waste being diverted from landfills due to recycling.

Electronic Waste: Sometimes called E-Waste. A term loosely applied to consumer and business electronic equipment that is near or at the end of its useful life. It includes, computers, computer peripherals, telephones, answering machines, radios, stereo equipment, tape players/recorders, video cassette players/recorders, compact disc players/recorders, calculators, and some appliances. Certain components of some electronic products contain materials that render them hazardous, depending on their condition and density.

Ferrous Metals: Magnetic metals which are predominantly composed of iron. Includes steel.

HDPE (High-Density Polyethylene): Often referred to as #2 Plastic. Recyclable plastic used to make plastic bottles, milk cartons, and other similar products.

Materials Recovery Facility: A facility that processes residentially collected mixed recyclables into new products available for market.

Mixed Paper: Waste paper of various kinds and levels of quality, including stationery, notepads, manila folders, and envelopes.

Municipal Solid Waste: More commonly known as trash or garbage—consists of everyday items we use and then throw away, such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries.

Non-Ferrous Metals: Metals which contain no iron, such as aluminum, copper, brass, and bronze.

PETE (Polyethylene Terephthalate): Often referred to as #1 Plastic. Clear or colored, high-gloss, recyclable plastic used for beverage bottles and household cleanser containers.

Qualified Recycling Program: A Qualified Recycling Program is a way for Department of Defense facilities to retain proceeds from the direct sale of recyclable materials and use those proceeds to benefit the program.

Recovery Rate: Percentage of usable recycled materials that have been removed from the total amount of municipal solid waste generated in a specific area or by a specific business.

Source-Separated: A type of recycling in which recyclables are sorted by type at the source of generation (e.g., residence or business), prior to collection.

Tipping Fee: The charge levied upon a given quantity of waste received at a waste processing facility. In the case of a landfill it is generally levied to offset the cost of opening, maintaining and eventually closing the site.

Transfer Site: A site where recyclables and/or refuse are collected in preparation for processing or landfill.

Waste Stream: The flow of waste material from generation to disposal. Includes materials that may be reused, recycled, composted, buried in landfills, or burned.

1 INTRODUCTION

This report contains a comprehensive assessment of the current state of recycling in Fairbanks, a summary of other Alaska recycling programs, an economic evaluation of recycling in Fairbanks, and recommendations for implementing a local recycling program.

In 2005, the Fairbanks North Star Borough (FNSB) hired MACTEC to develop an assessment of a Borough-operated recycling facility, including two primary methods of collection – at a central facility and at transfer sites. At the time of the study, the value of recyclable materials was much different and there were fewer recycling options within the borough.

This study updates and expands upon the MACTEC report. Most notably, this study includes the evaluation of a recycling program operated by a non-profit entity.

1.1 Solid Waste Collection Summary

The FNSB operates a municipal landfill on the south side of the city. Solid waste in the borough is collected by public and private haulers as well as private residents and businesses that self-haul.

In fiscal year 2014 (July 2013-June 2014), 105,038 tons of solid waste entered the FNSB landfill. The primary sources of solid waste include:

- FNSB transfer sites
- Commercial sources
- Fort Wainwright (FTW)
- Eielson Air Force Base (EAFB)
- City of Fairbanks

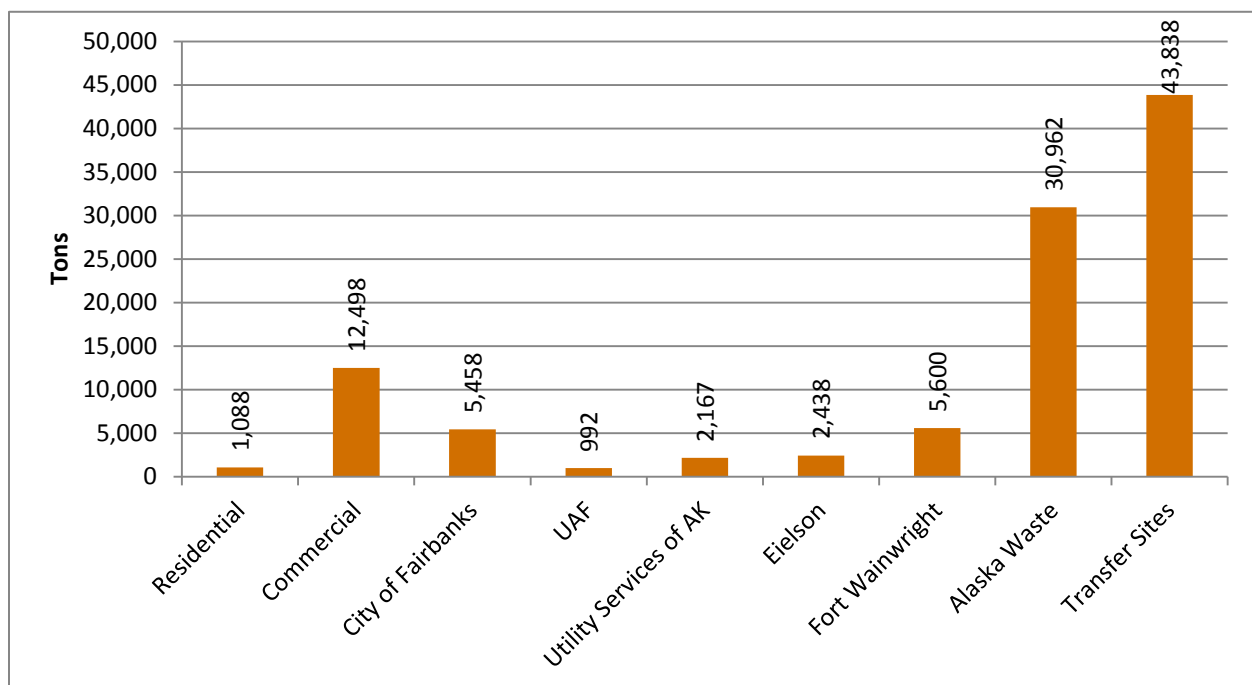


Figure 1 – Fiscal Year 2014 Waste Volumes Entering the FSNB Landfill by Customer

1.2 History of Recycling in Fairbanks

Recycling and reuse has a long history in Fairbanks, due in part to its location at the “end of the road.” Early pioneers to Interior Alaska had to be self-sufficient because of the distance from urban areas and other supply centers. High shipping costs have encouraged residents to reuse items that would likely be thrown away in the Lower 48. This is evident in the popularity of the reuse areas at the FNSB transfer sites.

Formal recycling programs began in the 1980s and 1990s. The 2005 MACTEC study was the first formal analysis of an FNSB-operated recycling program.

The FNSB recycling/hazardous waste facility opened in August 1996. This facility accepts waste motor oil, paint, antifreeze, batteries, and flammable liquids/fuels. The Used Oil Energy Recovery program at the landfill began in October 2002 and serves as the primary heat source for the main landfill building. This program uses waste oil as a fuel source to heat FNSB buildings. The program has resulted in significant savings of used oil disposal costs and reduced the need to purchase heating fuel.

The FNSB Recycling Commission was established in 2009 by amendment to Borough code. An independent recycling task force was formed in mid-2014.

The University of Alaska Fairbanks (UAF) began recycling in the 1990s; recycling is now part of broader sustainability efforts coordinated by the Office of Sustainability (OS). See Section 2.1.1 for a complete description of UAF’s recycling efforts.

Green Star of Interior Alaska (GSIA) was established in the mid-1990s and acquired 501(c)(3) non-profit status in 1998. The program focuses on reducing local waste and increasing community recycling. GSIA is the primary recycler of household electronics in Fairbanks. See Section 2.1.6 for a complete description of the program.

The Fairbanks Rescue Mission (FRM) opened a recycling center to the public in 2009 as part of a job skills program. See Section 2.1.1 for an overview of FRM’s recycling program.

1.3 Current Recycling Efforts in Fairbanks

As of early 2015, there are several entities in the Borough that collect recyclables. These include:

- Fairbanks Rescue Mission Recycling Center
- Green Star of Interior Alaska
- University of Alaska Fairbanks
- K&K Recycling
- Fort Wainwright
- Eielson Air Force Base
- Fairbanks North Star Borough Solid Waste Division

Descriptions of each of these programs are included in Section 2.1. The table below summarizes what products each program currently recycles.

Table 1 – Fairbanks Area Recyclable Collection Efforts

Material	Fairbanks Rescue Mission Green Star of Interior Alaska	UAF	K&K Recycling	FNSB ¹	Eielson Air Force Base	Fort Wainwright
Cardboard						
Newspaper						
Mixed Paper						
Plastic #1						
Plastic #2						
Glass						
Aluminum						
Steel						
Scrap Metal						
Electronics						
Paint/Oil/Antifreeze						

As the table shows, recycling in Fairbanks is being conducted in a piecemeal fashion. Other than Green Star of Interior Alaska, all other recycling programs overlap in one or more areas.

In addition to these programs, a Fairbanks Recycling Task Force was put together in August 2014 to encourage collaboration among local recyclers. The task force is composed of the entities identified above, as well as representatives of the FNSB Recycling Commission, FNSB Assembly, Alaskans for Litter Prevention and Recycling (ALPAR), Alaska Waste, recyclers from other parts of Alaska, and the public at-large.

1.4 Recycling in Other Parts of Alaska

Recycling occurs in several areas of the state, primarily in urban areas close to the coast. This includes:

- Matanuska-Susitna Borough
- Kodiak Island Borough
- Municipality of Anchorage
- Kenai Peninsula Borough
- City and Borough of Sitka

Summaries of other recycling programs are included in Section 2.2.

¹ The FNSB collects recyclables at the landfill and select transfer stations.

1.5 Overview of Recycling Stream

Most recyclables collected in Fairbanks are trucked or are shipped by rail to the Port of Anchorage where they are barged to Seattle or Tacoma, WA. The only recyclables that remain in Alaska are glass and newspaper. Some glass is recycled for several specialty uses such as aggregate in the base of roadbeds or pipe bedding. Newspaper is used by Thermo-Kool of Alaska to produce cellulose insulation. Shipments are largely donated through ALPAR (see Section 2.3.1 for summary of ALPAR).

1.6 Recycling Program Considerations

There are five components of a recycling program that need to be considered:

- 1 Markets** – The best markets for materials normally collected in municipal programs are for those packaged and sold in tractor-trailer lots. Combination loads of several materials are marketable as well, but usually at lower pricing as they need to be repackaged with similar materials by a buyer or broker.
- 2 Materials** – Analyzing the marketability and economics of different materials will help determine which materials to recycle.
- 3 Collection** – A collection system will be necessary to accumulate the recovered materials. Material types dictate the best method for collection.
- 4 Processing** – For materials to be marketable, they must be processed to meet quality standards established by the buyer. A processing center, whether public or private, is necessary.
- 5 Organization** – Some organizational structure is necessary to conduct the day-to-day operations of the program, schedule deliveries, ship materials, pay bills, and enter into contracts.

Additionally, recycling programs should pay attention to commercial, institutional, and industrial sources of recyclables because these generate large quantities of materials at one location, simplifying collection.

1.7 Potential Recyclables

The Environmental Protection Agency (EPA) publishes a guide to municipal solid waste generation and recycling that includes information on the typical percentage of recyclables in the waste stream as well as typical recycling recovery rates. These figures were applied to the Municipal Solid Waste (MSW)² stream in the FNSB (Table 2) to determine the potential volume of recyclables available to a recycling program.

Table 2 – Potential Recyclable Volumes in the FNSB

Material	% of MSW	Estimated Annual Tonnage in FNSB	Recycling Recovery Rates (%)	Estimated Annual Tonnage of Potential Recyclables in FNSB
Paper/Paper Board	27.4	22,035	64.6	14,235
Glass	4.6	3,699	27.7	1,025
Steel	6.7	5,388	33.0	1,778
Aluminum	1.4	1,126	19.8	223
Other Nonferrous Metals	0.8	643	68.0	437
Plastics	12.7	10,213	8.8	899
Rubber, Leather, Textiles	8.7	6,997	33.6	2,351
Wood	6.3	5,066	15.2	770
Other	3.4	2,734	28.3	774
Food Wastes	14.5	11,661	4.8	560
Yard Trimmings	13.5	10,857	57.7	6,264

²Of the 105,038 tons of solid waste entering the FNSB landfill in FY14, 80,420 tons were considered Municipal Solid Waste; the remainder was classified as construction debris. Construction debris was not included in the calculations for Table 2.

2 ALASKA RECYCLING & RECYCLING SUPPORT PROGRAMS

Understanding the successes and failures of other recycling programs is important in identifying a path forward for Fairbanks area recycling. This chapter summarizes several active recycling programs in Fairbanks and other parts of the state, as well as statewide programs that support recycling activities. Table 3 provides an overview of each program's basic components.

Table 3 – Summary of Alaska Recycling Programs

Program	Staff	Volunteers	Hours	Method	Materials Accepted	Uses ALPAR?	Subsidized
Fairbanks Rescue Mission	2	Yes	24-hour drop-off	Source-separated	Plastic (#1, #2) Paper Aluminum	Yes	Yes
K&K Recycling	35	No	M-F, 8am-5pm	Source-separated	Paper Glass Aluminum Steel	No	Some programs
UAF	*	No	24-hour drop-off	Source-separated	Plastic (#1, #2) Paper Glass Aluminum Steel	No	Partially
Eielson AFB	*	No	No public collection	Source-separated	Scrap Metal Batteries Cooking Oil	No	No
Fort Wainwright	*	No	No public collection	Source-separated	Brass Batteries Waste Oil Cooking Oil	No	No
GSIA	3	Yes	Monthly events	Source-separated	Electronics	No	Yes
FNSB	*	No	24-hour drop-off	Source-separated	Aluminum Batteries Waste Oil Scrap Metal	No	No
VCRS	8	Yes	T-F, 10:30am-6pm Sa, 10:30am-3:30pm	Source-separated	Plastic (#1, #2, #5, film) Paper Clothing	Yes	Yes
Threshold	18	Yes	T-Sa, 10am-6pm	Source-separated	Plastic (#1, #2) Paper	No	Yes
Kenai Peninsula Borough	6	No	24-hour drop-off	Source-separated	Plastic (#1, #2, bags) Paper Aluminum Glass Steel Batteries	Yes	No

* indicates the organization has no staff specifically dedicated to the recycling program.

Members of the consultant team interviewed the following entities during winter 2014-2015. This included site visits to see several of the operations in practice.

- University of Alaska Fairbanks
- Eielson Air Force Base
- Fort Wainwright
- Green Star of Interior Alaska
- Fairbanks Rescue Mission
- Valley Community for Recycling Services
- Kenai Peninsula Borough
- Threshold Kodiak
- Alaskans for Litter Prevention and Recycling (ALPAR)
- Rock Tenn
- Alaska Waste (Fairbanks operation)

2.1 Fairbanks-Area Recycling Programs

2.1.1 Fairbanks Rescue Mission

Background

The Fairbanks Rescue Mission has been in operation since 1974. FRM's recycling program began in 2009 as a work skills program for the mission tenants; a drop-off center for the public opened in September of that year. Drop-off of recyclables was initially available on Saturdays only. In April, 2011, the FRM recycling center expanded to include 24-hour drop-off. Since opening to the public, the center has processed an average of just over 1.5 million pounds (750 tons) of recyclables every year.

The FRM recycling center has seen consistent community support. There was a minor dip in the amount of recyclables being dropped off by the public after K&K Recycling began collecting recyclables at UAF. In 2012, the FRM recycling center accepted cardboard from Alaska Waste as part of a commercial recycling pilot project. That project is no longer operating.

Current Program

Today, the FRM recycling center operates a 2,000 square foot facility with 24-hour drop-off. Pick-up from businesses is also offered for a \$50 pickup fee. Local businesses that the FRM recycling center works with include Sears, Fairbanks Memorial Hospital, Pogo Mine, Fairbanks Daily News-miner, Cold Spot Feeds, and Aramark (which hauls recyclables from Denali National Park).

The FRM recycling center averages five volunteers per day to process recyclables. The center is able to use Mission tenants for volunteer labor as an exchange for room and board.

Aluminum is sold locally to C&R Pipe, while nearly all of the newspaper that the FRM recycling center collects is used by Thermo-Kool in Wasilla.

In addition to revenues from the sale of recyclables, the program relies on grants for funding. Because the FRM is a 501(c)(3) with multiple missions, it is able to apply for many different grants (e.g., environmental, social, educational).

Quality Control

Quality control (QC) is important to FRM, as maintaining high quality standards ensures they get top dollar for their recyclables. As such, they sort all recyclables by hand before baling and shipping to Anchorage. They do not accept contaminated products and will dispose of any contaminated items they receive.

Recyclable Materials

The FRM recycling center currently accepts:

- Aluminum
- Cardboard
- Newspaper
- Mixed paper
- Plastics #1 and #2

They are also investigating the possibility of recycling plastics #3-7 and glass. There has been some interest by a local contractor in using glass for septic installations.

Organization and Contracts

The FRM is a non-profit 501(c)(3) corporation that is governed by a Board of Directors and managed by an Executive Director. There are two paid staff related to the recycling program.

The FRM recycling center works with ALPAR for shipping recyclables to Anchorage, and Rock Tenn (see Section 2.3.2) is the exclusive buyer of FRM's recyclables.

The FRM recycling center is looking to expand their capacity by moving to a larger facility and acquiring a larger, horizontal baler. The larger facility and new baler will allow the FRM to process recyclables more efficiently and meet industry standard specifications. Negotiated partnerships at the new facility include space for Green Star of Interior Alaska's electronics recycling and Habitat for Humanity's construction material resales.

2.1.2 K&K Recycling

Background

K&K Recycling is a private, for-profit business in Fairbanks that was established in the early 1980s. The company operates from two locations along the Richardson Highway between Fairbanks and North Pole.

From 2010 until January 2014, K&K accepted plastics, which were baled and stored at K&K's facility on the Richardson Highway. The long-term goal was to convert the plastic into a liquid fuel. While they had some success at converting small amounts, K&K is still searching for a way to make the process viable for large amounts.

K&K also collected recyclables from Fort Wainwright and Eielson Air Force Base from 2010 to 2014 (see Sections 2.1.4 and 2.1.5).

Chena Power, LLC, which is affiliated with K&K Recycling, was started in 2006 to convert waste paper into compressed bricks for home heating.

Current Program

K&K maintains a recycling collection facility on the Richardson Highway halfway between Fairbanks and North Pole. They recently acquired a glass crusher and have been crushing glass for future use.

Chena Power continues to produce compressed bricks for home heating.

Quality Control

QC is not as critical to K&K as other recycling programs. This is because they do not sell many of the recyclables they collect to the commodity markets.

Recyclable Materials

K&K currently accepts cardboard, paper, glass, aluminum, and steel. They also take other non-ferrous metals such as brass and copper. In 2014, K&K collected 554 tons of paper, 190 tons of glass, 540 tons of steel, 8.5 tons of aluminum, and 19 tons of tin.

Organization and Contracts

K&K has a contract with the FNSB to haul recyclables from the UAF Taku parking lot (see Section 2.1.3 for history of this program). They also accept recyclables from businesses and residents at their Richardson Highway facility.

2.1.3 University of Alaska Fairbanks

Background

Recycling on campus was originally a volunteer effort, dating back at least to the 1990s. At some point prior to 2005, the Associated Students of UAF (ASUAF – the student government body) took over management of the recycling program, and created a student position to coordinate the effort. In 2009, ASUAF passed an initiative instating a \$20 student sustainability fee (matched by the Chancellor's office), creating the Review of Infrastructure and Sustainable Energy (RISE) board and the Office of Sustainability to tackle sustainability issues on campus. Shortly thereafter the OS assumed responsibility along with FS for recycling. The RISE board has oversight over the OS portion, which focuses on collection inside dorms and UAF buildings.

In the course of UAF's recycling history, materials have gone to many different entities that sprung up to accept them at various times. For example, UAF brought their paper waste to Eielson Air Force Base (EAFB) for most of the period that EAFB was running their paper waste-to-energy program (see Section 2.1.4). When this was shut down, there was a brief period where paper was landfilled. Once K&K began accepting paper, UAF began hauling their paper there. In 2010 UAF signed a contract with K&K recycling to accept paper waste as long as UAF also gave K&K aluminum, tin, glass, and plastic. That arrangement was in place until 2013. Plastic and glass have been recycled intermittently. In the late 2000s, plastic and glass were backhauled to Anchorage, but this was discontinued. Glass is currently taken to K&K's facility.

UAF has also had a complicated involvement with community-wide recycling in the FNSB. From UAF's first forays into recycling, it became apparent that some non-UAF-affiliated members of the Fairbanks community would go to great lengths to deposit their recyclables in bins on campus. When UAF expanded their operation and established dumpsters at easily accessible parking lots for recyclables, the community began using them heavily (UAF estimates community contribution at 80 to 97 percent of materials collected). Until July 2013, UAF hauled all material collected in these dumpsters to K&K at their own expense; after this date the FNSB paid K&K directly to pick up materials from this site. Given the community

contribution to materials collected at UAF, there is no good way to differentiate whether the source of the materials are from campus or the community in terms of tracked weights/volumes of recycled materials.

Current Program

UAF currently collects aluminum, paper, cardboard, glass, batteries, electronics, and #1 and #2 plastics (in select locations only). There are also containers in the Taku parking lot (Taku) for tin/steel food cans and clothing. Aluminum and glass is collected by OS staff in various locations around campus and consolidated in the recycling bins located at Taku. Plastics (#1 and #2) are collected by OS staff from the dormitories and the Murie Building and taken directly to the Fairbanks Rescue Mission. Paper and cardboard is collected (mixed) from office buildings by the janitorial contractor Alaska Building Maintenance (ABM), deposited in dumpsters at select buildings around campus, and transported directly to K&K by FS. Electronics are collected at UAF Surplus. The electronics are reused by other departments on campus, auctioned at annual sales, or recycled through Green Star of Interior Alaska. Batteries are either recycled by UAF Risk Management or by OS through GSIA. K&K periodically collects aluminum, paper, cardboard, glass, and tin/steel from the dumpsters at Taku and transports them to their facility. Fairbanks Resource Agency periodically collects clothing from the bin at Taku, for eventual reuse.

UAF Facilities Services also runs a limited pre-consumer food-waste composting operation with Dining Services, and leaves most grass clippings on lawns (rather than bagging). UAF also recently purchased a glass crusher, with the intent of crushing and reusing glass on campus. UAF has plans to expand both composting and glass-recycling on campus in the near future.

Quality Control

Historically, UAF has had to adapt their QC procedures to fit the criteria of who was accepting the material at the time. Recently, QC requirements are minimal, given the end uses of the materials by K&K. However, with UAF starting to take #1 and #2 plastic in select locations, QC has become a significant factor. FRM has strict QC requirements for plastics, and the OS expends substantial labor removing contaminants from plastic bins to meet these requirements. This may be in part due to prior acceptance of all plastics by K&K with minimal QC requirements, but also speaks to the general need for increased education and outreach among the UAF population. Historically, it has taken a significant amount of labor to separate contamination in plastics. There is little to no QC of materials collected directly in dumpsters at Taku; UAF has not had any significant complaints from K&K regarding quality concerns.

Recyclable Materials

UAF generally desires to recycle (or compost) the following materials: paper, cardboard, glass, aluminum, plastic, scrap metal, food waste, and yard waste. As noted above, UAF plans to recycle glass and compost food waste and yard waste internally, so these relatively low-value waste streams would likely not be diverted to a community recycling program. Finding a way to recycle plastics #3-7 is a priority for UAF, and likely an essential part of reaching waste diversion goals (see below). Currently, recycling these “other” plastics is expensive, and no entity in the FNSB is accepting them. UAF is hopeful the FNSB will begin to recycle glass at the community level so UAF is no longer handling the community glass waste collected at Taku.

Organization and Contracts

Sustainability efforts at UAF are guided by a recently-adopted Sustainability Plan, now a component of the UAF Master Plan. The Sustainability Plan establishes ambitious goals for waste reduction and diversion, including a 90 percent packaging reduction on incoming goods by 2022 and becoming a zero-

waste campus (90 percent waste diversion) by 2035. Many different entities at UAF will be involved in achieving these goals. The OS is charged with coordinating sustainability efforts on campus, including recycling. FS has a broader responsibility of general waste management on campus, and is therefore also involved in recycling. Other entities on campus involved in long-term planning and cross-department coordination of recycling and other aspects of waste reduction, reuse, and recycling, include the RISE board and the RISE board Zero Waste Subcommittee. The FNSB should coordinate with these groups for long-term recycling planning.

UAF contracts out their janitorial services to ABM. Making recycling pickups integral to the janitorial contract is a key strategy for institutionalizing the current recycling program. Unlike the military bases, UAF does not contract waste removal and hauling; rather, FS hauls waste directly to the landfill. This gives UAF greater control and flexibility in terms of making changes to their collection and transportation methods.

Given UAF's goal to become a zero-waste campus by 2035, and the high priority placed on sustainability by the student body and administration, UAF is eager to see recycling expanded in the greater Fairbanks community. The RISE board, the Zero Waste Subcommittee, the OS, and FS generally concur that a sustainable, comprehensive regional program is needed in order for UAF to achieve their goals. UAF already has a significant, well-supported, and dynamic collection process; what is lacking is a reliable and consistent local recycler with capacity to accept UAF's recyclables at a reasonable cost and with material end-uses that are environmentally responsible.

2.1.4 Eielson Air Force Base

Background

The history of recycling at EAFB includes past partnerships with the FNSB, as well as participation in private programs. From 1998 to 2007, EAFB ran a waste-to-energy program for paper, pelletizing it and burning it with coal in their power plant. The program ended in 2007 when the pelletizing facility burned.

K&K began conducting regular pickups of recyclables (paper, cardboard, plastics 1-7, and glass) in 2010, at no cost to EAFB. In 2014, K&K stopped collections, claiming their costs were too high. Base leadership encouraged the Civil Engineer Squadron (CES) to put out a request for proposal (RFP) to establish a recycling contract. In the summer of 2014, EAFB did issue such an RFP, but no bids were received that met RFP requirements.

Historically, recycling collection at EAFB has consisted of a central receiving area with dumpsters for different materials. There were also several satellite dumpsters near facilities generating specific kinds of waste. Participation was mostly voluntary, and a vast majority of participants were residents of base housing. Non-residential participants included the aircraft maintenance fabrication shop and the vertical construction shop, which generate measurable quantities of aluminum, brass, steel, and copper.

Current Program

EAFB currently recycles used cooking oil, lead acid batteries, and scrap metal through "in-house/government-employee-operated" programs. Cooking oil, batteries, and other hazardous materials are recycled through their hazardous waste program, and would not likely be part of a future comprehensive recycling program. Scrap metal is recycled through C&R Pipe and Steel; EAFB provides transportation (1 to 2 trips per week) of mixed scrap metal to C&R, which buys it based on market value.

EAFB currently does not have a Qualified Recycling Program (QRP). A QRP is a way for Department of Defense (DoD) facilities to retain proceeds from the direct sale of recyclable materials and use those proceeds to benefit the program.

Quality Control

Historically, there have been few controls on the quality of collected materials; collections for the K&K program consisted of generally unmonitored dumpsters. The only known QC issue with the K&K program occurred when used engine oil was discovered in a paper bin. K&K was generally able to accept low-quality materials due to the nature of their end-uses of the materials; QC is a much greater concern for a program selling materials on the commodity markets. EAFB has a much greater degree of control of non-residential recycling. QC of recyclables collected from base housing would be a greater challenge, and one that must be met through collaboration with Corvias Military Living (Corvias), the current housing contractor. EAFB has a strong volunteer base, as Airmen are expected to volunteer a certain number of hours in community programs. There is the potential for staffing collection sites with volunteers to conduct QC on incoming recyclables, though such a QC program would still need oversight and coordination by paid staff.

Recyclable Materials

EAFB generally desires to recycle the following materials: paper, cardboard, glass, aluminum, tin/steel cans, scrap metal, wood (mostly from pallets), and possibly plastic. EAFB housing generates a larger proportion of cardboard than typical residential generators, given the high turnover and corresponding quantities of shipping boxes. Historic records of the volume of paper and cardboard collected do not differentiate between the two materials, but Capt. Winsor noted that a majority was cardboard. Also noteworthy is that EAFB has a base-wide policy to shred and bag all paper waste.

Organization and Contracts

It is the general responsibility of CES to plan, develop, and implement recycling at EAFB. However, the Wing Commander has the ultimate authority on whether to implement a program, and there are several layers in the chain of command between the two. Base operations falls under this chain of command, so non-residential participation in a recycling program could be mandated from the top-down. Waste collection at non-residential buildings is currently contracted. Housing operation and maintenance is contracted to Corvias, who subcontracts curbside pickup refuse removal. There are currently 816 occupied homes on EAFB. Implementation of recycling at EAFB would likely require contract modifications.

Establishing an effective recycling program is a high priority for EAFB, but CES acknowledges that it must be based on a broader regional program in order to be feasible. The Air Force has strong goals for recycling on their installations, including a “Net Zero” waste policy that aims to minimize volumes of landfilled wastes. It is very likely that EAFB would participate in a community or regional recycling program that presented a similar or lesser cost than refuse removal. Development of a regional program would help EAFB establish a much needed QRP.

CES staff indicated a number of options for implementing a recycling program at EAFB, ranging from a fenced outdoor collection facility with dumpsters to a base-wide collection program with a central indoor sorting and baling facility. Simplicity and cost of the program weighs strongly into how long it would take to implement. Any regional program should work closely with EAFB when developing collection and transportation strategies, and take into consideration the costs and benefits to both entities of unbaled collection and transportation (via dumpsters and refuse trucks) vs. collection, on-site processing/baling, and transportation of baled recyclables.

2.1.5 Fort Wainwright

Background

FTW has a history of collecting recyclables, but finding end-uses for these materials has proven difficult. At one point FTW was shipping recyclables to Fort Richardson in Anchorage. FTW has approached the Alaska Railroad about backhauling recyclables, but were unable to obtain a discounted backhaul rate. Several private entities have approached FTW over the years to explore establishment of a recycling program, but these approaches generally lacked a solid plan for shipping out the materials in a cost-effective manner, and were thus not pursued.

FTW recently participated in a no-cost recycling arrangement with K&K Recycling. K&K began conducting regular pickups of recyclables (paper, cardboard, plastics 1-7, and glass) in August 2012. K&K stopped collections in August 2014, claiming their costs were too high. During participation in the K&K program, recycling collection at FTW consisted of dumpsters for different materials selectively placed in various locations throughout FTW. Participation was mostly voluntary, and a majority of participants were residents of on-post housing.

Early in the no-cost recycling arrangement with K&K, FTW sold their recycling equipment (including several trucks) to K&K through the Defense Reutilization and Marketing Office (DRMO) program. FTW does not currently have recycling equipment available for use in a comprehensive collection program on post.

Current Program

FTW currently recycles brass (from shooting ranges), lead-acid batteries and waste oil (through their hazardous waste program), scrap metal, cardboard (at the commissary only), and used cooking oil. Used cooking oil had been collected by K&K until their program ceased, at which point DPW assumed control of this waste stream which is shipped to outside recyclers.

A majority of scrap metal is recycled as part of construction contracts managed by the US Army Corps of Engineers (USACE). In addition to metal waste from construction, DPW recycles empty drums (emptied and crushed) through C&R Pipe and Steel. The Alaska Fire Service (AFS) recycles scrap metal from their operations directly with C&R Pipe and Steel.

FTW has a QRP that currently encompasses brass and hazardous waste items that are recycled (batteries and waste oil). Cardboard recycling at the commissary and scrap metal recycling through USACE contracts are not part of the QRP, nor would they likely be in the future. However, the QRP could be expanded to encompass other recyclables, depending on the end-use of the materials; waste-to-energy and stockpiling do not qualify as recycling under a QRP.

Quality Control

Historically, there have been few controls on the quality of collected materials; collections for the K&K program consisted of generally unmonitored dumpsters. There were no known QC issues where K&K was unable to accept recyclables from these dumpsters. K&K was generally able to accept low-quality materials due to the nature of their end-uses of the materials; QC is a much greater concern for a program selling materials on the commodity markets. According to FTW, volunteers are in short supply at FTW and could not be relied on for assistance with QC at collection facilities.

Recyclable Materials

Fort Wainwright generally desires to recycle the following materials: paper, cardboard, glass, aluminum, tin/steel cans, scrap metal, wood, and possibly plastic. Additionally, AFS generates a significant quantity of plastic helmets (made from a #7 [other] plastic) that they wish to recycle. FTW housing likely generates a larger proportion of cardboard than typical residential generators, given the high turnover and corresponding quantities of shipping boxes. As noted above, certain recyclable streams are currently dealt with outside the QRP, and these streams are not likely to be available to a regional program.

Organization and Contracts

FTW is currently undergoing a transition in management of recycling operations on post. Lt. Aquinovarela is currently acting manager of the QRP; however, this role is temporary, and FTW is actively looking to transition management of the QRP to a civilian employee, likely within the Department of Public Works (DPW). DPW is currently responsible for recycling within FTW's hazardous waste management program. AFS is headquartered at FTW, but exists as a separate entity under the umbrella of the BLM within the US Department of the Interior. Coordination between DPW, AFS, and other parties on post (e.g., the Commissary) is critical to building a comprehensive recycling program at FTW.

As with EAFB, FTW contracts out operation of their residential housing. Incorporating recycling into housing would likely require contract modifications. Waste collection and hauling from non-residential buildings on post is also contracted, and would require modifications to accommodate recycling (whether the same company was to collect and haul to a regional facility, or if an on-site collection and processing facility was established).

Establishing an effective recycling program, ideally through the existing QRP, is a high priority for FTW. However, QRP funds are limited to revenue from the sale of recyclables, and relying solely on QRP funding would make it difficult to fund collection and processing of lower-value recyclables. Alternatively, recycling could be considered a component of waste management in general, and would likely be implemented if recycling costs were similar or less than the current costs of landfilling. Both Lt. Aquinovarela and Mr. Seibel emphasized the need for a sustainable regional program with transportation to commodity markets to make a comprehensive recycling program at FTW feasible. The lack of local facilities accepting bulk recyclables is the largest barrier to FTW establishing their own program.

As with EAFB, FTW could potentially implement a range of collection, processing, and transport strategies, from a fenced outdoor collection facility with dumpsters to a base-wide collection program with a central indoor sorting and baling facility. Again, simplicity and cost of the program weighs strongly into how long it would take to implement. The FNSB should work with FTW to evaluate the advantages and disadvantages of unbaled collection and transportation (via dumpsters and refuse trucks) vs. collection, on-site processing/baling, and transportation of baled recyclables.

2.1.6 Green Star of Interior Alaska

Background

Green Star of Interior Alaska began as a chapter of Anchorage Green Star in 1990 and became a 501(c)(3) in 1998. Their original focus was the Green Star Award, which recognized local businesses for exercising environmental responsibility.

Today, Green Star of Interior Alaska is separate from Anchorage Green Star. The focus of the program has also changed, with an emphasis on reducing local waste and increasing recycling.

Current Program

Green Star of Interior Alaska is the primary recycler of electronics in Fairbanks, holding monthly collection periods the third weekend of the month. This program is partially subsidized by the FNSB, which allows Borough residents the ability to drop off electronics free of charge. Community participation in the electronics recycling program has grown steadily since its inception. Local businesses have been supportive of the program as well and contribute a large volume of e-waste.

Green Star of Interior Alaska also provides recycling at community events such as the Tanana Valley State Fair (TVSF) and the Midnight Sun Festival. They have organized recycling at the TVSF since 2006.

Outreach and education are also important tenets of Green Star of Interior Alaska's mission. As such, they develop the annual Fairbanks Recycling Guide with support from the FNSB and Recycling Commission. The Recycling Guide has grown over the years from a one-page flyer to a multi-page insert in the Fairbanks Daily News-miner. Future plans include direct-mail of the guide to households throughout the Borough.

Other outreach efforts include Facebook ads, Chamber of Commerce announcements, flyers for special events, and updating community calendars with recycling events.

Quality Control

QC is not as imperative with electronics recycling as it is with other commodities. Because the collection of e-waste is limited to one weekend per month at a central facility, Green Star of Interior Alaska can ensure that no unacceptable products are collected.

Recyclable Materials

Green Star of Interior Alaska accepts most items that plug in or run on batteries, such as computers, monitors, cell phones, cameras, and game systems. They also accept batteries, ink cartridges, and DVDs. These items are shipped to Anchorage.

Items that cannot be accepted include full-size appliances, smoke detectors, vacuum cleaners, and fluorescent light bulbs.

Organization and Contracts

The organization is managed by an Executive Director who reports to a five-member board of directors. In addition to the Executive Director there are two part-time staff members. During 2014, more than 140 volunteers had participated in GSIA activities.

Green Star of Interior Alaska relies on the FNSB, sponsorships, grants, and individual contributions to keep the program funded. A small percentage of revenue comes from the sale of compost bins and fees for special event recycling. The FNSB funding is currently appropriated on an annual basis and must be sought every year.

Green Star of Interior Alaska is currently working with ComputerWerks to develop consignment sales of high quality computer components that are collected as part of the e-waste recycling. This could provide additional income for the program.

2.2 Other Alaska Recycling Programs

2.2.1 Valley Community Recycling Solutions

Background

Valley Community Recycling Solutions (VCRS) began in 1998 as a volunteer-run community based non-profit. It began by accepting recyclables in borrowed crates at one-stop events in parking lots across the Borough. VCRS began its operations with the goal of providing a reliable and consistent program, a goal which still remains a central tenant of their operations.

In 2002, they moved to their first permanent location on the corner of the Palmer-Wasilla Highway and 49th State Street. This permanent location allowed them to acquire their first vertical single stroke baler, which was donated by Waste Management of Alaska. This first baler increased the marketability of their recyclable products. Bales of recyclable materials could now be sold to brokers in the state and elsewhere. However, the vertical baler did not have the capacity to bring all of their products to industry standards. For instance, aluminum could only be processed as half bales which, once shipped, had to be broken apart and re-baled for market.

Grassroots outreach campaigns were conducted throughout the Borough from 1998 through 2005. The aim of this outreach was to increase awareness of recycling and increase the amount of recycling being brought to VCRS rather than dumped in the landfill. In 2005, VCRS acquired a horizontal single stroke baler. This baler allowed their products to meet industry standards and increase total recycling capacity. Their production could now be measured in tons per hour rather than hours per ton.

In 2010, a 23,000 square foot, gold-level LEED certified building was constructed on five acres adjacent to the landfill to house the nonprofit's recycling and educational facilities where they could be easily accessed by both the public and the waste contractors. The construction was funded largely by a grant from the Economic Development Association (\$3.5 M), the Borough (\$1.5 M), and the State (\$1 M). The Borough maintains ownership of the building, but its ongoing expenses and operation are managed fully by VCRS. This new facility has also been instrumental in furthering the nonprofit's educational and outreach campaigns.

The baler purchased in 2005 hit its capacity at around 1,500 tons per year in 2010. In 2014 VCRS purchased a larger, double-stroke horizontal baler with an in-floor conveyer for a sum of \$700,000. With a new capacity for growth, VCRS is poised to launch another outreach campaign to increase the volume of recycling in the borough.

Current Program

VCRS currently recycles aluminum, steel, plastics #1, #2, and #5, plastic film, newspaper, mixed paper, egg cartons, cardboard, and a number of miscellaneous items, including clothing, eye glasses, ink jet cartridges, and packing peanuts. All recycling is dropped off and processed at the Community Recycling Center, located adjacent to the landfill in Palmer.

VCRS expressed the wish to establish additional drop off locations at the Borough's waste transfer stations, although the necessary facilities have not yet been developed.

Quality Control

Education is a key component of quality control carried out by VCRS. Since its formation in the late '90's, VCRS has had the goal of becoming a model for recycling in Alaska communities. They maintain a LEED certified building, where they run their recycling programs, and encourage the public to visit and learn more about the benefits of recycling, what to recycle, and how to reduce and reuse in daily life. The facilities include a classroom, where elementary school groups can come to learn about waste systems and recycling. VCRS develops flyers, brochures, and educational pamphlets for distribution at schools and throughout the community to foster a continued awareness of their recycling programs, and inform residents how to clean and sort recycling for processing.

The Community Recycling Center is a fully manned facility. Drop-off hours for residential recycling are from Tuesday – Friday, from 10:30 a.m. to 6:00 p.m., and Saturday, from 10:30 a.m. to 3:30 p.m. The Center is closed for drop-off of residential recycling on Sunday & Monday. Fully manned facilities and designated drop-off hours gives VCRS greater oversight of the quality and type of materials being dropped off and processed at the Recycling Center.

Recyclable Materials

VCRS generally desires to recycle the following materials: newspaper, mixed paper, cardboard, glass, aluminum, plastic, scrap metal, and other miscellaneous products. Their recycling programs are carried out with the objectives of reducing waste going into the landfill and providing a valuable product. Most of their products are shipped from Alaska for processing. Newspaper is an exception, which VCRS sells to the Alaskan company Thermo-Kool, which in turn uses it in their cellulose-based insulation products. VCRS is also experimenting with plastics-to-oil technologies, which would allow them to expand the types of plastic recycling they accept and process.

Organization and Contracts

VCRS is maintained as a 501(c)(3) non-profit organization. Its recycling and education programs operate with eight paid staff, and approximately 400 volunteers from the community. Recyclable materials are mainly sold through five different contractors. Each bale is sold to the highest bidder. Because their materials have a reputation as being consistently high quality, they tend to get a consistently high price.

VCRS is part of the freight agreement with ALPAR, which provides discounted shipping rates for recycling from Alaska to the Lower 48 for processing (see Section 2.3.1). VCRS pays its own wharfage fees.

In addition to revenues from recycling commodities, the Mat-Su Borough currently provides support of \$75,000 per year from its landfill tipping fees. Over the past 10 years, VCRS has operated with average net program revenue of approximately \$52,000 per year.

2.2.2 Kenai Peninsula Borough Solid Waste Services

Background

Recycling in the Kenai Peninsula Borough has been carried out since 1990. Recycling is carried out by the Kenai Borough Solid Waste division, which is involved in nearly every part of the Borough, year round. The Borough is required to have waste and recycling drop off facilities within 12 miles of population centers.

The volume and profitability of recycling commodities picked up considerably when the Borough obtained balers in Homer and Soldotna in 1982 and 1992 respectively.

Current Program

The Kenai Peninsula Borough currently recycles aluminum cans, glass containers, cardboard, mixed paper, newspaper, plastics #1 and #2, plastic bags, tin cans, vehicle batteries and household batteries.

Recycling drop off facilities are located at all 8 of the Borough's waste transfer sites, as well as the Borough Administration Building, the Save-U-More in Homer, two of the Borough's remote landfills, three of the Borough's waste transfer facilities, and the Seward Boat Harbor. Recycling materials are shipped from these locations to the Central Peninsula Landfill (CPL), the Homer Transfer Facility (HTF), or the Seward Transfer Facility (STF), from which they are sold directly to Rock Tenn who ship out of state at a discounted rate under the ALPAR agreement.

Quality Control

The larger, more frequently visited drop off facilities and transfer sites throughout the Kenai Peninsula Borough are manned to monitor operation and use by patrons.

Recyclable Materials

In addition to the recyclables above, the Borough conducts an annual Christmas Tree Recycling program and participates with non-profit organizations Re*Group, the Homer-based Electronic Recycling Committee, and Total Reclaim in Anchorage to collect and process electronics for recycling in Seattle markets.

Organization and Contracts

The Kenai Peninsula Borough maintains contracts for most of its regular operations, such as waste hauling, and manning drop off locations. The Seward transfer sites, for example, are operated under contract with Alaska Waste, while transfer sites in Homer are operated under contract with Moore and Moore. All construction and updates are operated under contract with DNL Construction.

Kenai Peninsula Borough staff reported that contracting out their operations in this manner has led to considerable efficiencies and savings.

2.2.3 Kodiak, Alaska – Threshold Services, Inc.

Threshold Services, Inc. (Threshold) is a non-profit company that conducts recycling for the community of Kodiak, Alaska in the Kodiak Island Borough (KIB).

Background

Threshold started around 1984 as a small volunteer organization conducting workshops for the disabled with a focus on job training. In 1994, Threshold began their recycling program. Recycling was a good complement to their core mission, and the recycling operation was expanded over the following years. Around 2007, Threshold received a grant from the Denali Commission to build their recycling facility. Also around this time the KIB was experiencing a space crisis in their landfill, and was looking at all options for maximizing diversion from the landfill, including recycling. In 2009, Threshold received their first contract from the KIB to conduct recycling in Kodiak on a per-ton basis for materials recycled. Threshold is currently in a three-year contract with a flat amount per year (see Organization and Contracts, below).

Current Program

Threshold currently recycles cardboard, mixed paper, tin, aluminum, #1 plastic bottles, #2 plastic bottles, and plastic film. Materials are primarily collected at Threshold's central receiving facility, which is open and staffed from 10:00 a.m. to 6:00 p.m. Tuesday through Saturday. The facility features a covered drive-through receiving area and an indoor sorting/processing center. Threshold also conducts pickups from local businesses and organizations, charging \$20 per pickup. Threshold estimates current diversion rates achieved by their program to be less than 10 percent of Kodiak's total waste stream and aims to increase this rate.

Threshold has four full-time employees and an executive director; remaining staff consists of a part-time bookkeeper and 12 part-time employees. A majority of these part-time employees are involved with assisting KIB residents sort their materials at the receiving facility, or with further sorting of the received materials.

One major success of the current program is the employment of disabled people in material sorting. Threshold pays their disabled employees proportional to their productive capacity, in accordance with Section 14(c) of the Fair Labor Standards Act, allowing for sub-minimum wage for lower-capacity employees. This allows Threshold to employ a generally unemployable population in a valuable role within the recycling program. The lowest-capacity employees primarily sort mixed paper. By sorting the mixed paper into products such as office paper, newsprint, and others, Threshold takes a relatively low-value waste stream and converts it into several high-value streams. Benefits to the employees include being able to partake in meaningful daily work, spending time with peers in a positive working environment, and learning social and vocational skills.

Threshold does not rely heavily on volunteers. They have tried to attract volunteers in the past, but have struggled with recruitment and volunteer longevity. Occasionally Threshold will make use of volunteers with mandated community service requirements.

Threshold conducts education and outreach in a number of ways. Public education regarding material acceptance criteria is primarily conducted at the central receiving facility (see Quality Control section, below). Threshold conducts outreach at local schools, civic organizations, and community events to boost participation in recycling. They also conducted limited advertising.

Quality Control

Threshold has a rigorous QC program that is largely based on the model pioneered in Alaska by VCRS. Threshold staffs their central receiving facility and KIB residents are assisted with sorting their recyclables and educated on-the-spot about what can and cannot be accepted. In this way, education is immediate and quality of received materials is high. Threshold indicated that the downside to this approach is that it may put off or discourage certain residents who arrive with inaccurate expectations of what they can recycle.

Threshold operates several satellite receiving areas throughout the community. They struggle with the quality of materials originating from these satellite areas, and incur significant labor costs to sort the materials as well as tipping fees for disposing the contamination (trash). Threshold was forced to stop receiving plastics altogether from these sites due to quality issues.

Recyclable Materials & Markets

As noted above, Threshold currently recycles cardboard, mixed paper, tin, aluminum, #1 plastic bottles, #2 plastic bottles, and plastic film. Mixed paper is sorted into several higher-value paper products. Their biggest single stream is cardboard, which is generated in bulk by local canneries during the fishing season. All recyclables are individual baled, and shipped by sea to lower-48 markets. Shipping costs are around \$45 per ton; Threshold does not get to take advantage of discounted shipping through ALPAR, which is limited to the Port of Anchorage.

There have been several local uses of recyclable materials over Threshold's history. For a time, a local company was purchasing cardboard for use as a carbon source for composting municipal sewage sludge; this company stopped purchasing cardboard in 2014, and it is unclear whether they will have a future need for cardboard. Threshold uses a modified SmartAsh burner with heat capture unit to burn fryer-oil sludge to heat their facility. Used cooking oil can be burnt in a typical furnace if filtered and preheated, but the SmartAsh burner allows for clean burning of unfiltered oil and the sludge from fryer bottoms that is typically unusable. This innovative strategy also reduces operational costs related to heating the facility.

Organization and Contracts

Since 2009, Threshold has been supported through contracts from the KIB, covering a significant portion of operating costs. The initial contract (2009 to 2012) was on a per-ton basis for material recycled (\$325 per ton). In 2012, the KIB issued a new RFP for a community recycling contract. Threshold successfully bid on the RFP, and was able to negotiate a new contract. The current contract (now in the final year of a 3-year term) pays Threshold a flat annual amount (about \$200,000) based on an estimated yearly tonnage (650 tons). Threshold refunds the Borough 10 to 15 percent of the costs they reclaim when they sell recycled materials to the commodity market. In this way, Threshold can count on a certain amount of support per year and expanding recycling is incentivized. Expanding recycling does not result in an increased cost to the KIB; on the contrary, expanding recycling may result in more money refunded to the KIB given sufficient commodity prices. For example, Threshold recycled 711 tons of materials in 2014, exceeding their contract tonnage estimate at no additional cost to the KIB. Predictability of funding is also important for Threshold when they seek grants, as they can demonstrate a certain amount of KIB support per year.

Remaining funds to operate the program come from individual and business memberships (totaling \$10,000 to \$12,000 per year), donations, pickup fees, and revenue from the sale of recyclables in lower-48 commodity markets. This last revenue source is unpredictable and constantly changing, as commodity prices are notoriously volatile. In fact, commodity prices have fallen steeply over the past year, in part due to ongoing labor disputes on the west coast. In addition to the above revenues supporting their operational budget, Threshold periodically applies for one-time grants from the Rasmussen Foundation or the Alaska Mental Health Trust Authority to cover capital expenses, such as new equipment. The amounts of these grants are variable, but average roughly \$30,000 per year.

The KIB operates their solid waste management program, including their landfill and the recycling contract with Threshold, out of an enterprise fund. Revenue for the enterprise fund comes from tipping fees, curbside pickup fees (urban area), and property taxes (rural area). The tipping fee at the KIB landfill is \$187 per ton (commercial waste). Currently, the KIB pays more for recycling than landfilling if evaluated solely based on the tipping fee and the Threshold contract amount and diversion rate.

However, it is questionable whether the tipping fee takes into account all long-term costs associated with landfilling, and there are social and environmental benefits to recycling that are not valued in this equation. The contract amount, evaluated on a per-ton basis, belies the overall value of the recycling program to the community. The KIB has seen the value in the program, and continues to support it. According to the KIB solid waste manager, the KIB has a very strong working relationship with Threshold and recognizes the clear value to the community that their program represents.

2.3 Alaska Recycling Support Programs

2.3.1 Alaskans for Litter Prevention and Recycling (ALPAR)

Background

ALPAR is a privately funded, 501(c)(3) non-profit organization dedicated to eliminating litter and increasing economically-viable recycling in Alaska. Founded in 1982 by a group of Alaskan business leaders, ALPAR's programs help clean up Alaska's communities, roadways, parks, beaches, and waterways and assist with recycling initiatives throughout Alaska. ALPAR programs and services are made possible by the support of businesses and organizations throughout Alaska.

Current Program

ALPAR sponsors or coordinates several programs. These include:

- Backhaul shipping
- ALPAR Flying Cans
- Can-do Kids
- Youth litter patrols
- Adopt-a-bike-path
- Nursery pot recycling (Anchorage)
- Public awareness and outreach

Of these, the backhaul agreements with shipping companies are the most important for Fairbanks recycling. The backhaul agreements provide free or reduced-rate shipping of recyclables from the Port of Anchorage to markets originating at Seattle-Tacoma ports.

Quality Control

QC is in the agreements made with ALPAR and the recycling centers across the state. ALPAR does not monitor presence of contaminants, as this is between the buyer and the seller.

Organization and Contracts

ALPAR works with freight carriers to secure a certain number of vans every year that are allocated to the various Alaska recyclers. Approximately 1,100 vans were available in 2014; 982 of those were donated and the rest were offered to recycling centers at a greatly reduced rate. Additional information on ALPAR can be found in Section 3.2.1.

2.3.2 Rock Tenn Recycling

Background

Rock Tenn is a private, for-profit company, and is the primary broker for recycling leaving the state of Alaska. By far, the greatest volume of recycling that leaves Alaska does so through Rock Tenn. The company has shipped 25,000 or more tons per year over the last five years.

Rock Tenn is one of the largest recycling and packaging manufacturing companies in the U.S. Since the company began operating in 1973 it has seen steady growth in its operation of recycling and packaging facilities, acquiring a number of other producers across the U.S.

Rock Tenn operates 26 recycling locations across the U.S. Nationally, the company currently manages over 6.5 million tons of recyclables on an annual basis.

In 2011 Rock Tenn acquired Smurfit Stone Container Company and opened its operations in Alaska. Since Rock Tenn arrived in Alaska, they have championed recycling ventures across the state. Rock Tenn provides a couple of key elements that facilitate the state's recycling programs. With a large base of operations, the Rock Tenn Company operates at a scale that can withstand the ups and downs of the often volatile international recycling commodities market. The Company also operates a large facility with sufficient balers and other equipment to package and ship large volumes of recycling commodities to markets in Seattle-Tacoma. This capacity and equipment has been particularly important for smaller recycling operations, such as the Fairbanks Rescue Mission, who are trying to enter the market, but may not have the capacity or equipment to get started on their own.

Current Program

Rock Tenn operates at the Municipality of Anchorage's Recycling Facility with 11 employees. The products they recover include: cardboard, mixed paper, newspaper, aluminum cans, glass containers, plastics #1 and #2, plastic bags, and tin cans. They also accept commingled residential material from curbside recycling haulers.

Rock Tenn uses the largest number of vans acquired under the ALPAR agreement (see Section 2.4.1 for full description). In 2014, Rock Tenn acquired over 1,000 vans at a much reduced rate under the ALPAR agreement.

Organization and Contracts

Rock Tenn holds contracts with recyclable producers around the state, including:

- Anchorage Solid Waste
- Kenai Peninsula Borough Solid Waste
- Fairbanks Rescue Mission

Rock Tenn fully supports the development of expanded recycling facilities in the Fairbanks North Star Borough, and has expressed interest in being involved with the development or maintenance of those facilities.

3 ECONOMIC ANALYSIS

A comprehensive economic analysis is an important precursor of implementing any recycling program. Understanding the economics of collection, processing, and marketing of recyclables are critical to ensuring a sustainable recycling program.

3.1 Evaluation of Collection and Processing Methods

There are several potential methods for collecting recyclables. Each method has unique benefits and drawbacks. The following section evaluates five primary methods for collection and processing. The methods are not mutually exclusive, and a combination of methods may prove to be beneficial in Fairbanks. The processing method plays a significant role in evaluating the overall operating costs of a recycling program. The less processing and handling of recyclables, the lower the costs.

Recyclables could be collected at the five largest sites as **source-separated** or **commingled**. Source-separated collection has been used at UAF and the Fairbanks Rescue Mission in recent years.

Source-separated collection is a type of recycling in which recyclables are sorted by type at the source of generation (e.g., residences or businesses) prior to processing. **Commingled** is a method of collection in which different types of recyclables are mixed in a single container and sorted at a central recycling facility.

3.1.1 Assumptions

- To determine potential recyclable volumes, we assume a 35 percent participation rate in a recycling program. This rate is based on the latest EPA estimates of nationwide participation in municipal recycling programs and is the rate used by the 2005 MACTEC study.
- Estimated volumes presented for each option represent the volumes at full implementation (i.e., the program is established and all infrastructure is constructed)
- We assume that cardboard, mixed paper, plastics (#1 and #2), and aluminum are the target recyclables.
- Cost estimates are based on the 2005 MACTEC study with adjustments for inflation³. All operational costs assume staffing by FNSB employees unless otherwise indicated.
- To account for the reduced value of commingled recyclables, we assume a 50 percent price reduction when collected via commingling.
- The 2005 MACTEC study considered improvements to the “cold” side of the landfill building in order to accommodate a drop-off recycling center. That portion of the landfill building is no longer an option as it is currently being utilized and would require a major retrofit for use as a recycling facility.

Integral to any recycling program is the development of a central recycling facility. A central facility is needed before any collection of recyclables can begin, as this facility will be the processing, packaging, and shipping center of a borough-wide recycling program. In this study, we evaluate two options for the development and operation of a central recycling facility. These are presented in Section 3.1.2 and Section 3.1.3.

³ Cumulative rate of inflation of 20.2% based on US government Consumer Price Index (CPI) data published March 24, 2015

3.1.2 Option A – FNSB-Operated Recycling Center (Source-Separated)

This option proposes the construction of a new 18,000 square foot drop-off recycling center that is operated and maintained by the FNSB. Borough residents, businesses, and other institutions would self-haul recyclables to the facility and deposit them into bins. The center would be open 8 hours per day, 5 days per week.

An attendant would staff the facility to ensure residents are placing recyclables into correct bins and no unacceptable materials are deposited. Additional staff includes an equipment operator and laborers.

The drop-off center could also serve as a processing center for recyclables collected at the transfer sites as discussed in Options 1 through 3 below.

If a drop-off center was built and operated by the FNSB, the annual operating costs to process source-separated recyclables that were self-hauled by residents and businesses would be approximately \$400,000. With depreciation factored in, that amount increases to approximately \$615,000.

**Table 4 – Estimated Potential Volume and Value of Recyclables
Dropped Off at an FNSB-Operated Recycling Center**

	Paper				Plastic	
	OCC	Mixed	Newspaper	Office	#1 & #2	Aluminum
Estimated Tons ⁴	2,491	1,495	498	498	315	78
Estimated Value/Ton	\$124	\$71	\$82	\$135	\$314	\$1,245
Potential Total Value	\$308,884	\$106,117	\$40,852	\$67,257	\$102,260	\$97,110
Total, All Materials	\$722,480					

3.1.3 Option B – Non-Profit-Operated Recycling Center (Source-Separated)

This option proposes a similar scheme as Option A, but with a non-profit entity operating the facility.

An attendant would staff the facility to ensure residents are placing recyclables into correct bins and no unacceptable materials are deposited. Additional staff includes an equipment operator and laborers.

The drop-off center could also serve as a processing center for recyclables collected at the transfer sites as discussed in Options 1 through 3 below.

Annual operating expenses are approximately \$135,000 (see Appendix A). Operating expenses are lower than a Borough-operated facility due to lower wages and benefit obligations.

⁴ Estimate based on potential recyclables from entire Borough (includes Transfer Site service areas)

Table 5 – Estimated Potential Volume and Value of Recyclables
Dropped Off at a Non-Profit-Operated Recycling Center

	Paper				Plastic	Aluminum
	OCC	Mixed	Newspaper	Office	#1 & #2	
Estimated Tons	2,491	1,495	498	498	315	78
Estimated Value/Ton	\$124	\$71	\$82	\$135	\$314	\$1,245
Potential Total Value	\$308,884	\$106,117	\$40,852	\$67,257	\$102,260	\$97,110
Total, All Materials	\$722,480					

The five largest transfer sites account for 79 percent of all waste collected at the 14 transfer sites, and 42 percent of the total municipal solid waste entering the landfill. Therefore, it is worthwhile to investigate the potential for collecting recyclables at these sites. Table 6 summarizes the potential volumes of recyclables from the five largest transfer sites.

Recyclables could be collected at the remaining nine transfer sites via any of the following methods as well. Due to the relatively small volumes of recyclables coming from these sites, this analysis does not include those sites.

Table 6 – Potential Volumes (tons) of Recyclables from the Five Largest Transfer Sites⁵

	Paper	Plastic	Aluminum	Total
Potential Tons of Recyclables from All 14 Transfer Sites	7,760	490	122	8,372
Percent from 5 Largest Transfer Sites	79%	79%	79%	--
Potential Tons of Recyclables from 5 Largest Sites	6,130	387	96	6,613
Expected Contribution from Residents	35%	35%	35%	--
Adjusted Tons of Recyclables from 5 Largest Transfer Sites	2,146	135	34	2,315

3.1.4 Option 1 – Manning the Five Largest Transfer Sites (Source-Separated)

Under this option, collection bins for each type of recyclable would be available for residents to deposit materials in. The bins would be placed in a separate, fenced-off area and open 8 hours per day, five days per week with staff on-site. Controlling the use of the recyclable bins through fencing and staffing would provide better quality control of recyclables and, correspondingly, better prices for the recyclables.

An attendant would assist residents with placing their recyclables into the correct bins and ensure no unacceptable or contaminated items are dropped off. This method of collection requires a small shelter for the attendant that provides protection from the elements. Other capital costs for improving the transfer sites include expansion of the transfer site pad and additional fencing.

Recyclables collected under this method would be transported to a central recycling facility for processing, such as those presented in Options A and B above.

⁵ Based on EPA estimates applied to 43,838 tons of MSW generated at the 14 transfer sites

3.1.5 Option 2 - Unmanned Collection at the Five Largest Transfer Sites (Commingled)

Under a commingled collection scheme, collection bins would not be designated for particular recyclables. Instead, a resident could deposit all recyclables in a single bin. The recyclables would be sorted at a recycling facility before shipment to market.

The drawback to a commingled collection scheme is that the quality of the recyclables is not as high as those collected under a source-separated program. Contamination from dirty materials, unacceptable materials, and rain or snow will require additional processing effort and cost at a recycling center.

Processing costs for commingled collection are the highest of the three options (see Table 8). However, the value of the recyclables collected is reduced due to contamination. The processing costs are more than other options because the recyclables must be sorted before shipment to market. This process also requires more expensive equipment, thus higher capital costs as well.

3.1.6 Option 3 - Mobile Collection Units at the Five Largest Transfer Sites (Source-Separated)

This option includes the use of three mobile recycling units that rotate among the five largest transfer sites. Scheduling would be based upon the amount of recyclables each site would produce, with busier sites receiving more frequent visits by the mobile units.

This method of collection does not require extensive improvements to the transfer sites. The staffing needs are slightly less than for manning the five largest sites.

Under this scenario, the mobile units would arrive at the scheduled transfer site at the start of each work day. An attendant would assist residents with placing their recyclables into the correct bins and ensure no unacceptable or contaminated items are dropped off. At the end of the work day, the mobile units would be unloaded at a recycling processing center, such as those presented in Options A and B.

3.1.7 Summary of Collection and Processing Methods

There is considerable variability in the costs associated with the collection and processing methods presented in this report and are presented here as an order-of-magnitude estimate.

Table 7 summarizes the operations and capital costs associated with a central recycling facility. The costs assume an 18,000 square foot building.

Table 7 - Summary Costs for a Central Recycling Facility

Option	Collection Method	Capital Costs⁶	Operational Costs⁶	Depreciation	Total Annual Costs
A	FNSB-Operated Facility	\$5.6 million	\$400,000	\$215,000	\$615,000
B	Non-Profit-Operated Facility	\$5.6 million	\$135,000	\$215,000	\$350,000

⁶ Assume recyclables are source-separated

Table 8 summarizes the costs associated with collecting recyclables at the transfer sites.

Table 8 – Summary Costs for Transfer Site Collection

Option	Collection Method	Capital Costs	Collection & Transportation Costs	Annual Capital Depreciation	Total Annual Costs	Total Cost/Ton ⁷
1	Staff at 5 Largest Sites	\$265,000	\$665,000	\$25,000	\$690,000	\$298
2	No Staff at 5 Largest Sites	\$156,000	\$345,000	\$13,000	\$358,000	\$155
3	Collection via Mobile Unit	\$265,000	\$430,000	\$32,000	\$462,000	\$200

3.2 Transportation Costs

No economic assessment of recycling in Interior Alaska is complete without the economics of transporting recyclables to the commodity markets in Seattle-Tacoma. Because Fairbanks is so far from these markets, transportation costs represent a large component of any recycling program's expenses.

3.2.1 ALPAR

ALPAR provides reduced-rate backhaul of recyclables to markets in Seattle-Tacoma through agreements with several shipping companies: Totem Ocean Trailer Express (TOTE), Horizon Lines of Alaska, Lynden/Alaska West Express/Alaska Marine Lines, Northland Services, Alaska Railroad, AirLand Transport, and Weaver Brothers (see Section 2.3.1 for a complete description of ALPAR programs). Normally, a truckload costs anywhere from \$2,000 to \$4,000 per load (van). Under the ALPAR agreement, over 1,000 vans have been secured at a price of \$150 per van. In addition, the shippers in the ALPAR agreement have been willing to sell additional vans for backhaul at a rate of \$1,000 per van.

In the past, there was concern that the number of trucks available through ALPAR was limited. However, as Figure 2 demonstrates, there has been an increasing trend in the number of vans obtained through the ALPAR agreement from 2000-2015. It is important to note, however, that the number of low-cost vans remains fixed and the vans that have been added are offered at a reduced rate.

The number of vans obtained under the ALPAR agreement since 2000 has largely kept pace with growth in recycling volumes. As Figure 2 shows, the relative number of vans obtained under the ALPAR agreement each year has outpaced the growth in recycling volume nearly every year since 2000.

⁷ Based on 2,315 tons of recyclables; FY16 Hauling & Tipping fees are \$134.49/ton

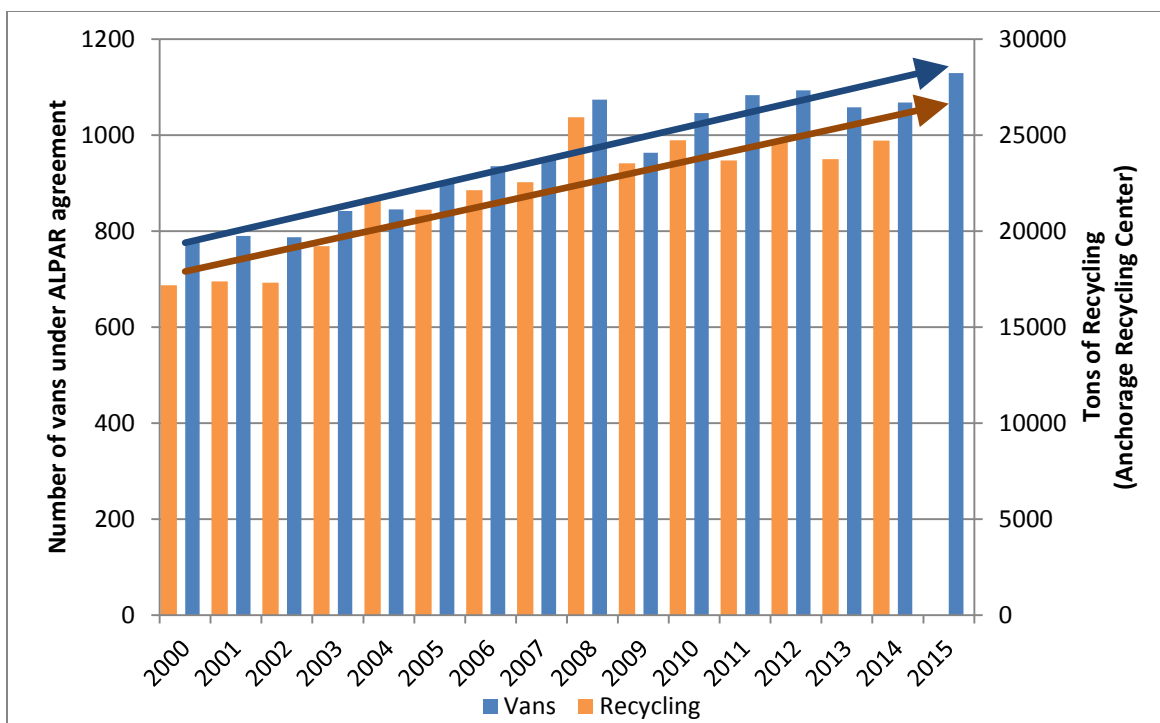


Figure 2 – Comparison of Historical Recycling Volumes and Vans Obtained under ALPAR Agreement

Although the future of recycling and transportation cannot be accurately predicted, these figures indicate that the trend in vehicles available through ALPAR has steadily increased over time, and has by and large, kept pace with the increase in recycling volumes being shipped.

Randy Virgin, manager of operations for Rock Tenn in Anchorage indicated that Fairbanks could double or even triple the amount of recycling currently being shipped through Anchorage without disturbing the current setup. The Fairbanks Rescue Mission is the only Fairbanks-based recycler currently working with ALPAR.

It should be noted that the vans provided by ALPAR have been obtained by donation or reduced rates through the shipping companies that participate in ALPAR agreements. Over the long-term, as recycling continues to increase, Alaska may not be able to continue to rely solely on these donations in order to affordably ship recycling commodities. New avenues may have to be explored in the future.

It should also be noted that the expense of shipping from Fairbanks to the Port of Anchorage is not currently a part of the written freight agreement with the shipping companies. Rather, the freight companies have made a commitment to a number of vans per year (44 vans for the FNSB in 2014) in order to ship recycling from the interior to the ports. If recycling shipped from the FNSB were to grow substantially, new agreements with shippers may have to be secured.

In order to accommodate the projected tonnage of recyclables leaving Fairbanks (5,375 tons) under a fully implemented recycling program, a Fairbanks recycling program would need 244 vans. Based on discussions with ALPAR, the FNSB could reasonable expect to acquire 60 vans at the \$150 rate. The remaining 185 vans could likely be secured at the \$1,000 rate. Therefore, a Fairbanks recycling program would need to spend approximately \$194,000 on shipping annually, or \$36 per ton.

What's Needed to Get into the ALPAR Agreement?

In order to participate in ALPAR's shipping agreement, the following conditions must be met:

- There must be a single collection facility for the region.
- There must be business plan, outlining the role of all parties involved in the development and maintenance of the recycling program.
- The facility must collect paper, cardboard, aluminum, steel cans, and certain plastics for businesses AND residents.

3.3 Market Values

Historic commodity values are surprisingly difficult to obtain. Several vendors offer proprietary data for a fee, but these are not specific to Alaska.

The VCRS provided historic prices they received for recyclable commodities. The following figure shows the 5-year average price received for each recyclable commodity.

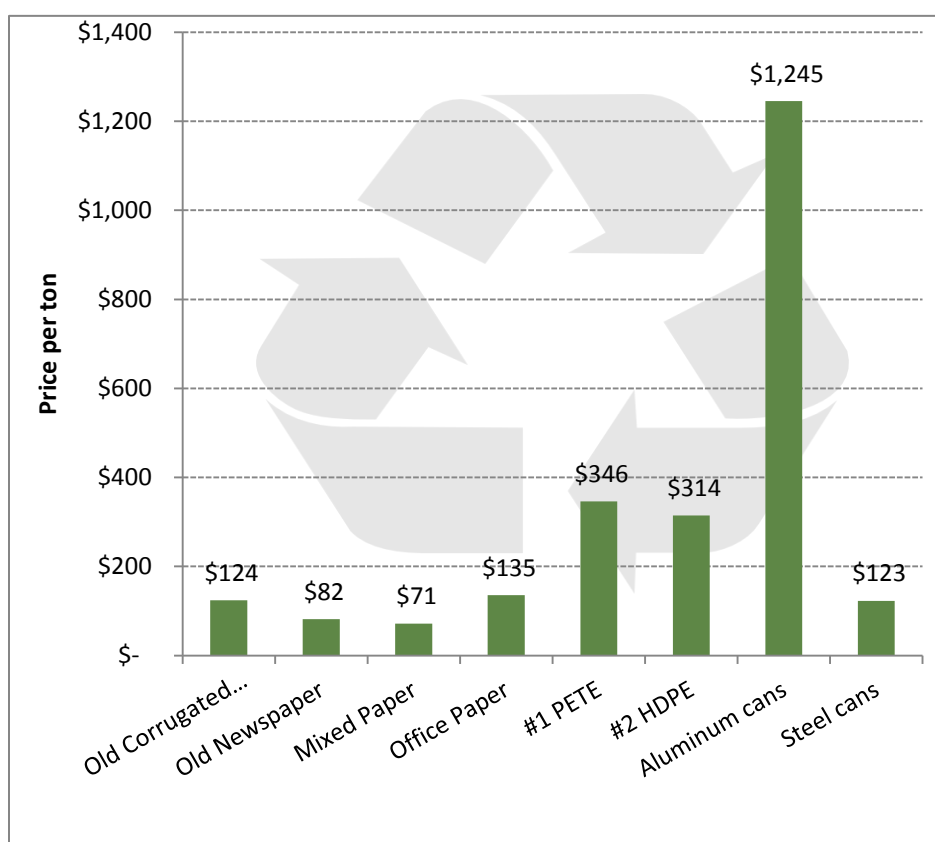


Figure 3 – Five-Year Average Commodity Values for Alaskan Recyclers, 2010-2014

Commodity prices are subject to fluctuations in international markets, which are driven by global economies. China is a major destination for recyclables and, as such, the strength of China's economy has considerable influence on commodity prices. The price of oil also influences commodity values, primarily plastics. As oil prices climb, so does the value of plastics, and vice versa.

To receive full value for recyclables, Alaska recyclers must bundle recyclables according to industry standard dimensions. If recyclables do not meet industry standards, they must be re-bundled by Rock Tenn in Anchorage before shipment to Tacoma. Additionally, each van load of recyclables must contain a single type of recyclable (e.g., aluminum, cardboard) in order to receive maximum price. Vans containing multiple types of recyclables must be repackaged in Anchorage. The fewer times that recyclables are handled, the higher the price a recycler will receive.

Political factors can also influence market values of recyclables. The shutdown of West Coast ports in early 2015 due to striking workers negatively impacted commodity prices. This is because recyclers do not have the capacity to store recyclables while waiting for the ports to reopen.

3.4 Recycling versus Burying

There are costs associated with both burying waste and recycling. The following section outlines the basic costs of each.

Landfill expenditures are essentially fixed. The landfill's main costs include personnel, commodities (parts, supplies, fuel etc.), contractual (professional services, gravel hauling, environmental services, permits, utilities, equipment rentals, etc.), and capital (equipment, buildings, constructed cells, etc.). In addition, there are various programs that include recycling, waste-to-energy, leachate recirculation, and environmental, among others. None of these expenditures fluctuate with a decrease or increase in tonnage. For example, whether you have 100,000 tons or 115,000 tons of incoming waste in a year, you still need the same personnel, equipment, permits, and constructed cell to accept and process this debris. Therefore, the cost to bury a ton of solid waste is essentially the tipping fee. The FY16 tipping fee at the Borough landfill is \$97/ton (see Section 3.5.1).

Recycling has costs similar to the typical waste stream including overhead (electricity, insurance, supplies, etc.), capital (equipment, buildings, etc.), and operating (labor). The primary differences with evaluating the cost of recycling are 1) recyclables sold on the commodity markets produce revenue, and 2) the avoided costs associated with diverting waste from the landfill must be accounted for (see sidebar regarding FNSB code and avoided costs).

The FNSB encourages recycling and has identified a formula for compensating recyclers the avoided costs of diverting solid waste from the landfill. Section 8.12.033 of Borough code states:

The borough shall waive in whole or in part the tipping fee to persons, businesses and entities which separate recyclable materials into lots designated by the borough which may include aluminum, glass, plastic, cardboard, mixed paper, newspaper, electronics or wood products in loads delivered to the landfill.

It is the policy of the Fairbanks North Star Borough to encourage reduction, reuse and recycling of solid wastes generated in the borough. These efforts may include payment of a portion of actual avoided costs of hauling and land filling to approved recyclers/reusers not to exceed \$175,000. Subject to appropriation, avoided costs, less a 25 percent reduction, may be paid to approved recyclers when documentation is provided to show that materials separated as recyclables have been removed from the waste stream by recycling within the current fiscal year. Twenty-five percent of avoided costs may be paid to a fund established to maintain the efforts of the commission.

Borough code, Section 8.12.021, defines "avoided costs" as follows:

"Avoided costs" means the savings realized by the solid waste collection district or solid waste disposal funds of the borough if recyclables are diverted from the landfill or separated from the waste stream prior to being deposited in the landfill or a transfer station.

Table 9 summarizes the costs associated with processing a ton of recyclables in Fairbanks. This estimate is based on the *current* operations at FRM. The estimate is conservative and would be reduced significantly if the FRM or another non-profit recycler had access to a horizontal baler, an in-floor conveyor, a larger facility, etc.

Table 9 – Estimated Cost to Recycle One Ton of Material

Material	Hours/ Ton	\$/Hour	Labor/ Ton	OH/ Ton	Cost/ Ton	% of Total⁸	Total Cost/Ton
Cardboard	5	\$10	\$50	\$68.28	\$118.28	47.5	\$56.19
Mixed paper	15	\$10	\$150	\$68.28	\$218.28	47.5	\$103.69
Plastics	35	\$10	\$350	\$68.28	\$418.28	3.5	\$14.64
Total							\$174.51

Table 10 outlines the costs associated with processing recyclables under several different scenarios of potential recyclable volumes. This is intended to demonstrate how the cost per ton to recycle decreases as the total volume of recyclables increases. This is because fixed operational costs have a greater impact on the cost per ton at low volumes or recyclables.

Table 10 – Estimated Costs to Recycle One Ton of Material at a Central Recycling Facility

Option	Tons Recycled	Operational Costs	Transportation to Seattle Markets⁹	Depreciation of Equipment	Revenue from Sale of Recyclables	Total Cost	Total Cost/Ton
A	5,375	\$401,600	\$194,000	\$58,600	(\$722,000)	(\$67,800)	(\$12.60)
	3,000	\$401,600	\$85,400	\$58,600	(\$402,990)	\$142,610	\$47.54
	2,000	\$401,600	\$40,000	\$58,600	(\$268,660)	\$231,540	\$115.77
	1,000	\$401,600	\$6,900	\$58,600	(\$134,330)	\$332,770	\$332.77
B	5,375	\$135,000	\$194,000	\$58,600	(\$722,000)	(\$334,400)	(\$62.21)
	3,000	\$135,000	\$85,400	\$58,600	(\$402,990)	(\$123,990)	(\$41.33)
	2,000	\$135,000	\$40,000	\$58,600	(\$268,660)	(\$35,060)	(\$17.53)
	1,000	\$135,000	\$6,900	\$58,600	(\$134,330)	\$66,170	\$66.17

⁸ Based on 2005 MACTEC study; aluminum constitutes the remaining 1.5%, but costs are negligible

⁹ Assume ALPAR agreement for 60 vans at \$150 and additional vans at \$1,000 – See Appendix A

3.5 Tipping Fee Impacts

3.5.1 How Are Tipping Fees Determined?

A long range forecast is completed and updated several times per year. Based upon factors such as tonnage, other revenues, and expenses (those listed above), the tipping fee is set to provide sufficient funds for the current year and future years. The long range forecast projects out 20 years, and generally the tipping fee is increased about \$2 to \$4 per ton each year (for four years the tipping fee increased by \$7/ton to “catch up” on meeting necessary expenses; see Figure 4.) The tipping fee is *not* based upon the expected closure date of a landfill cell.

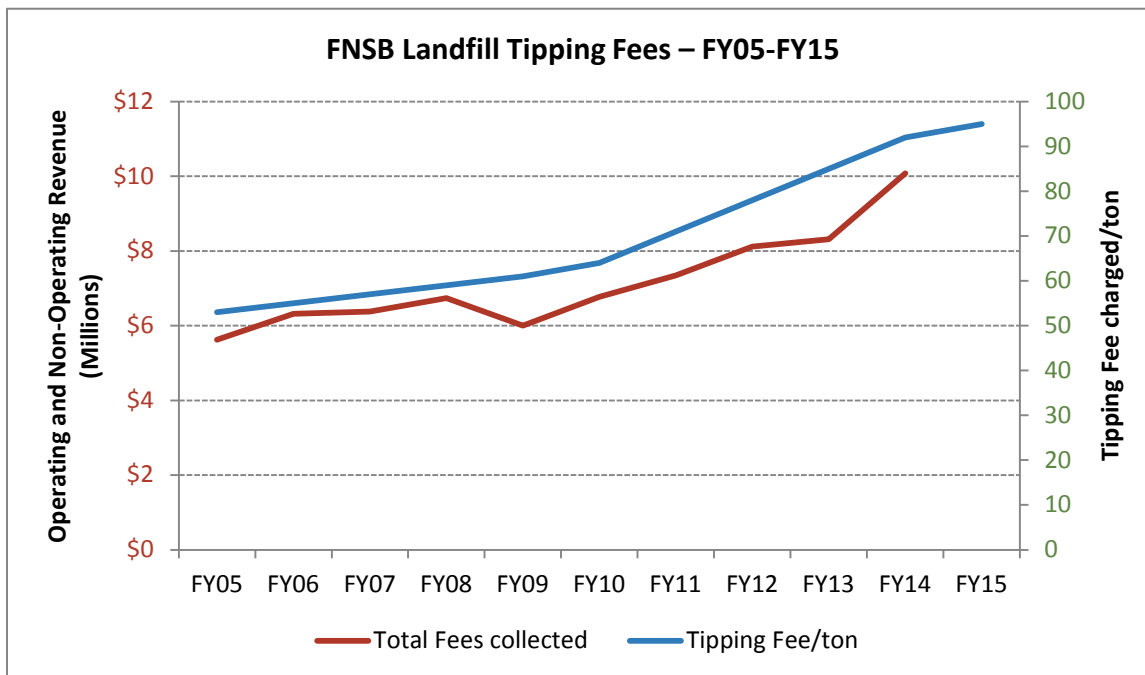


Figure 4 – Historic FNSB Landfill Tipping Fees and Revenue

3.5.2 Diversion Analysis

Based on EPA and national guidelines, we do not anticipate a diversion rate of more than 5%. Diversion rates greater than this are unrealistic, and as such, impacts to tipping fees were not evaluated. A diversion of 5% would not have any impact on the landfill tipping fees.

3.6 Summary

The following table summarizes the advantages and disadvantages with each option. Section 4 will present recommendations for collection and processing methods to implement.

Table 11 – Summary of Collection and Processing Methods

	Method	Pros	Cons
Transfer Site Collection	Manning the Five Largest Transfer Sites (Source-Separated)	Maintains QC	Limited hours
	Commingled at the Five Largest Transfer Sites	Continual operation (24-7) Low collection costs	Lack of QC Does not preclude “dumpster diving” High capital costs High processing costs
	Mobile Units at the Five Largest Transfer Sites (Source-Separated)	Maintains QC	Limited hours Not as convenient to residents
Recycling Center	FNSB-Operated Drop-Off Center	Maintains QC Co-located with landfill Opportunities for commercial collection	Higher overhead costs Less convenient to residents than collection at transfer sites
	Non-Profit-Operated Drop-Off Center	Maintains QC Provides community service Lower processing costs Potential for different funding streams (e.g., grants) Opportunities for commercial collection	Relies on volunteers Less convenient to residents than collection at transfer sites

4 RECOMMENDATIONS

The following recommendations are based on the economic analysis presented in Section 3 and successful recycling practices in other Alaska communities.

4.1 Central Recycling Facility

The key to any recycling program is the establishment of a central recycling facility. This facility will serve as the processing center for all recyclables collected in the FNSB. Collection at transfer sites or from commercial customers cannot begin until a central facility is established.

A single recycling facility is also crucial to securing long-term agreements with ALPAR for backhaul of recyclables. Without ALPAR agreements, the transportation costs render a recycling program unsustainable.

The recycling facility must be sized to accommodate the potential volume of recyclables generated in the Borough. The 18,000 square foot building presented in Option A is recommended. Borough-led development of this facility will ensure that the facility is sized appropriately. Relying on a non-profit to purchase or construct a building of appropriate capacity could lead to an undersized facility.

Funding for such a facility could come from a variety of sources such as the FNSB, the US Economic Development Administration, and State of Alaska appropriations. Leveraging multiple funding sources was successful for the VCRS (see Section 2.2.1).

To keep operation costs low, the facility should be contracted out to a non-profit organization. This model has been successful for recycling in the Mat-Su Valley. Other FNSB facilities are operated in a similar manner, such as the Carlson Center and Birch Hill Cross Country Ski Center.

The following table outlines the planning-level cost estimates for developing a central recycling facility that is operated by a non-profit entity.

Table 12 – Estimated Costs for Central Recycling Facility

	Item	Cost
Capital Costs	18,000 square foot building	\$4,700,000
	Recycling materials baler	\$420,700
	In-floor conveyor	\$240,400
	Front-end loader	\$162,270
	Fork lift	\$48,000
Operational Costs	Labor	\$90,000
	Equipment/building maintenance	\$31,000
	Public education expenses	\$12,000

4.2 Consolidated Recycling Stream

In order for a Borough-wide recycling program to receive maximum revenue from the sale of recyclables, that program must have access to the full potential volume of recyclables in the Borough. Currently, recyclables in the Borough are collected by competing interests. In the long run, this will limit the ability of a recycling program to grow. Multiple recycling streams will also lead to confusion among the public, particularly if the competing programs do not accept the same materials or maintain the same standards (e.g., contamination).

To foster the consolidation of the local recycling stream, the FNSB should provide funding to a single entity for recycling plastics, paper, and aluminum. Funding for electronics recycling should be maintained. Consolidation of the recycling stream will require a central recycling facility.

4.3 Coordinated Outreach and Education

In conjunction with a consolidated recycling stream, there should be a single outreach and education campaign to inform Borough residents. Like any other service or product, recycling earns more “customers” through advertisement, outreach, and education. Properly educated citizens are able to spread the word about recycling opportunities in their community and help ensure a higher volume of recyclables with less contamination.

The outreach and education program should be branded so as to provide a consistent look and feel that is easily recognizable. Components of a successful outreach and education program typically include:

- What items/materials are accepted
- How those items should be prepared (e.g., washing, removing caps)
- Where and when materials can be dropped-off

Outreach methods should include the use of social media, participation in community events, brochures and other printed materials, and radio and television public service announcements. Identifying stakeholders and developing partnerships is also important to promote a recycling program.

4.4 Limited Transfer Site Collection

Once a central recycling facility is established and operating, the Borough should begin limited collection at the five largest transfer sites via mobile units (see Section 5 on implementation). This will allow collection efforts to ramp up as community participation increases.

Collection via mobile units is the most cost effective method for initial collection at the transfer sites. It can easily be scaled up as community participation increases. Likewise, it can be gradually phased into collection via permanent, manned stations at the transfer sites (Option 1).

5 IMPLEMENTATION

Many assumptions were necessary to develop the recycling options and cost estimates discussed in this report. For example, a key assumption is that the value of recyclables does not vary considerably from the five-year averages. Estimates of recoverable quantities are based on national averages. These assumptions will likely change as a recycling program is developed and grows. Updating the analysis with actual numbers that are obtained as the program is implemented is imperative.

5.1 Near-Term (0 to 5 Years)

5.1.1 Central Recycling Facility

The FNSB should begin development of an 18,000 square foot recycling facility. Initial work includes:

- Site selection
- Preliminary design
- Environmental documentation

Once the facility is constructed, an operator will need to be selected. This will likely be a contentious and politicized process. Therefore it is critical that the Borough use a transparent process that allows ample opportunities for public comment. A competitive RFP process with clearly defined evaluation criteria will provide justification for final selection of a recycler.

5.2 Long-Term (5+ Years)

5.2.1 Transfer Site Collection

Once a central recycling facility is developed and a sustainable recycling program is underway, the Borough should begin collecting recyclables at the transfer sites.

Initial collection should begin with the three largest sites via mobile recycling units: Farmer's Loop East, Farmer's Loop West, and North Pole. As community participation increases, additional transfer sites can be added to the rotation. The use of volunteers should also be investigated for manning the mobile collection units.

Appendix A				MACTEC data				Option A - FNSB-operated drop-off center			Option B - Non-profit drop-off center			OPTION 1 Manning 5 Transfer Sites (Source Separated Collection)			OPTION 2 Transfer Site Collection by 3 Mobile Recycling Centers (Source Separated Collection)			OPTION 3 Unmanned Transfer Sites (Commingled Collection)		
Capital Costs				Cost	Life	Depreciation	Dep. w/ Inflation	quantity	total	total + inflation	quantity	total	total + inflation	Quantity	Total	Total + Inflation	Quantity	Total	Total + Inflation	Quantity	Total	Total + Inflation
Central Recycling Facility (CRF)																						
New Building (18,000 sf)				\$4,700,000.00	30	\$157,000.00	\$188,714.00	1	\$4,700,000.00	\$4,700,000.00	1	\$4,700,000.00	\$4,700,000.00	N/A			N/A			1 \$345,000.00 \$414,690.00		
Recycling Materials Baler				\$350,000.00	20	\$17,500.00	\$21,035.00	1	\$350,000.00	\$420,700.00	1	\$350,000.00	\$420,700.00									
In-Floor Conveyor System				\$200,000.00	20	\$10,000.00	\$12,020.00	1	\$200,000.00	\$240,400.00	1	\$200,000.00	\$240,400.00									
Materials Sorting Line				\$345,000.00	20	\$17,250.00	\$20,734.50	0	\$0.00	\$0.00	0	\$0.00	\$0.00									
Materials Mechanical Screens				\$260,000.00	20	\$13,000.00	\$15,626.00	0	\$0.00	\$0.00	0	\$0.00	\$0.00									
Front-end Loader				\$135,000.00	7	\$19,286.00	\$23,181.77	1	\$135,000.00	\$162,270.00	1	\$135,000.00	\$162,270.00							1 \$260,000.00 \$312,520.00		
Fork Lift				\$40,000.00	20	\$2,000.00	\$2,404.00	1	\$40,000.00	\$48,080.00	1	\$40,000.00	\$48,080.00									
SUBTOTAL									\$5,571,450.00			\$5,571,450.00		\$0.00	\$0.00		\$0.00	\$0.00		\$605,000.00	\$727,210.00	
Transfer Site Collection																						
Fence Recycling Area on Transfer Site				\$10,000.00	20	\$500.00	\$3,005.00	N/A			N/A			5	\$50,000.00	\$60,100.00	0	\$0.00	\$0.00	5	\$50,000.00	\$60,100.00
Personnel Shelter-Camp Trailer				\$15,000.00	10	\$1,500.00	\$9,015.00							5	\$75,000.00	\$90,150.00	0	\$0.00	\$0.00		\$0.00	\$0.00
Dumpster Bins				\$1,000.00	10	\$100.00	\$4,808.00							40	\$40,000.00	\$48,080.00	0	\$0.00	\$0.00	20	\$20,000.00	\$24,040.00
Pickup Truck				\$30,000.00	7	\$4,286.00	\$5,151.43							1	\$30,000.00	\$36,060.00	4	\$120,000.00	\$144,240.00	2	\$60,000.00	\$72,120.00
Flatbed 5th Wheel Trailer				\$25,000.00	10	\$2,500.00	\$3,005.00							1	\$25,000.00	\$30,050.00	4	\$100,000.00	\$120,200.00	0	\$0.00	\$0.00
SUBTOTAL								\$0.00		\$0.00		\$264,440.00		\$264,440.00		\$156,260.00						
TOTAL Capital Costs								\$5,571,450.00		\$5,571,450.00		\$264,440.00		\$264,440.00		\$883,470.00						
Transfer Site Collection Costs																						
	Cost	Unit	Cost + Benefits	N/A			N/A															
Estimated Tons Collected										Number	Total	Total + Inflation	Number	Total	Total + Inflation	Number	Total	Total + Inflation				
Labor-Recycling Supervisor	\$22.00	hr	\$35.49							2315			2315			2315						
Labor-Truck Operator/Recycling Attendant	\$21.43	hr	\$34.57							0.5	\$36,905.00	\$44,359.81	0.5	\$36,905.00	\$44,359.81	0.5	\$36,905.00	\$44,359.81				
Labor-Recycling Attendant	\$16.53	hr	\$26.66							1	\$71,899.00	\$86,422.60	4	\$287,594.00	\$345,687.99	2	\$143,797.00	\$172,843.99				
Truck/Trailer- Fuel & Maint.- Repairs	\$8,500.00	yr	\$8,500.00							5	\$277,294.00	\$333,307.39	0	\$0.00	\$0.00	2	\$0.00	\$0.00				
Materials Transportation to CRF	\$340.00	load	\$340.00							1	\$8,500.00	\$10,217.00	4	\$34,000.00	\$40,868.00	2	\$17,000.00	\$20,434.00				
TOTAL Transfer Site Collection Costs										468	\$159,120.00	\$191,262.24	0	\$0.00	\$0.00	260	\$88,400.00	\$106,256.80				
										\$665,569.04			\$430,915.80			\$343,894.60						
Processing Costs																						
Labor Costs	Cost	Unit	Cost + Benefits	Non-profit labor costs based on FRM draft business plan			Total Labor \$90,000.00															
Labor-Recycling Supervisor	\$22.00	hr	\$35.49							0.5	\$36,905.00	\$44,359.81	0.5	\$3								