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SOLID WASTE ASSOCIATION  
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Rhode Island Resource Recovery Corporation

# Recycling Systems Excellence Award Nomination



May 2013



# 2013 RECYCLING SYSTEMS EXCELLENCE AWARD

## RELEASE FORM

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Printed Name of Representative: Michael OConnell

Organization Name: RI Resource Recovery Corporation

Signature: M OConnell

Date: 5/10/2013

# Executive Summary

SWANA Recycling Systems Excellence Award



The Rhode Island Resource Recovery Corporation's recent Materials Recycling Facility (MRF) retrofit paired select existing equipment with proven, state-of-the-art processing machinery to enable the plant to transition from dual stream to a highly automated and efficient 50 tph single stream facility at nearly half the cost of building a facility from the ground up.

Since the retrofit, the MRF has operated safely and compliantly while realizing performance improvements. Baled product shipments have increased by 15% due to the recovery of additional materials, lower loss of recyclables to residue and continual inbound tonnage increases.

And this increase in recycling is projected to continue. A large portion of the MRF's revenues is dedicated to education programs to increase waste diversion and realize a new era of recycling in Rhode Island fostered through a shared understanding and appreciation of the criticality of materials recovery to the sustainability of waste disposal in the State.

# SWANA Recycling Systems Excellence Award

Rhode Island Resource Recovery Corporation



## Background and Overview

The Rhode Island Resource Recovery Corporation (RIRRC) is a quasi-public agency created by the Rhode Island General Assembly in 1974 to manage solid waste and recyclable material for the State. During the last four decades, evolution in the disposal needs of Rhode Island's 39 towns and cities has led to dynamic growth within the organization. **Today, the RIRRC manages the solid waste and recycling demands for nearly all of Rhode Island's 1.05 million residents from its facilities located in Johnston, Rhode Island.**

The RIRRC property is approximately 1,100 acres and consists of a Subtitle D Landfill and the following support facilities: **1)** the Materials Recycling Facility (MRF); **2)** the Administration

Building; **3)** the Composting Facility; **4)** the Wood Processing Facility; **5)** the Tipping Facility; **6)** the Electric Power Generating Stations; **7)** the Small Vehicle Acceptance Area and **8)** the Eco-Depot for household hazardous waste.

This application focuses on the MRF's most recent retrofit that transformed the facility into one of the largest and most technologically advanced in New England. It is now the centerpiece of the new RIRRC initiative called "Recycle Together RI," which aims to increase recycling diversion across the state.

**The new MRF also provides benefits to the local communities through RIRRC's dedication to profit sharing and education programs.**



**Integrity**  
is basic

**Accountability**  
takes courage

**Commitment**  
means giving it  
your best effort

**Excellence**  
is found in  
results

**Teamwork**  
improves  
everyone's  
performance

**Customer  
Service**  
we are here to  
help

RIRRC's core values guide activities at the facility and are integral to helping the organization achieve its goals of safe solid waste handling and increased recycling in Rhode Island.

## SECTION 1 Design of the Recycling System

### MRF Upgrade

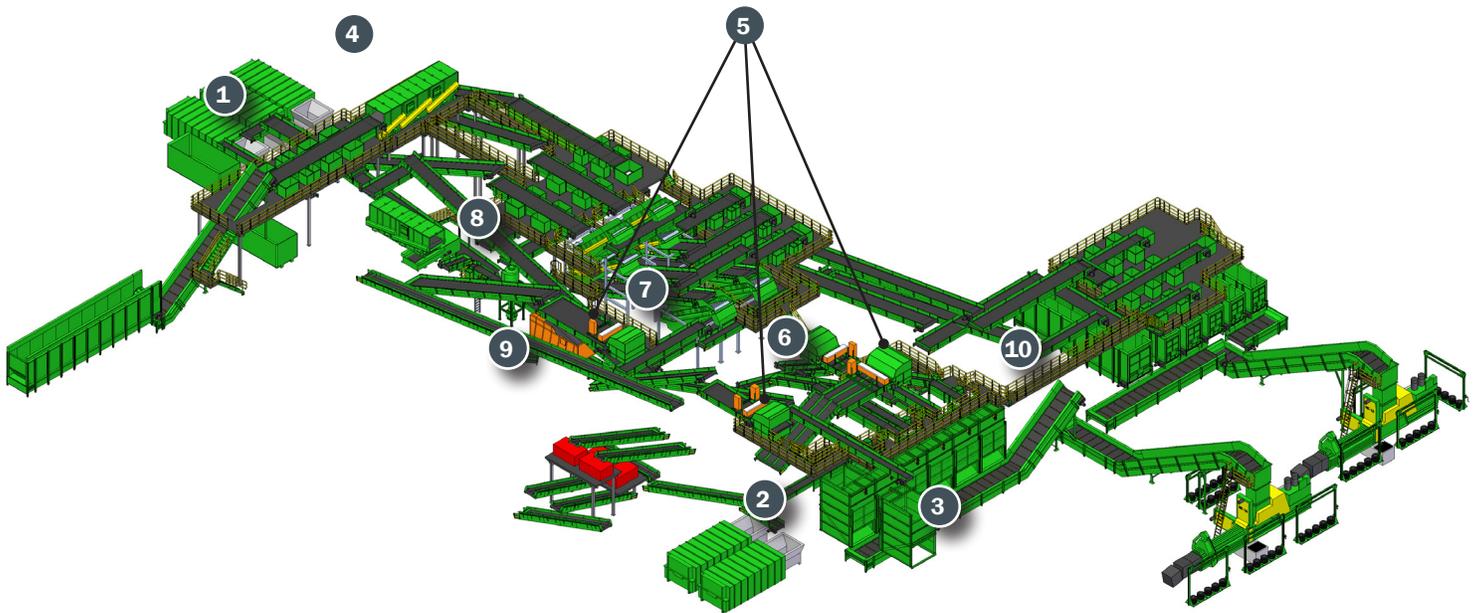
The need to expand and diversify the MRF's product processing capabilities and simplify the recycling process for both residents and businesses prompted RIRRC to rethink its setup. In 2011, RIRRC initiated a project to convert its existing dual stream MRF into a modern, 50 ton per hour single stream system. The end result would further promote recycling and its allied education and public outreach programs.

Conserving resources and maximizing the project's value for the community was of utmost importance

throughout this project. **As a result, RIRRC decided to retrofit its existing 77,260-square-foot MRF building to accommodate the new system's equipment.** RIRRC's in-house staff developed the RFP/RFQ, which defined preferred equipment, technologies, throughput materials, and end product standards. Staff formulated specifications in the RFP/RFQ based on extensive research and site tours of successful recycling facilities. The goal was to target proven technologies that would provide optimal performance with the lowest amount of risk for the investment. The RFP/RFQ also specified performance metrics for the new system, including residual limits, tons per hour, finished product quality standards, and reduced manual sorting requirements.



**BEFORE**> RIRRC's dual stream processing center



#### AFTER> RIRRC's single stream configuration

The new, state of the art MRF uses a combination of manual, mechanical, and optical sorting technologies to produce baled end-products. Bales, which are clean and marketable, contain the following products collected by the facility:

- #2 HDPE Natural Jugs
- LDPE film
- #2 HDPE Mixed Color Jugs
- Aseptic / gable top cartons
- #1 PET Bottles and Containers (NEW PRODUCT)
- Non-ferrous scrap metal (NEW PRODUCT)
- #5 Polypropylene (NEW PRODUCT)
- Aluminum Used Beverage Containers (UBC)
- #8 Old Newsprint Paper (ONP)
- Aluminum foil
- #3 Mixed paper
- #36 SOW paper (shredded paper) (NEW PRODUCT)
- #11 Corrugated Cardboard (OCC)
- #2HDPE/#5PP Rigid plastics mix (NEW PRODUCT)
- #3 - #7 Mixed Plastics (NEW PRODUCT)

RIRRC also markets loose loads of scrap metal and 3 Mix glass aggregate for recycling into new products. **Baled material shipments have increased by over 15% due to the recovery of additional materials, lower loss of recyclables to residue, and the increase in inbound tonnage.**

## Maximizing existing equipment life

RIRRC completed an evaluation of system components to

identify which equipment it should salvage and repurpose within the new design. This inventory helped reduce the outright capital costs and maximized RIRRC's investment in select equipment that was integrated into the final design, such as:

- Bollegraaf HBC-140 single ram baler
- Lubo Extra Wide OCC sorting screen
- Two Lubo ONP sorting screens
- Lubo Drumfeeder infeed self-metering bunker
- Several large chain conveyors
- Walking floor bunker material storage system

## New equipment

Van Dyk Recycling Solutions, in conjunction with RIRRC staff, designed and constructed the retrofit. The new features occupy the existing footprint and include:

- 1 Expanded primary and secondary sorting stations
- 2 New residual sort stations
- 3 Additional material storage bins
- 4 Advanced LDPE Film recovery system
- 5 High resolution optical scanners
- 6 High performance material separation screens
- 7 Permanent overhead magnetic separator
- 8 Eddy current magnetic separator
- 9 High TPH capacity ballistic separator
- 10 Expanded walkways and access points



### Expanded primary and secondary sorting stations.

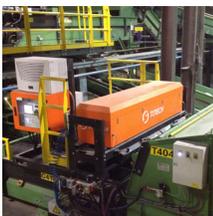
Large primary and secondary sorting station platforms were included to provide capacity for up to 16 sorters at any given time. The sorting station expansion enables RIRRC to process an increased volume of product and improve removal

of prohibitive and contaminant items from the recyclables while also enhancing station comfort and safety.

**New residual sort stations.** Two newly installed residuals sort stations enhance the recovery of recyclables, such as bottles that contain liquids, and other residuals that may have slipped through the system unrecovered.

**Additional material storage bins.** The extra storage bins provide flexibility for RIRRC to recover and bale new materials or use secondary storage for high volume materials.

**Advanced LDPE Film recovery system.** The new LDPE system consists of five hoods and a compactor for storage to remove and bale plastic bags from the recycle stream. The new vacuum system has decreased downtime previously caused by plastic bags clogging downstream equipment in the system. The compaction system allows for a decrease in the frequency of baling for the low density material, saving labor and floor space.

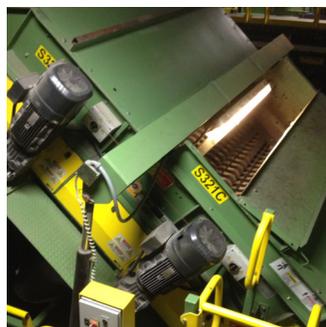


### High Resolution Optical Scanners.

Four High Resolution Optical Scanners are staggered throughout the container processing segment of the system. The first unit sorts remaining pieces of fiber from the plastics. The next three scanners, using Near Infrared technology,

separate the plastics by resin type and also perform a color sort on the #2 HDPE.

**High performance material separation screens.** Extensive use of screening technology enables efficient separation of materials such as cardboard from the comingled fiber and containers. Fiber is also screened from container materials over three screening decks that incorporate increasingly



smaller disc spacing with greater screen angles. The screening decks allow all three-dimensional container materials to sift through or roll back from the clean fiber materials riding over the screens. Meanwhile, a newly installed glass breaking screen and an integrated sizing screen for Used Beverage Container (UBC) removal reduce the amount of material traveling over the eddy current magnet and provides a cleaner aluminum UBC commodity, which commands a high price on the primary aluminum market. These screens have increased the quality of the finished product by enhancing debris removal.

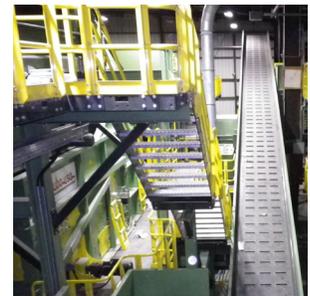
**Permanent overhead magnetic separator.** The container processing system also uses magnetics to further sort the recyclables. A large 5'-9" wide overhead magnet consisting of a ceramic permanent magnet is used to remove tin cans from the containers before the non-ferrous aluminum cans are transported over the 6' wide neodymium permanent magnet of the eddy current to repel the aluminum to a quality control sort station.



### Eddy current magnetic separator.

The eddy current separator mechanically sorts out non-ferrous metals from the stream. The separator rotates to create a changing magnetic field and electric (eddy) current causing aluminum to repel away from the conveyor belt.

**Expanded walkways and access points.** All new sorting equipment and platforms are now linked by a series of continuous walkways, stairways and catwalks to increase safety and enhance ease of access to all of the equipment for visual inspection and maintenance.



## Increased processing capacity and ease of operation

Detailed in Section 4 of this application, the new RIRRC MRF has experienced improved performance in nearly all categories of measurement:

- Increased Capacity
- Improved Product Quality
- Reduced Residuals
- Increased Operational Efficiency
- Increased Reliability
- Increased Diversion
- Enhanced Safety

## Unique aspects of the system



• **Air compressor mechanical room.** RIRRC fabricated its own separate air compressor mechanical room out of a repurposed export shipping container to keep the three 60-horsepower compressors running clean, cool and as efficiently as possible.

• **Conveyor belt cleaners.** RIRRC installed conveyor belt cleaners on every new optical sorter feed belt. A cleaner belt improves sorted material quality and energy efficiency by reducing false air releases that waste compressed air, which happens when a scanner senses accumulating debris on the belt. A cleaner belt also allows the optical sorter to function with less cross contamination and fewer missed target items.

• **High capacity ballistic separator.** RIRRC's unique new ballistic separator uses a series of side-by-side, rectangular, sieve-like paddles with openings to remove any extraneous film or residual fiber from intact containers. The paddles are stationed at an angle and designed to move in such a way that containers roll back toward the optical sorters, as film or leftover paper "walks" forward. This machine also serves a critical secondary function of removing residual fines from the remaining stream of plastic containers. The openings in the paddles allow remaining glass particles, paper shreds, and all other forms of small debris to filter through, achieving optimal debris removal before their next step of separation in the optical sorters. Removing potentially damaging particles before the containers enter the expensive optical sorter belts makes this piece of equipment an essential component of the new system.



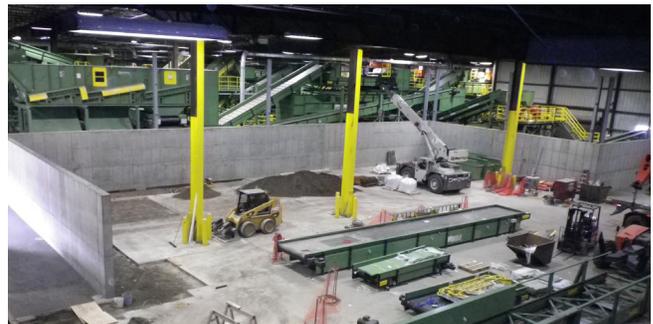
### Education center updates

Several exhibits at the MRF education center were upgraded to reflect the transition to the single stream process. RIRRC had to "build up" to take advantage of precious vertical real estate to accommodate the new

equipment. As a result, the view of the recycling process from the second floor gallery was partially obstructed. One of the most popular new features of the education center is the virtual tour—12 flat screen monitors that loop video segments of the various steps in the recovery process to illustrate for visitors the full lifecycle of the recycling process.

### Tipping floor renovations

Newly constructed 12' cast-in-place concrete walls replaced the tipping floor's existing, segmented, precast concrete push walls. The replacement increased the tipping floor's square footage from 10,000 square feet to



14,500 square feet. **An additional tipping floor access door was installed to reduce truck wait times during times of heavy deliveries.**

### Protecting human health and the environment

RIRRC captures and stores harmful liquid discharge from the baling process called "greywater". A local wastewater collection vendor collects the greywater on a weekly basis to prevent the liquid from entering the storm water runoff drains.

All loose, unprocessed material is stored in the fully enclosed tipping area and baled commodities are kept indoors prior to shipment to keep the exterior grounds clean and to protect the baled materials from oxidization and UV degradation.

In addition to the MRF Facility, RIRRC maintains various programs to protect human health, environmental quality, and resource conservation in Rhode Island:

- Free household hazardous waste (HHW) program
- Free electronics recycling program
- Free waste oil, waste antifreeze and used cooking oil acceptance program

RIRRC hosts about 25 HHW collection days at their “Eco Depot” facility in Johnston and 20 HHW collection days off-site for Rhode Island residents. HHW collection services are free to the public. **Since RIRRC assumed responsibility for the program in 2001, approximately 9 million pounds of HHW have been safely collected, recycled or disposed.**

## SECTION 2 Regulatory Compliance

The Rhode Island Department of Environmental Management (RIDEM) oversees RIRRC’s compliance with its enabling legislation. Regulations require the separation of all solid waste into recyclable and non-recyclable components; the recycling of all solid waste capable of being recycled; and annual reports on total amounts segregated and the markets for these materials. These regulations, administered in cooperation with the Rhode Island Resource Recovery Corporation, establish the requirements for waste reduction and recycling and promote environmentally acceptable and economically sound solid waste management.

RIRRC takes great pride in its ability to meet and exceed its compliance standards. **The MRF has no regulatory citations and even goes above and beyond its regulatory framework by recycling additional materials.** According to Rule 6 of the Rules and Regulations for Reduction and Recycling of Commercial and Non-Municipal Residential Solid Waste (Rules and Regulations), the following materials are defined as recyclable:

1. aluminum;
2. glass food and beverage containers;
3. leaves and yard wastes;
4. newspaper;
5. high density polyethylene (HDPE) plastic milk and water containers;
6. polyethylene terephthalate (PET) plastic soft drink containers;

7. steel, and tin coated steel cans;
8. telephone directories;
9. white goods.

In practice, RIRRC accepts more items than those on the list, specifically the recent additions of #5 (polyethylene plastic) and #3-7 (mixed plastics). RIRRC encourages the residents of the State of Rhode Island to recycle by accepting E-waste, household items, and many other materials, most of which are accepted free of charge.

The Rules and Regulations also require companies with 50 or more employees to submit yearly recycling reports to RIDEM. **RIRRC has created an online reporting form in order to make it easy for companies to comply with the commercial recycling regulations requirements.** This is a result of the cooperative effort between RIRRC and RIDEM to reinvigorate the Commercial Recycling Program.

RIRRC takes additional regulatory steps to reduce the amount of disposed solid waste. RIRRC participates in statewide policy commissions (most recently as a member of the Senate Special Legislative Commission to Study Producer Responsibility Models for Paper and Packaging) and provides written and oral testimony at legislative hearings to move recycling goals forward. **Last year, RIRRC successfully lobbied to pass legislation to allow the MRF to accept out of state recyclables to exercise the full capacity of the new system.**

## SECTION 3 Planning

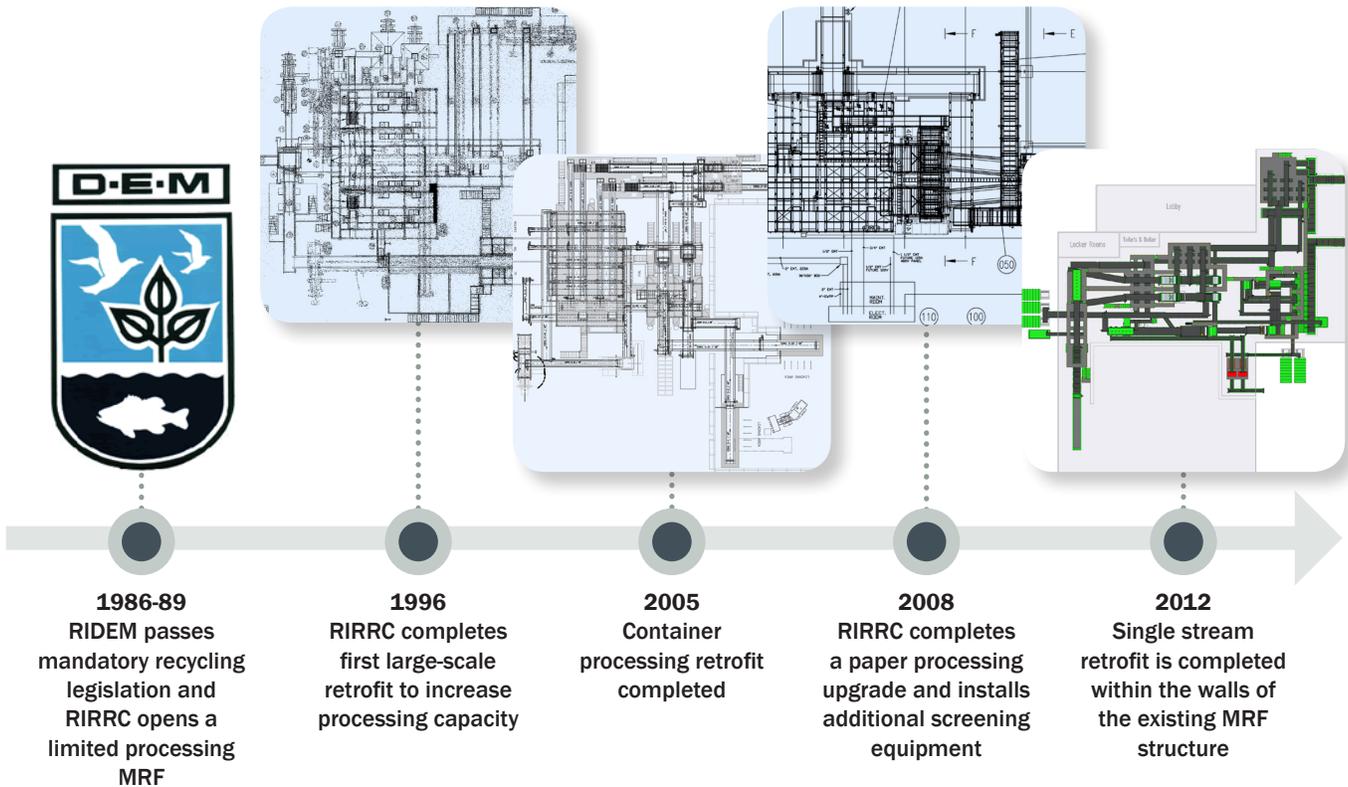
The latest retrofit represented a critical crossroads for the MRF. The selected alternative would be tasked with serving the state for the next 20 years and would play a decisive role in diverting waste from the landfill. RIRRC screened several alternatives to ensure that the optimal solution was selected for the State. Options reviewed and analyzed to maximize the recycling benefits for local municipalities included:

- Automated cart pick up vs. manual bins
- Bi weekly vs. weekly collections
- Automated cart sizing
- Third party retrofit implementation and handover of daily operation of the MRF

To fully vet the options, RIRRC released two RFPs simultaneously; one for retrofit services and one for operations and retrofit services. After the analysis was performed and all scenarios were evaluated RIRRC concluded that it was in the best interest for the communities of Rhode Island to switch to single stream processing to stimulate commercial recycling and to retain operations to capture the revenue generated by the MRF to further advance the recycling goals of the State.



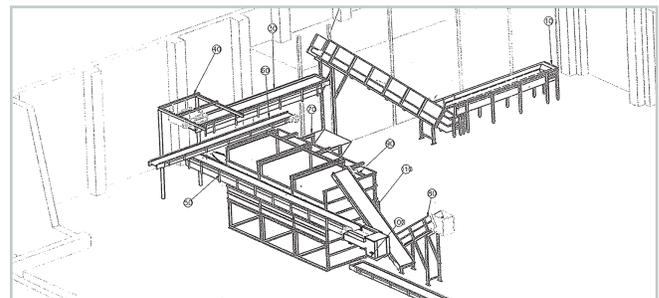
Since commencing operations in 1986, RIRRC has consistently demonstrated this commitment to fiscal responsibility. Each of the upgrades to the facility has been carefully evaluated to ensure long-term functionality while minimizing the impacts to the bottom line. The timeline below details the major milestones in the facility's evolution:



Prudent planning enabled RIRRC to overcome several challenges to maintain plant operations during the various retrofits:

- In 2005, RIRRC rented and installed a small temporary processing system on the tipping floor to maintain operations while the new container processing equipment was installed.
- During the 5-month fiber system retrofit in 2008, RIRRC built a 2000 square foot building for the existing baler and relocated the infeed conveyor to the tipping floor to transfer material directly to the new baler building to maintain paper processing capabilities.
- Throughout the 7-month single-stream retrofit project, RIRRC maintained comprehensive on-site processing capabilities by including a requirement in the retrofit RFP for repurposing components of the existing MRF to construct a temporary MRF in an unused portion of the existing tipping facility to process container materials.

**RIRRC's creativity and ingenuity in leveraging existing resources has enabled the MRF to keep its doors open every single day since the facility commenced operations in 1989.**



RIRRC's temporary processing facility was purchased by a small processing facility after the retrofit and is still in operation.

## SECTION 4 Performance, Economics & Cost- Effectiveness

### Measures of success

Recognizing the importance of system performance tracking, RIRRC's Information Technology (IT) department developed a sophisticated Key Performance Indicator reporting tool that incorporates daily, weekly, monthly and yearly production statistics including components of weather and precipitation trends to precisely monitor system performance.



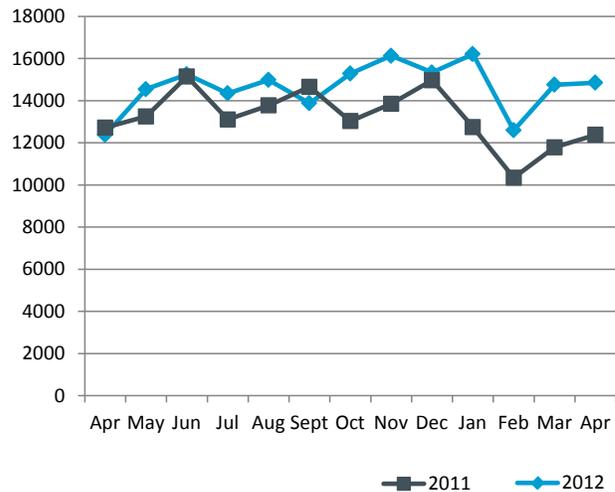
Detailed metrics are recorded for tons in, tons out, tons per hour, residue rate, system efficiency, production efficiency, tons baled per hour, materials processed broken down by percentage, downtime by event type, average hourly labor expense, precipitation and temperature per day. Since the retrofit, RIRRC has experienced marked improvement in every category of performance measurement.

- **Increased capacity.** The system processes an average of 52 tons per hour and **achieves a throughput of close to 36 tons per hour of finished and baled product commodities.**
- **Improved product quality.** Stationing two quality control pickers to remove final contaminants before the material is baled ensures that the **cleanest finished product is shipped to market.**

**“ The quality of material that we purchase from RIRRC is always a very high quality pack of wastepaper that meets or exceeds the industry standards.”**

- Susan Crisafulli, Director of Secondary Fiber, International Forest Products LLC

- **Increased tonnage.** The MRF processed 103,690 tons over the twelve-month period from April 2012 through March 2013—a **7% increase from the same period last year.** RIRRC has tracked the most notable increase in commercial tonnage which is credited to the switch to single stream processing and the reduced front-end sorting requirements that were cumbersome for some commercial users.

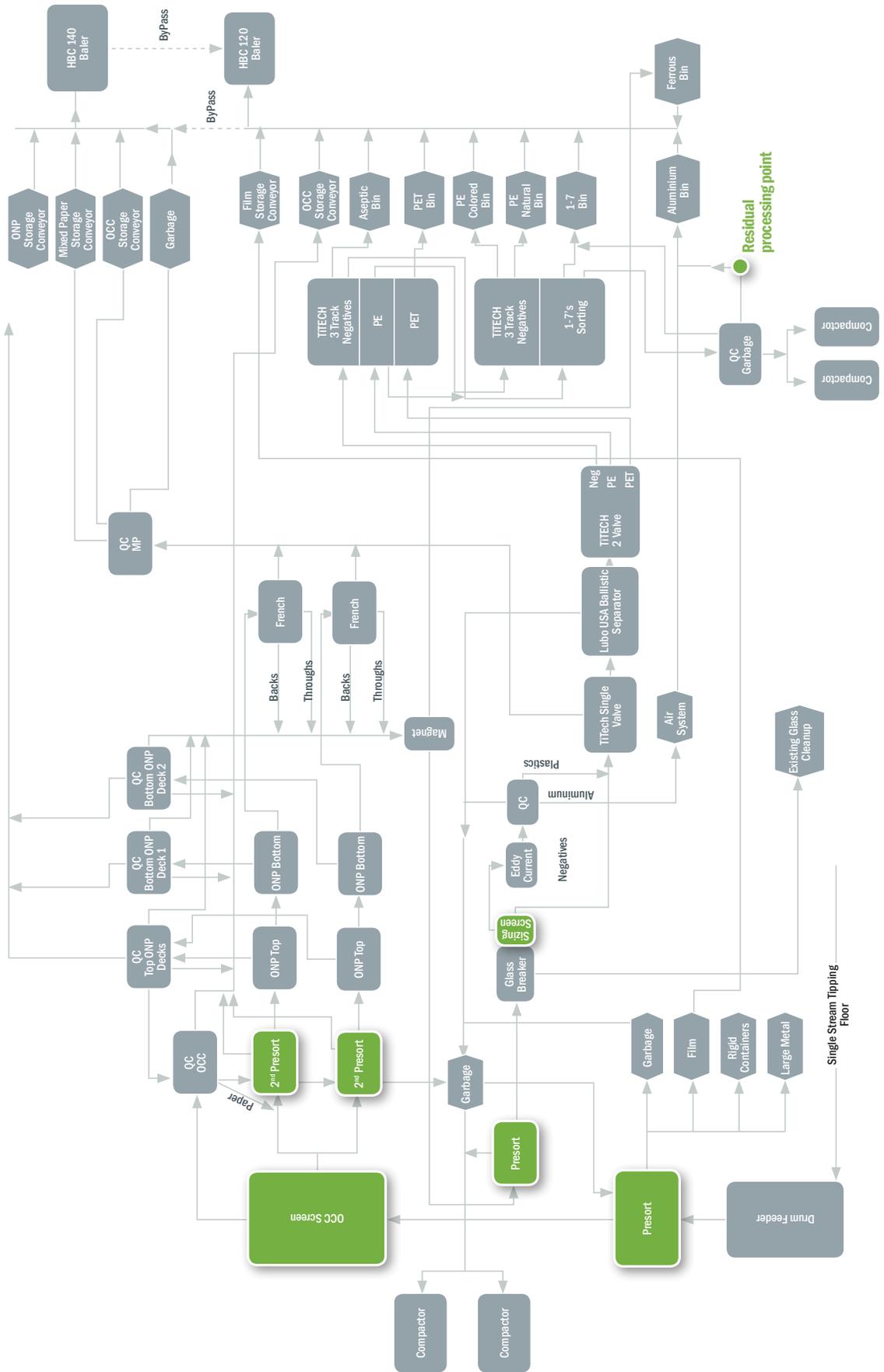


**The switch to single stream processing has produced a noticeable uptick in commercial recycling rates.**

- **Reduced residuals.** Residual rates average about 9%. The approximate makeup of RIRRC's total residue rate is 4.3% process residue and 4.7% incoming reject contamination—a **decrease of 10.5% from the previous system.**
- **Increased reliability.** The new system has not experienced any significant periods of downtime. **The longest period of downtime was less than four hours, which was incurred during the initial testing period within the first three months of operation.** The facility has a long track record for maximizing system uptime which RIRRC attributes to the experience, skill and dedication of maintenance personnel and the quality of the equipment installed at the MRF.
- **Increased diversion.** The new system has significantly lowered RIRRC's effective residue rate allowing RIRRC to divert an additional 9,600 tons of material from the landfill over the past 12 months. **This equates to a 15% increase in commodity shipments over the last 12 months.**
- **Improved safety record.** Most importantly, RIRRC's declining occurrence of minor injuries and continued maintenance of zero severe injuries is a measure of success and metric that is most valuable to the facility's leadership team.

# Waste Screening Enhancements

All aspects of waste screening have improved with the new system. The flow chart below highlights the features of the system related to waste screening. Select process components are detailed on the following page.



- Enhanced primary and secondary sorting.** Expanded sorting stations allow staff to capture and remove more harmful waste at the front end of the MRF to prevent damage to downstream equipment.
- Robust screening equipment.** The new MRF is fitted with OCC, ONP, Fiber Container, Comingled, Glass Breaking and Trommel screens.
- Additional residual collection points.** Installation of separate residue collection points allows RIRRC to better determine processing efficiency by collecting data on the percentage of incoming rejects that are removed up front in the presorting areas vs. the process residue generated at the back end of the system—empowering RIRRC to make adjustments to improve material sorting and screening performance.
- Flexible processing.** The new single stream processing system was designed for flexible processing capabilities. With a few minor programming changes to the new optical sorters, the MRF can sort for a number of different materials. For example, RIRRC staff recently adapted the system to remove #5 Polypropylene plastics to take advantage of a 400% average increase in its commodity value.
- Public education through social media and public outreach.** RIRRC posts “Dos and Don’ts” to their Facebook and Twitter profiles to help educate MRF users about accepted recyclables and to field customer’s questions. These platforms have been a valuable tool to improve the quality of the incoming product to the MRF.



## Community benefits and customer service

### Dedication to acting with honesty and integrity.

Occasionally valuables inadvertently discarded by residents and businesses make their way to the MRF. RIRRC production staff extract and report lost items and make every effort to reunite valuables with their owners. This commitment to acting with honesty and integrity is one of RIRRC's core values and key to establishing a trusted relationship with the community.

**“ Many thanks to you and your staff for recovering my daughters billfold. It was quite the Christmas present that quite frankly none of us thought possible.”**

- Jim Hagan, former RI State Senator and former president of the Greater Providence Chamber of Commerce

**Free Programs.** RIRRC has implemented several free programs to assist surrounding residents and businesses with their disposal needs. Financial assistance provided by RIRRC directly to citizens includes:

- No tip fees for recyclables and profit sharing program to share revenues
- Free household hazardous waste program
- Free electronics recycling program
- Free waste oil, waste antifreeze and used cooking oil acceptance program
- Free compost allowance and cap sharing program among municipalities

## Financial performance

The RIRRC Recycling Department generates revenue solely from the sale of finished bales of recyclable material. The MRF has never charged a tipping fee. A summary of the revenues, operating expenses and distribution of profit to the general fund from the MRF is below.

	FY10	FY11	FY12
<b>Revenues</b>	\$7.7M	\$11.6M	\$11.2M
<b>Expenses</b>	\$6.2M	\$8.6M	\$7.4M
<b>Income before Profit Sharing</b>	\$1.5M	\$3.0M	\$3.9M
<b>Profit Sharing Distribution</b>	\$712K	\$1.86M	\$1.94M

RIRRC also generates revenues from 4 additional sources: **(1)** commercial tipping fees, **(2)** municipal tipping fees, **(3)** methane royalty, **(4)** interest and investment income. Over its 33 year history RIRRC has operated the facility without

securing any financing from the State of Rhode Island. In fact, RIRRC has contributed money back to the General Fund of the State totaling approximately \$63 million since 1996. In addition, host community payments have been made to the Town of Johnston since 1996, totaling approximately \$64 million.

RIRRC has also implemented energy saving enhancements within the MRF to increase efficiency and lower operations costs:

- **High Efficiency Lighting.** RIRRC replaced 55 incandescent lighting fixtures in the educational tour room with high efficiency LED lighting. Additionally, RIRRC plans to replace all of the fluorescent fixtures in the production areas of the plant with highly efficient and durable LED lighting by the end of next fiscal year.
- **Natural Gas Heating system.** An Investment Grade Audit is currently being conducted to replace infrared electric heaters in the plant sorting areas with highly efficient natural gas powered heat. The installation is scheduled for completion prior to December 2013.
- **Premium Efficiency Motors.** 94% of the electric motors in the new processing system are Totally Enclosed Fan Cooled (TEFC) Premium Efficiency motors operating at an efficiency level that is almost 2% above that of a High Efficiency motor. 56 of these motors are connected to variable frequency drives to improve sorting effectiveness and further enhance energy efficiency.

## Projected Payback Period

The total cost of the retrofit was \$16.9 million. The payback period for the new processing system is heavily dependent upon commodity market pricing, but initial projections indicate that the facility will recoup its investment within five to six years. **Van Dyk estimates that if RIRRC had chosen the easier path of abandoning the existing system and building a similar system from the ground up, the project cost would have nearly doubled to \$32 million.**

## Revenue Distribution for programs and community outreach endeavors

RIRRC invests a significant portion of MRF revenues to maintain recycling education and incentive programs in the State. Over the past two fiscal years, RIRRC offered \$50,000 in municipal grants to help cities and towns fund pilot projects aimed at increasing recycling rates. Approximately \$800,000 is budgeted for the new Recycle Together RI outreach program. RIRRC's FY13 education and outreach program is budgeted at \$365,000. Finally, the Recycling Department routinely budgets \$75,000 for Eco-Depot advertising to promote safe Household Hazardous Waste disposal.



## SECTION 5 Use of Equipment/Systems and Technologies

Van Dyk Recycling Solutions led the equipment selection for the retrofit. Preference was given to equipment with proven process performance and energy efficiency. Equipment specifications for the MRF's major machinery are below. **The system has performed exactly as specified with little to no production downtime since coming online in March 2012.**



RIRRC's HBC-140 Bollegraaf Baler reliably packages product in preparation for resale.

	Motor Capability	Electrical Features	Specifications	Equipment Features
<b>HBC-140 Bollegraaf Baler</b>	2 x 75kw TEFC electric motors	480 volt / 3 phase All moving parts are enclosed behind access doors that are interlocked to the control circuit. If any door is opened while operating the baler instantly shuts down.	The baler has a bale chamber that produces a 43" wide x 43" tall x adjustable length bale	High throughput single ram baler. Prepress-flap allows the ram to press without having to cut/shear through material. This increases energy efficiency and the service life of the components within the ram chamber. Baler also has a cross-tie system that allows for strapping the baling wire both vertically and horizontal for hard to bale materials.
<b>HBC-120 Bollegraaf Baler</b>	90kw TEFC electric motor	480 volt / 3 phase All moving parts are enclosed behind access doors that are interlocked to the control circuit. If any door is opened while operating the baler instantly shuts down.	The baler has a bale chamber that produces a 43" wide x 29" tall x adjustable length bale	High throughput single ram baler. Prepress-flap allows the ram to press without having to cut/shear through material. This increases energy efficiency and the service life of the components within the ram chamber. Baler also has a cross-tie system that allows for strapping the baling wire both vertically and horizontal for hard to bale materials.
<b>Lubo Comingled Separation Screen</b>	4 x 5.5kw Premium Efficiency TEFC electric motors	480 volt / 3 phase Variable Frequency Drive controlled	Each unit has 27 horizontally mounted shafts with a total of 554 rubber stars per screen	Screen reverses upon system stop to clear any material left on shafts. Screens have interior lighting to make cleaning safer for employees. Incorporated in the screen is an air system to aid in the separation of fiber from containers. Shaft speeds and screen angle are fully adjustable.
<b>Lubo ONP Screen</b>	3 x 5.5kw Premium Efficiency TEFC electric motors	480 volt / 3 phase Variable Frequency Drive controlled	Units each have 23 horizontally mounted shafts with a range 161 to 219 rubber stars per screen	Screens have interior lighting to make cleaning safer for employees. Shaft speeds and screen angle are fully adjustable.
<b>Lubo OCC Screen</b>	3 x 7.5kw TEFC electric motors	480 volt / 3 phase Variable Frequency Drive controlled	Unit has 21 horizontally mounted shafts with a total of 191 rubber stars and is 9' wide x 30' long	Shaft speeds are adjustable by VFD for each section.
<b>Stadler Ballistic Separator</b>	11kw Premium Efficiency TEFC electric motor	480 volt / 3 phase Variable Frequency Drive controlled All access doors feature electrical safety interlocks that shut the entire system down if disengaged	Unit dimensions 8' wide x 19' long x 8.5' high with 2" screening holes	Paddle screen deck angle is fully adjustable and rotation speed is adjustable by VFD.
<b>Bakker Magnetics Eddy Current Magnetic Separator</b>	1 x 4kw & 1 x 7.5kw Premium Efficiency TEFC electric motor	Belt drive motor is Variable Frequency Drive controlled 480 volt / 3phase Rotor drive motor is Variable Frequency Drive controlled	Neodymium magnet rotor 1600mm wide beltTo allow for proper dispersion of aluminum UBC material for better separation	Unit has vibration and belt tracking sensors that automatically shut machine down if changes occur in operational parameters to prevent equipment damage or sorted material separation issues.

## SECTION 6 Worker Health & Safety

### Staff organization

RIRRC devotes considerable time, effort, and money to provide its staff with a safe and comfortable working environment.

The 59-member MRF staff completes one production shift and one maintenance shift daily. The team includes: 28 Material Sorters, 3 Baler QC Sorters, 2 Production Team Leaders, 5 Equipment Operators, 2 Equipment Specialists, 9 Equipment Cleaners/Janitors, 4 Mechanics, 1 truck Driver, and 2 Production Supervisors, in addition to the MRF Business Manager, the MRF Logistics & Inventory Control Coordinator and the MRF Operations Supervisor.

### Protective equipment

Before entering any production areas, all staff members, employees and visitors must wear task-appropriate Personal Protective Equipment (PPE) including:

- Hard hats
- Protective eyewear
- High-visibility reflective outerwear

Furthermore, all employees stationed inside the MRF must wear appropriate hearing protection, cut and puncture resistant gloves, and protective foot wear at all times. Particulate dust masks and vinyl aprons are also provided at the request of employees.

### Training courses

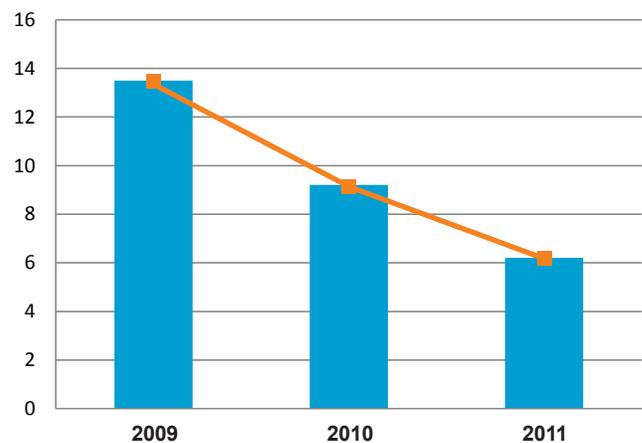
RIRRC holds monthly safety training courses for facility staff. Topics include:

- HAZ-Com Right-to-Know program
- Confined spaces
- Lock-out/tag-out
- Housekeeping safety
- Slips trips and falls
- Cold /heat stress
- Machine guarding
- Proper PPE use/care
- Emergency evacuation training
- Hot work-welding, torch and plasma cutting
- Fire extinguisher training
- CPR/AED
- First aid
- Audiometric testing & hearing conservation training
- Violence in the workplace
- Safe lifting procedures

RIRRC has a full-time Certified Health and Safety Officer (CHSO) to maintain compliance, conduct safety training sessions, evaluate incidents with the safety committee, and prevent future occurrences. The Corporation CHSO is also certified to conduct OSHA 10 and OSHA 30 hour training modules along with forklift, aerial boom and scissor lift certification.

### Safety Procedures, enforcement and injury rates

**RIRRC's site wide Occupational Safety and Health Administration (OSHA) Days Away, Restricted and Transferred (DART) rate has steadily decreased over the last three years with the addition of the site's CHSO.**



All injuries and incidents that occur on site are promptly reported to security. Incident details are submitted to a Supervisor who reviews the characteristics to determine whether it was avoidable and if /where fault occurred. The Supervisor then prepares a recommendation on how to resolve the incident and implements controls or procedures to mitigate risk of future similar occurrences. Finally, all of the incident information is passed along to a Safety Committee that further explores the cause and offers additional mitigation strategies, if applicable.

### Additional Site Safety and Security Features

- **Security.** Full-time professional security officers are on site around the clock to maintain site security and respond to accident or injury calls.
- **Task Lighting.** Fixtures installed above or inside all material separation screens ensure worker safety during routine cleaning tasks.
- **Traction.** Fluid retention barriers located on the floor near the container baler hold and divert standing liquids into the baler needle pit. This allows for nightly pumping into collection tanks, which keeps floors dry and maintains adequate traction for vehicles and personnel.

## SECTION 7 Facility aesthetics and maintenance

RIRRC takes pride in the appearance and aesthetic appeal of the MRF. Regular maintenance activities at the facility recognize the impact that cleanliness has on customer experience and include:

- Daily floor and equipment cleaning
- Weekly deep clean of facility equipment
- Weekly pressure wash of rolling stock
- Daily collection of windblown paper and plastic bag litter around the building perimeter

During the MRF retrofit, RIRRC staff worked tirelessly to manage the construction dust and debris on the site. Staff cleaned all interior facility walls during the retrofit to maintain a pleasant customer experience despite the ongoing construction activities and all reused equipment was cleaned and painted.



**Litter Control.** A fully enclosed tipping area stores all loose, unprocessed material. Baled commodities are warehoused indoors prior to shipment.

**Dust Control.** A misting system limits airborne dust particulate matter inside the facility on the tipping floor and at several

dust generation points. The operation of two water trucks and one sweeper controls dust on roadways.

## Educational programs

RIRRC believes that fun educational activities are a great way for kids and adults to learn about responsible waste management and recycling, in addition to the environmental benefits that follow. This methodology has prompted RIRRC staff and educators to use a variety of educational outreach programs, including recycling-themed activities, lesson plans and events, and public appearances by MaxMan, RIRRC's recycling superhero to connect with schools, municipalities, community organizations, and residents. All the while, RIRRC targets heightened awareness and enthusiasm around the "Three R's: Reduce, Reuse and Recycle." Programs include:

- **School Field Trips and Public Tours.** RIRRC educators guide visitors through the comprehensive MRF education center, where participants can watch videos, explore museum-quality displays, and

learn about the sorting and reselling of recyclables. Tours are free of charge and open to all Rhode Island residents, community groups, schools and businesses.

- **Educational Materials.** RIRRC produces and distributes various educational materials to residents state-wide. Subject matters range from recycling best practices to at-home composting how-to's.
- **School Visits.** Educators from the RIRRC recycling department visit classrooms state-wide to present on recycling, composting, and waste reduction. Each presentation is age appropriate and tailored to the group.



- **MaxMan Presentations.** MaxMan is Rhode Island's friendly recycling superhero. He teaches groups of youngsters the benefits of the "Three R's" and can be seen walking parade routes on St. Patrick's Day and the Fourth of July. Each presentation is age

appropriate, tailored to the audience, and offered free of charge.

- **Public Presentations.** RIRRC staff members conduct regular presentations and lead discussions about solid waste issues to groups, organizations, and agencies all around Rhode Island. Audiences have included Chambers of Commerce, city and town councils, garden clubs, state agencies, civic groups, business associations, green teams, and more.

**“ Our sincere thanks for one of the best educational field trips I have ever been on! The information gained by visiting the facility is crucial to the future of our young people and I highly recommend this trip to everyone.”**

- Wendy Bruce, Teaching Assistant, Lippit School, Warwick Rhode Island



RIRRC's Recycle Together RI webpage helps broadcast the changes of the single stream conversion and importance of recycling to the community

- **Recycle Together RI.** The Rhode Island Resource Recovery Corporation Board of Commissioners introduced the new Recycle Together RI initiative upon the completion of the retrofit. [The website and accompanying educational materials were developed to foster a new way of thinking about recycling in Rhode Island—one that truly connects the community to why recycling is so important for the state.](#)
- **Recyclopeda.** RIRRC maintains an online “Recyclopeda” page. At the click of a mouse, users can access disposal information for everything from Aerosol cans to Ziploc bags.

[In 2012, the education program provided unique services to 25,709 people through MRF visits, field trips, school visits, and outreach presentations. RIRRC educators completed 257 presentations for Rhode Island residents ranging from Pre-K to Adult.](#)

## Additional events and programs

- **Business Assessments.** RIRRC conducts free business assessments that identify areas where cost savings can be achieved through waste prevention, recycling, and reduced purchasing. An effective assessment can be a simple “walk-through” of the facility or a comprehensive look at waste generation, involving sorting and weighing all waste for a period of time. RIRRC also contributes to a free, regional materials exchange website so that businesses can trade or sell surplus inventory: [www.reusemarketplace.org](http://www.reusemarketplace.org).
- **Event Recycling.** RIRRC provides local RI communities and organizations with collection assistance for recyclable materials during large public events. RIRRC will supply, deliver and pick up the necessary equipment to collect an event’s

recyclables. These events have included Newport Folk Festival, Newport Jazz Festival, South County Seaside Classic Soccer Tournament, Burrillville Relay For Life, Cumberland Fest, Great Pumpkin Festival (North Smithfield), Newport Wine & Food Festival, and Scituate Art Festival. [Last year, RIRRC’s event recycling initiative diverted an extra 8.7 tons of recyclables from the Central Landfill.](#)

- **Rhode Island Recycles Day.** In recognition of America Recycles Day, RIRRC transforms its Small Vehicle Area drop off zone into a comprehensive, one-stop drop off hub for Household Hazardous Wastes, shredding of sensitive documents and recyclables.



## Outreach and social media

As mentioned previously, RIRRC leverages a wide variety of media such as news-papers, magazines, radio, and online advertising to promote various recycling activities. Two weekly columns called “Trash Tutorial” and “Five Items” are written by staff and published in The Providence Journal. RIRRC also publishes a monthly newsletter, Chasing Arrows, for municipal recycling coordinators in every city and town. Chasing Arrows is a vehicle for making announcements, sharing-best practices, and generating discussion.

Social media outlets also provide RIRRC with an opportunity to grow traffic and increase recycling awareness. RIRRC has had an active Twitter account since 2009 and Facebook page since 2010. These channels share videos, advice and information on upcoming events to a burgeoning number of interactive followers.



May 3, 2013

Sarah Kite, Director of Recycling Services  
Rhode Island Resource Recovery Corporation  
65 Shun Pike  
Johnston, RI 02919

Dear Sarah,

I am happy to support one of our most outstanding customers, the Rhode Island Resource Recovery Corporation, for the SWANA 2013 Recycling Systems Excellence Award.

RIRRC has processed dual stream recyclables for the state of Rhode Island since approximately 1989. They have made several upgrades over the years, and they have always used Bollegraaf systems and balers on their paper side and a combination of Bezner, Machinex, and Bollegraaf on their commingled processing side. Collectively, the RIRRC employees have more than 20 impressive years of experience in MRF operation.

In 2011, RIRRC decided to convert their facility to single stream. The task was daunting. The facility had to continue running while the new single stream system was installed, but RIRRC made the transition seamlessly. They chose their equipment carefully, and after a thorough review selected Bollegraaf equipment sold by VAN DYK Recycling Solutions based on our trusted reputation. We found the alliance very rewarding, and RIRRC's cooperation was exemplary. It was a true example of private public partnership.

Brian Dubis, Operations Supervisor, Mike O'Connell, Executive Director, and Sarah Kite, Director of Recycling Services, are peerless in the art of collaboration. Due to their professionalism and help, the system was installed ahead of time, on budget, and processed 50-60 tph of single stream in the first weeks—all while sustaining operation. The cooperation from the entire plant's staff was invaluable and made the retrofit a joy to perform.

I would welcome anybody to have a look at this state-of-the-art single stream facility. RIRRC is processing with a remarkable 28 sorters total. The Lubo screens and 4 TITECH optical sorters produce clean ONP, OCC, mixed paper, double sorted PET, natural PE, colored PE, PP, and do recovery of any missed items.

In my opinion, the facility is one of the biggest and best in the world at the moment. I sincerely recommend RIRRC for the highest SWANA Excellence Award.

Please contact me if you have any further questions.

Best Regards,

A handwritten signature in blue ink, appearing to read "Pieter Eenkema van Dijk". The signature is stylized and written in a cursive-like font.

Pieter Eenkema van Dijk  
President, VAN DYK Recycling Solutions

**Main Office:**

78 Halloween Blvd, Stamford, CT ● 203.967.1100 (o) ● 203.967.1199 (f) ● [info@vdrs.com](mailto:info@vdrs.com) ● [www.vdrs.com](http://www.vdrs.com)

*Exclusive Sales & Support for Bollegraaf, Lubo and TITECH Recycling Machinery  
VAN DYK Recycling Solutions is the trade name for Van Dyk Baler Corp. and Lubo USA, LLC.*

Lippitt School  
35 Almay St  
Warwick, RI 02886

May 21, 2012

Dear Ms. Perry,

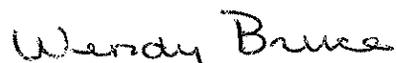
I attended the field trip to RIRRC last Wednesday and you were our tour guide for this visit. I would like to first thank you for the best tour that I have been on at this facility. I have attended several prior to this visit. I found you very informative and in excellent control of the children. It was a pleasure to book this field trip for several of our grades here at Lippitt Elementary. Please know that you were complimented by all of the adults on this field trip and also that it was a wonderful learning experience for students, parents and teachers.

I have enclosed a couple of narratives written by two students in Mrs. Casacalenda's third grade class so you can see for yourself that the students were very impressed with both the landfill and most importantly their tour guide.

Our sincere thanks for one of the best educational field trips I have ever been on! The information gained by visiting the facility is crucial to the future of our young people and I highly recommend this trip to everyone. I will be happy to book a tour for any grade in our school next year and will certainly encourage it, even if the students have attended before. We will make it a yearly visit to be sure!

Looking forward to seeing you again!

Sincerely,

A handwritten signature in cursive script that reads "Wendy Bruce".

Wendy Bruce  
Teaching Assistant, Lippitt School

**Brian Dubis**

---

**From:** Gary Maddocks  
**Sent:** Thursday, February 21, 2013 8:03 AM  
**To:** Mike OConnell  
**Cc:** Sarah Kite; Krystal Noiseux; Brian Dubis  
**Subject:** FW: thank you

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Director this was a response to the found purse at the MRF on 12-26-12.

Gary W. Maddocks Jr.  
Chief of Security/Maintenance  
Rhode Island Resource Recovery Corporation  
65 Shun Pike Johnston, RI 02919  
Phone: 401.942.1430 x222  
Cell: 401-639-0841 Fax: 401.228.3280  
e-mail: [gmaddocks@rirrc.org](mailto:gmaddocks@rirrc.org) or [www.rirrc.org](http://www.rirrc.org)

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**From:** James Hagan [<mailto:jhaganjmg@yahoo.com>]  
**Sent:** Wednesday, February 20, 2013 4:26 PM  
**To:** Gary Maddocks  
**Subject:** thank you

Hi Chief----again many thanks to you and your staff for recovering my daughters billfold. It was quite the Christmas present that quite frankly none of us thought possible. It traveled all the way from a container in Little Compton to the Landfill & Recovery Center in Johnston and low and behold you found it. Amazing! I did send a short note to the local media but it may not have been printed. Anyhow, thanks again and keep up the good work.

Jim Hagan---former RI State Senator & former President of the Greater Providence Chamber of Commerce

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International  
Forest Products LLC



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TELEPHONE 508/698-4600 FAX 508/698-1500

WEBSITE [www.ifpcorp.com](http://www.ifpcorp.com)

May 9, 2013

Mr. Michael Florio  
Major Account Manager  
Waste Management  
6255 Sheridan Drive  
Williamsville, NY 14221

Re: Quality of RIRR tons

Dear Mr. Florio

As requested this letter confirms that International Forest Products / Rand Whitney Containerboard purchases all grades of secondary fibers, such as Cardboard, newspaper, office paper and mixed paper from Rhode Island Resource Recovery located at 33 Shun Pike Johnston RI. The quantities of materials purchased are generally about 60 tons per day. The quality of material that we purchase from RIRR is always a very high quality pack of wastepaper that meets or exceeds the industry standards.

It is currently our intent to continue to be in a position to accept this material for the foreseeable future. Please contact me should you have any questions regarding this matter.

Sincerely,

-----Member of the Kraft Group Companies-----





**Anheuser-Busch  
Recycling Corporation**  
ONE OF THE ANHEUSER-BUSCH COMPANIES

To: Michael Miller - WM

RE: RIRRC Quality

Michael,

This letter is to confirm RIRRC has been shipping used beverage cans (UBC) to ABRC that meet our UBC specifications. We appreciate the extra effort to clean, bale, and ship quality product.

Thanks again,

Thomas N Marshall  
Director, Sales and Service  
Anheuser-Busch Recycling  
314-765-3226





Prepared by



Rhode Island Resource Recovery Corporation  
65 Shun Pike  
Johnston, RI 02919  
(401) 942-1430