

# **Public**

## Submitted to:

Maritza Pagan Department of Energy and Environmental Protection 79 Elm Street Hartford, CT 06106-5127

# **Submitted by:**

Sacyr Rooney Recovery Team 5601 S. 122<sup>nd</sup> E. Ave. Tulsa, OK 74146



Phase II request for proposals for the financing, design, construction, operation, and maintenance of a solid waste management projects.

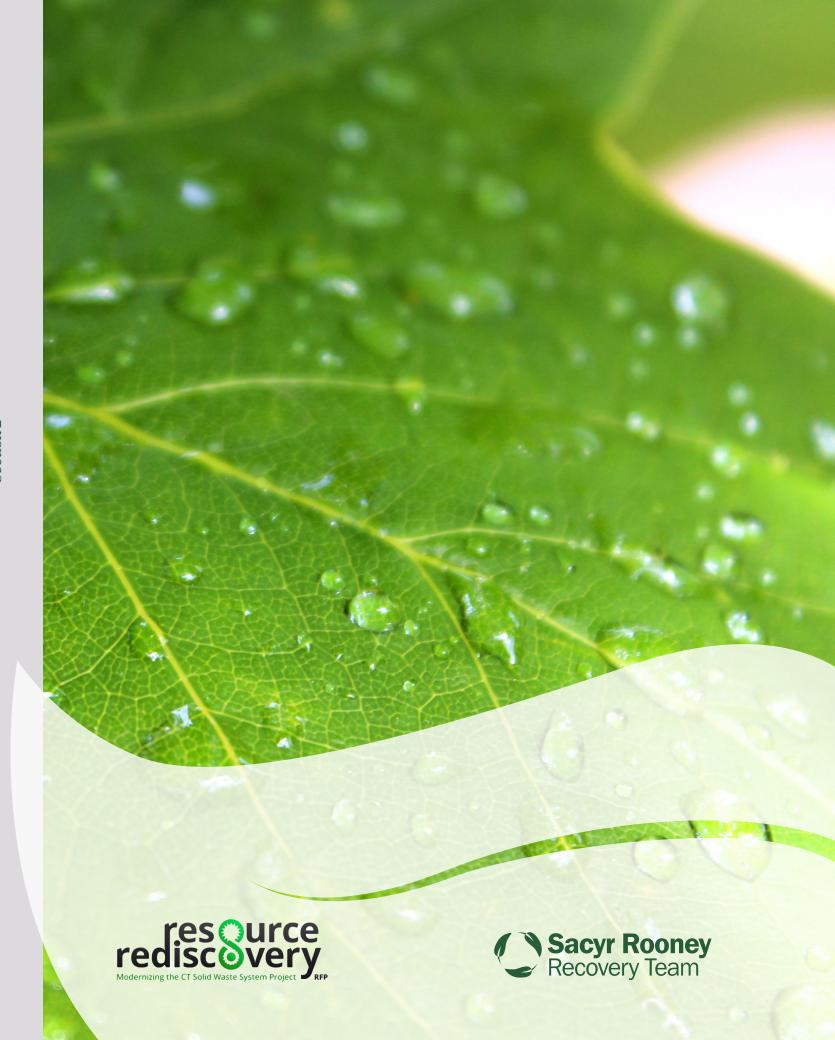
**Qualification Statement** 

Sacyr Rooney Recovery Team, LLC

5601 S. 122<sup>nd</sup> E. Ave. Tulsa, OK 74146

Per of 1.4 (page 22) of the RFP, we have marked pages in this proposal that contain trade secrets or financial information as "Confidential", and these pages have been redacted from the Public Version of this proposal as instructed.







# → Section 2. Executive Summary

The Proposer is required to provide an executive summary of the project proposal that includes a complete description of the proposed project, pricing schedule, and other factors the Proposer deems to be important.

Selecting a firm for a long-term contract such as yours means you need to have certainty that the company you select is financially solid and will be there for you decades into the future. With our Sacyr Rooney Recovery Team you get a professional, financially-strong team who has proven longevity and is highly-experienced in construction and operation of waste-to-energy and recovery facilities.

#### About the Sacyr Rooney Recovery Team

Founded in 1896, the **Rooney** family of companies is highly experienced with national and local (northeast US) experience. With our longevity and proven track record you can be certain we will be around for the long-term to service your facility and be part of your community.

**Sacyr** brings experience in more than 20 countries including the development, financing and management of domestic and international waste-to-energy and recovery facilities.

**Sacyr Rooney** teamed together to bring world-class recovery and recycling technology and proven US building experience to American municipalities.

In response to your request for proposals, we have provided expert knowledge and recommendations for DEEP and MIRA. Our proposal is based on our first-hand experience of building and operating dozens of waste-to-energy and recovery facilities. We have also partnered with local firms to ensure successful delivery of this project. We believe our answers to your questions will help you meet your goals.

#### **Technology and Expertise**

Proven long-term durability and predictable results are imperative for municipalities to operate efficiently. Our team members have constructed 58 solid waste treatment systems, 41 of which we are currently operating. With our extensive experience in construction and operation, we have a unique perspective on how waste-to-energy and recovery technologies enhance service to the community and waste-handling performance. Our design and recycling technology is automated in most areas, increasing safety and percent of recycled material recovered.

**Mechanical Treatment Technology:** This technology processes the post-recycled municipal solid waste (MSW), yard trimmings and single stream recycling from the collection service.

**Anaerobic Digestion (AD):** This process treats a selected fraction of the organics from the MSW, producing renewable natural gas that will be used as fuel for trucks and vehicles.

**Aerobic Fermentation Composting:** This process treats the organics from MSW, the digestate from the anaerobic digestion, and the organics from the yard trimmings mechanical treatment.









**Refused Derived Fuel (RDF):** This process derives fuel from inorganic fraction from MSW mechanical treatment.

**Waste-to-Energy:** This process creates previously unrealized value out of inorganics through MSW mechanical treatment, RDF production, and aerobic fermentation and maturation.

Outlined below are the main technologies implemented at our Reference Plants:

Reference Plant	MSW mechanical treatment	Organic fraction aerobic fermentation	Anaerobic digestion of organic fraction with power generation	Maturation refinement and compost storage	Waste-to- energy facility with power generation
Mataró Waste to Energy Plant Barcelona, Spain	✓	Automated composting inside closed reactor tanks	✓	<b>√</b>	✓
La Rioja Waste to Energy Plant <i>La</i> <i>Rioja</i> , <i>Spain</i>	✓	✓ Fully-automated lane composting	<b>√</b>	<b>√</b>	
La Paloma Waste to Energy Plant Madrid, Spain	<b>✓</b>	✓ In-vessel tunnels composting	✓	✓	

These technologies have been successfully proven, not only by VSM, but also worldwide.

The main technologies regarding our proposal for the DEEP and MIRA's needs are detailed below:

#### Proposed plan for modernizing the CT Solid Waste System Project

**Mechanical Treatment** technology will be used to increase diversion of MSW.

Anaerobic Digestion (AD) and Aerobic Automatic Vessel Composting will treat the organics from post-recycled MSW. **Waste-to-energy** will valorize the inorganics from the mechanical treatment and the RDF production.

Waste can be processed promptly when it comes in preventing the need for storage. This avoids storage issues including odor, rodents, and loss of quality in feedstocks.

This facility exceeds the diversion goal.

#### Benefits of our plan.

- Flexible: Our technologies provide a global solution. The flexible design enables the facility to operate under several scenarios and variations in quantity and quality of the different feedstocks.
- **Environmentally Sustainable:** The proposed technologies at the waste processing and alternative energy facility will provide an integrative center where every waste fraction can be treated. The treatment technologies chosen are the most environmentally sustainable available.





 Water and Energy Conservation: Our technology also allows water and energy conservation and beneficial use of materials.

**Current situation SRRT Proposal** MSW and MSW and Recyclables Recyclables 100% 100% Recovered **CSWSP** Mechanical Materials Renewable Recovered Treatment Anaerobic Materials Natural Gas Digestion Digestate **Biological** Recovered Treatment Materials **Aerobic** Raw RDF Clean RDF Compost 45% Incineration 90%

PBF

Closed-loop system with no potential for water pollution.

#### Local architectural and landscaping integration

PBF

Several modifications have been planned to improve the aesthetics of the waste management facilities, maximize their integration in the environment and adapt them to host public visits.

Reduction

#### New PBF Welcome Center and Museum •

The north end of the PBF building will be renovated to host public visitors, including school groups, and to conduct Open House events and scheduled tours. The existing administration office building at the north end of the PBF and the northern portion of the boiler plant will be converted into a Welcome Center and a Museum space.

This facility will be a working example of STEM in action for Connecticutarea students.



#### **Reception Building**

The existing WPF administration office building will be demolished and a new Reception Building will be constructed to serve as an administrative building and welcome center for visitors that access the site from Maxim Road.

This new building will provide an educational space for visitors and will serve as an entry point for a long exterior and interior pedestrian walkway system (catwalk) through and around the MBT and PBF buildings. The first floor of the building will also accommodate the offices of the operations personnel working on the MBT.



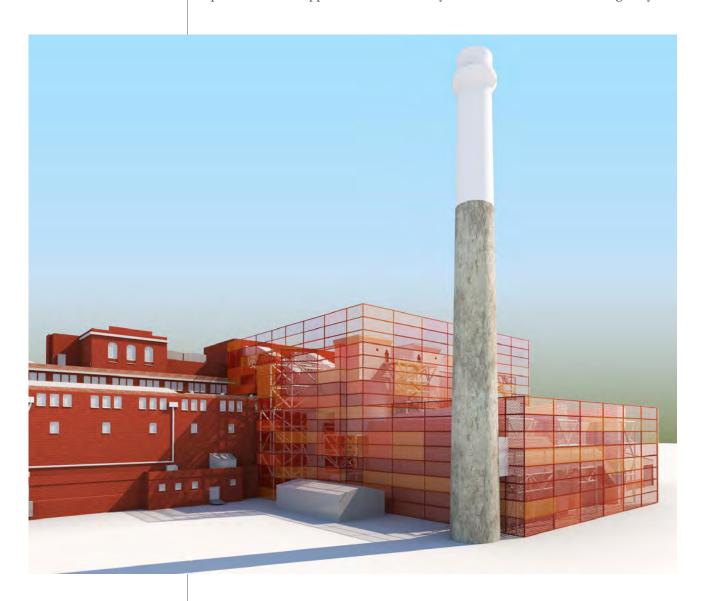


#### New exterior appearance of the MBT industrial buildings

For aesthetic and integration reasons, the external appearance of all MBT buildings (new and existing) will be unified.

## Buffer and visual screens

Visual screens will be placed around the Flue Gas Treatment Equipment and the auxiliary tanks of the PBF. They will be made of "Textile Architecture" with colors compatible with the color tones of its neighboring brick buildings. These screens will improve the visual appearance of the facility from I-91 and Wilbur Cross Highway.







#### Hartford Riverwalk extension

The PBF is adjacent to the south end of the Hartford Riverwalk at the Charter Oak Landing. To facilitate the integration of the new facility into the neighboring City of Hartford community, the extension of the Riverwalk is planned to connect to the new Visitor Center at the north end of the PBF and to possibly further continue the Riverwalk south along the earthen and concrete wall dikes. Pedestrian paths will connect the Reception Building and river frontage areas to the south of the MBT.



#### **Engaging Visitors During Facility Operations**

Visitors to the Power Block Facility (PBF) and the Mechanical Biological Treatment (MBT) Building sites will be able to engage in several educational and recreational activities from the north end of the PBF to the south end of the MBT. They will be able to tour interior and exterior portions of the buildings and be engaged throughout the site, and on a Riverwalk trail on the west bank of the Connecticut River that connects to the existing Charter Oak Landing public park.

The PBF building will be renovated to host public visitors, including school groups, and to conduct Open House events and scheduled tours. The PBF and the northern portion of the boiler plant off Reserve Road will be converted into Welcome Center and Museum space.

A new catwalk system will pass through and wrap around the MBT buildings and continue north to the PBF. This pedestrian catwalk will allow the public to see various recycling operations and processing (mechanical handling/sorting/baling and composting/aerobic fermentation) in progress. The elevated portions of the





catwalk will be fully accessible and code compliant. The catwalk will pass back into the PBF building, through the Turbine Hall on a designated path, and finally connect to the Visitors Center at the north end of the PBF complex.



#### **Community Service and Support**

Our Sacyr Rooney Recovery Team members have been building in the northeastern US for twenty years. We have created an extensive database of local subcontractors and suppliers that we work with to achieve our local and MBE goals. We have already begun implementing our plan by reaching out to the local community to select the most highly-qualified MBEs to join our design team as the first step.

Once we are awarded the project, step three begins as our local and MBE goals are built into the early preconstruction bid packages. Our small business database is use to identify prime subcontractors that qualify for the bidders list. The database is also used to identify companies that could perform work on the project in a lower tier capacity or as vendors. As this subcontracting plan develops we look



#### Resource Rediscovery Phase II



for further opportunities for local and MBEs, but we also give great focus to the areas in which we see gaps where we have not been able to identify an ample number of qualified MBE firms for a specific trade. An important part of our MBE and local small business plan is to remove obstacles from their successful performance. Often times, bonding and cash flow is a serious issue for these small businesses, that's why we offer bonding alternatives and expedited payment plans for these firms. Our team includes flow-down goal requirements with our prime tier subcontractors, and requires reporting requirements to ensure those goals are met. As part of the process, subcontractors are required to provide proof of payment to lower tier MBE subcontractors. The project team provides a monthly report of initial commitments, current contracts and payments to date to verify the subcontractors follow through with contractual commitments. This process also allows the team to address and correct any discrepancies that arise early on.

#### Marketing

Our approach for all projects is to successfully operate the facility and maximize its performance. Our technical proposal is based on VSM's vast experience in the solid waste management sector, 41 current facilities under operation and process more than 5 million tons of waste per year. This includes experience in selling products, which are listed in the margin of this page. They are also included in <u>Appendix F:</u> <u>Feedstock Acquisition and Product Marketing Plan</u>, which meets the requirements.

Other key factors to achieve performance goals:

- The correct dimensioning of material and human resources assigned to operation.
- The correct maintenance (both preventive and corrective).
- The appropriate training program for the staff.

With this approach, the Respondent targets are:

- Maximize availability (or up-time).
- · Maximize recovery rate.
- · Maximize power generation.
- · Maximize compost production.
- Maximize RDF production.
- · Minimize rejects.

Furthermore, in our design we integrated all the waste management operations by including a new composting plant in our new facility.

## Financing and Viability - Providing a Realistic Solution

We consider the current plant as part of our technical solution and investment. This plan includes the existing facility because it makes the overall system financially feasible and maintains or lowers the tipping fees for the consumers.

Our proposal maintains the current site and improves the environmental conditions around the facility, while keeping the plant operational during the improvements and introduction of the additional processes that will increase the amount of MSW that will be diverted from the landfill. Improving the overall facility will be accomplished on the existing site.

Product selling experience and products included

in <u>Appendix F: Feedstock</u> <u>Acquisition and Product</u> <u>Marketing Plan on page 821</u>.

Recovered materials from post-recycled MSW mechanical treatment

By - Product

Corrugated Cardboard

Other Paper

Ferrous

Aluminum

PET#1

HDPE #2 Natural

HDPE #2 Colored

Other Plastics #3-#7

Plastic Film

Anaerobic Digestion (AD)

By - Product

Renewable Natural Gas

Recovered Materials from source separated recyclables mechanical treatment

By - Product

Corrugated Cardboard

Other Paper

Ferrous

Aluminum

Glass Flint

Glass Amber

Glass Green

PET#1

HDPE #2 Natural

HDPE #2 Colored

Other Plastics #3-#7

Plastic Film

Compost from in-vessel Aerobic Fermentation Treatment

By - Product

Compost

Energy output from PBF waste to energy

Output

Power Output





Our plan is based on the mass balance sheet (page 13) and includes the following plans:

- Construction of advanced technology MBT plant, which recovers the
  marketable materials contained within the mixed waste or so called "dirty
  waste." Our sorting technology has been proven for several years with this
  type of waste and recovery of marketable products. These products range
  from packages, paper, and cardboard to organic products that can be used
  in making compost with a quality that can be used for commercial sales,
  engineered soils, agricultural and horticultural uses, and golf courses.
- We will improve the processing plant that prepares the RDF for the waste to energy, disposing of materials such as PVC and fines that include high chlorine and other pollutants thus producing a higher quality RDF. This process will increase the quality of the emissions from the plant.

The envisioned solution is realistic and proven worldwide and from an economical point of view, the business model is profitable with the current electricity prices being as low as they are.

Construction of a new MBT plant will allow for the compliance with the diversion criteria before combustion and the preparation of an adequate RDF for this facility. The technology used in the mechanical equipment sorting plant is more than appropriate for sorting the materials of the single stream. The dimensioning of the plant is achieved with three lines each with an hourly capacity of 50 tons per hour, making it possible to treat all the MSW and, if necessary, the projected 100,000 TPY of recyclables, plus the advantage of the capability of being able to adapt to variations in quality and quantity during the contractual period.

State-of-the-art technology for recycling before incineration improves the quality of the emissions from the plant and significantly increases diversion.

# Mataró Waste-to-Energy Plant

Example of refurbishing of an existing WTE and construction of a new MBT processing plant and a successful integration in urban area.





#### Resource Rediscovery Phase II



Our experience with mechanical sorting of materials, with mixed urban waste, makes recovery of materials and RDF production possible. Also, we integrate proven equipment, including technology that separates by size, densimetrics, optical and infrared and manages "dirty waste". This approach allows us to separate the acceptable Municipal Solid Waste in three main fractions including:

- 1. Organic fractions and fines, with low calorific power, obtaining commercial compost and inert materials.
- 2. Fractions with high content in packaging materials, containers, appropriate materials for recycling and sale as commodities.
- 3. Light fractions and high calorific value, adequate for the RDF production. This product, is released, mostly, of components such as chlorine (in the humidity of organic fine materials and PVC), favoring so the ulterior waste-to-energy, reducing pollutants and foulding in the furnace.

See the mass balance diagram on the following page for diversion percentages of our proposed plan.

Recycling a larger percentage of the incoming waste stream will reduce PBF stack emissions per ton of incoming waste, and improving the efficiency and pollutant removal technology will reduce stack emissions further.







# RESOURCE REDISCOVERY MODERNIZING THE CT SOLID WASTE SYSTEM PROJECT

# PHASE II REQUEST FOR PROPOSAL FOR THE FINANCING, DESIGN, CONSTRUCTION, OPERATION, AND MAINTENANCE OF A SOLID WASTE MANAGEMENT PROJECT

## **SUMMARY MASS BALANCE CSWSP**

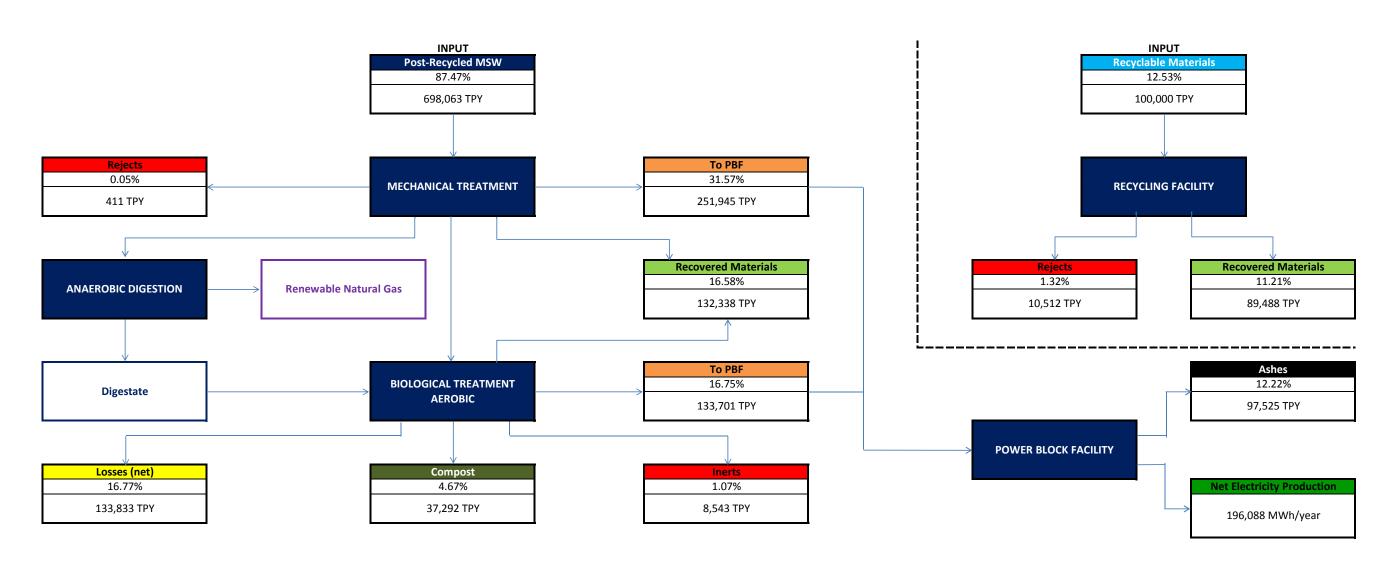
INPUTS	
Post-Recycled MSW	698,063 TPY
Recyclable Materials	100,000 TPY
TOTAL	798.063 TPY

DIVERTED		
Recovered Materials	221,826 TPY	27.80%
Compost	37,292 TPY	4.67%
Losses	133,833 TPY	16.77%
TOTAL	392,951 TPY	49.24%

To Power Block Facility	385,646 TPY	48.32%
Rejects	19,466 TPY	2.44%
TOTAL	405,112 TPY	50.76%

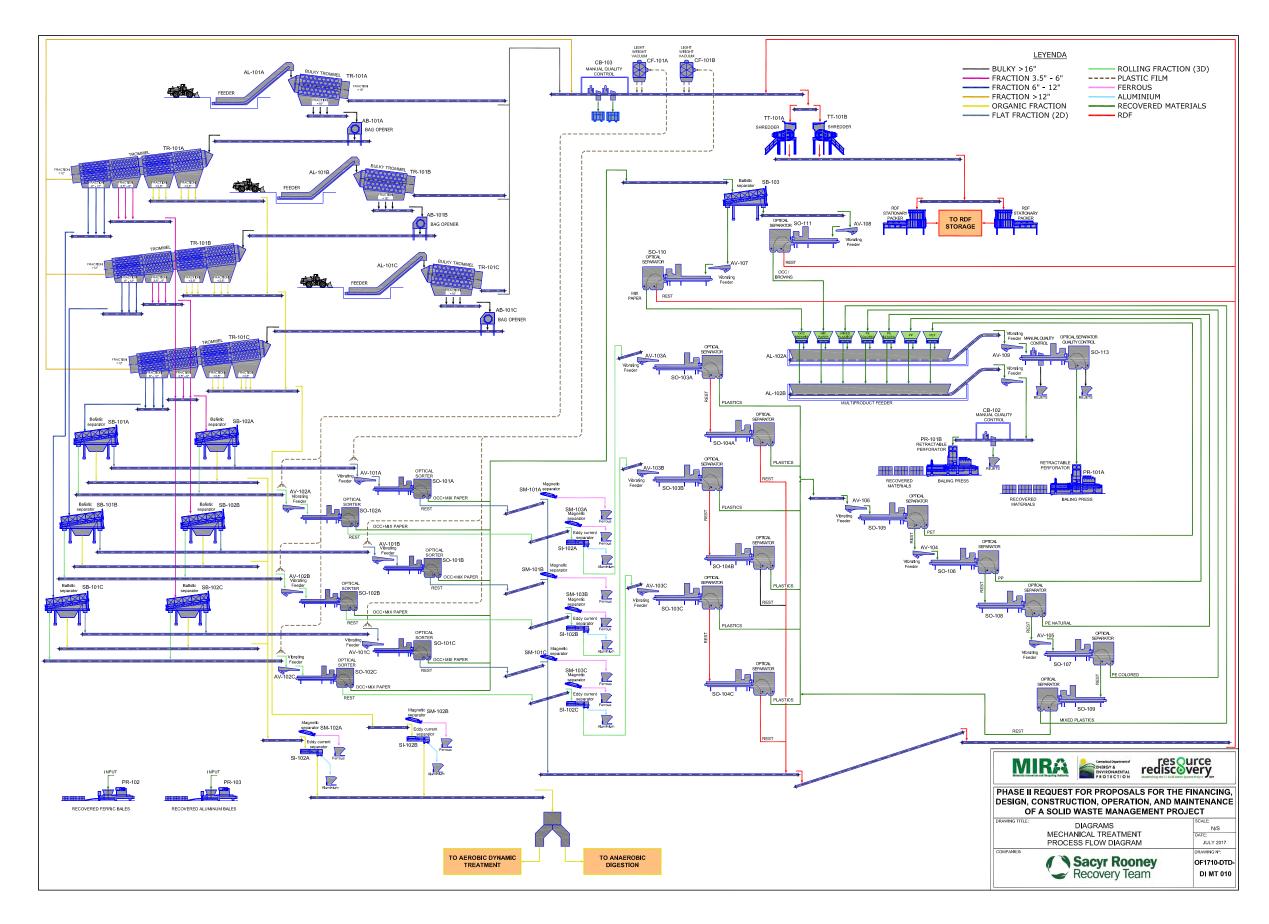
**NON - DIVERTED** 

DIVERSION	49.24%	
Minimum required (*)	45.00%	

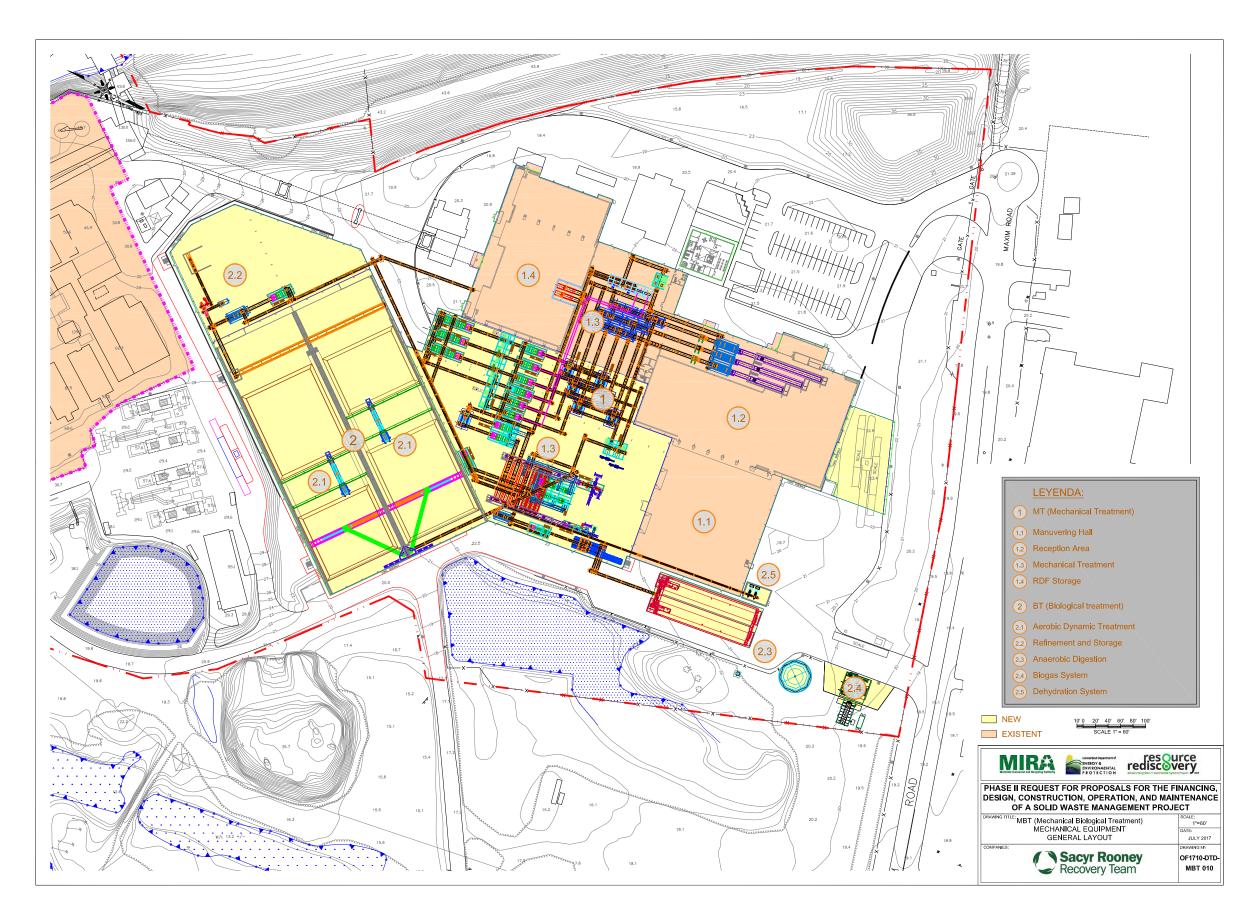


(\*) Minimum required in order to achieve 60% diversion of MSW (2016 Comprehensive Materials Management Strategy – The Connecticut Solid Waste Management Plan)

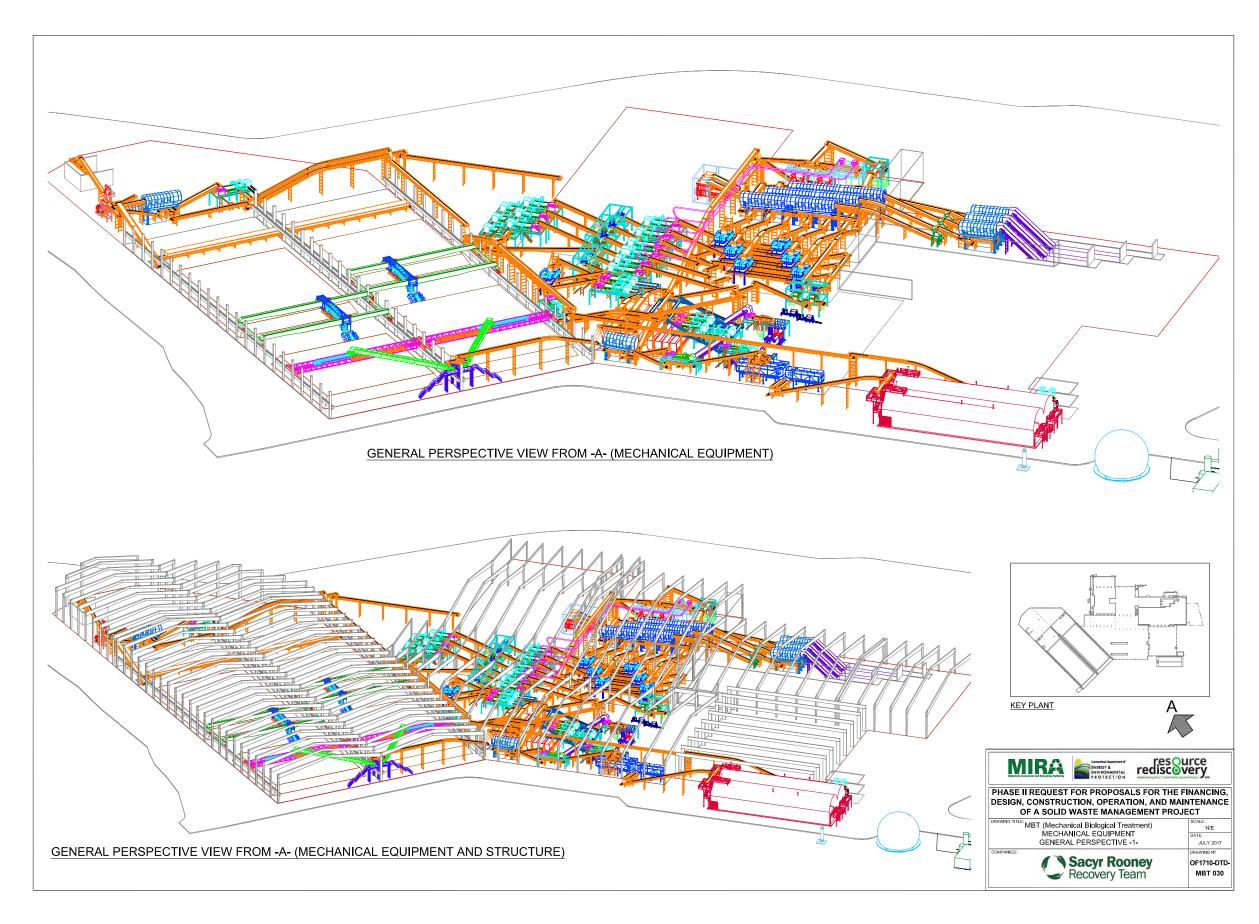


















Hornillos Facility Compost Storage Area

The construction of this new MBT plant will allow for the compliance with the diversion criteria before combustion and the preparation of an adequate RDF for the facility.

We maintain the current High Heating Value (HHV) of the RDF being sent to the PBF, despite the recovery of packages (of high calorific power, such as plastics, paper-cardboard), and we also dispose the finest and wet fractions.

The technology used in the mechanical sorting plant is able to treat even the single-stream material. The dimensioning of the plant is achieved with three lines with a hourly capacity of 50 tons/hour, besides having the versatility to handle situations of excess capacity and possibility to adapt to diverse qualities and quantities during the thirty contractual years.

The qualities of the by-products, obtained from both streams (dirty waste and single stream) will be similar and it will be possible for marketing integration of products.



Processed Recyclables Materials Storage Area

#### Waste Processing Facility - Mechanical Treatment Plant

Our plan includes a new mechanical treatment plant, which is one of the fundamental modifications of the facility. This plant will be completely new, and annexed to the current facilities. New plant benefits include:

• During permitting, design, construction and commissioning, we continue operation of the WTE plant, maintaining the current reception area and making the construction compatible with the operation.

There will be no interruption of service.







This minimizes traffic in and out of the facility for better community relations

This minimizes further processing of wet materials, reducing costs.

- We adapt the construction of the building to the new sorting and RDF production equipment, with specific solutions for the treatment, maintenance and cleaning; in addition, the incoming and outgoing materials will be positioned in strategic areas, to facilitate the movement of the materials.
- The technology for sorting materials enables the separation of the fine and humid parts contained in most of organic fermentable fractions. These fractions are sent to the new biological plant including anaerobic digestion (AD) and composting processes.



## Waste Processing Facility - Anaerobic Digestion (AD) Biological Treatment Plant

Anaerobic Digestion is a differentiated treatment for a very well selected part of the organic fraction from MSW sorted in the mechanical treatment (50,000 TPY capacity). By treating the organic fraction in this process, we obtain a stabilized material, and produce renewable natural gas to be used as fuel for trucks and vehicles.

Before entering the digesters there is an adaptation of the waste and elimination of contaminants (inerts and others in the incoming MSW). This technology is key for the appropriate operation of the AD process with organic fraction coming from MSW and has been developed through several years experience in similar operations by VSM. This is achieved using Kompogas Hitachi Zosen Inova equipment or similar.

Its main advantages are:

- · Proven technology.
- Highest renewable natural gas production and quality.
- Flexibility by technology chosen (horizontal an individual digesters, each small-capacity).
- Possibility of adaptation to future increasing quantities of waste to be treated due to the modularity.

Waste Processing Facility – Automatic Composting Biological Treatment Plant We plan on implementing the aerobic fermentation technology for the treatment of the separated organic fractions in the mechanical plant. The technology is fermented in two composting closed vessel reactors, with an exhaustive control

of conditions such as temperature and humidity, so the composting process is optimized to control odors and percolates.

This plan minimizes the need for further processing of the percolate water.

Odor control means better relations between the plant operation and the community.







Image shows automatic feeding and extraction of organic material.

This is a very robust process and enables us to obtain a good quality compost with a minimum expenditure of energy and resources.

## Recovery Facility (Single Stream Plant)

The existing Recycling Facility (Murphy Road) will be renovated, including a new line of optical sorters to recover glass differentiated by color, which will allow us to improve the marketability of the recovered materials. Additionally, the sorting technology used in the mechanical treatment plant at the Resource Recovery Facility (Maxim Road) is very sophisticated. With a previous selection in three main streams (RDF, containers and organic materials) we can separate materials of quality to recycle (containers, plastics, ferrous metals (Fe). aluminum (Al), papercardboard) even with "dirty mix waste". This enables us to use, basically, a similar sorting process for both types of urban waste and to integrate the single stream, in the same facility, while adapting the operation parameters in one line to the specific needs of waste by composition.

#### Refurbishment of the Power Block Facility

It has been planned to maintain and operate the existing major equipment at the PBF, incorporating some upgrades to optimize the operation of the current facility, increase availability and reduce pollutant emissions. The modifications in the plant will be completed taking into consideration the current situation and the integration with the new MBT plant, as well as the planning of improvements so as the waste treatment service is always available. We count on the flexibility of having three lines for this integration and operation of the treatment by having one of the WTE lines remaining in "stand by" to accomplish this operation.



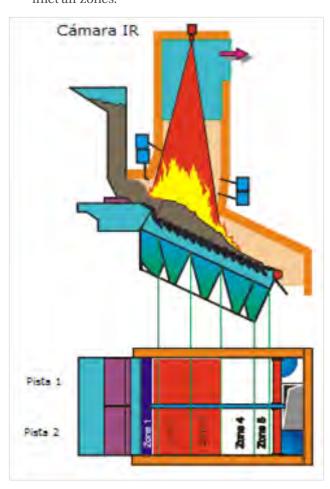
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Proposed SRRT operations will reduce  $SO_2$  and PM emissions from the current operation by approximately 43%, while emissions of NOx will be reduced of approximately 40%.

The three existing incineration lines will be modernized, incorporating the following upgrades:

- · RDF feeding system upgrade.
- Combustion system upgrade, reducing the proportion of unburned in the slag, the amount of flue gas and stabilizing the steam production. Infrared (IR) pyrometers and a thermal camera will be installed in each line; and the necessary elements to independently perform the injection air combustion control in each zone or group of inlet air zones.



- · Boiler's pressure parts upgrades.
- New cleaning system of superheater with water, to reduce the problems of foulding at superheaters and consequent reduction of availability.

 Baghouses replacement. New filtration materials and technologies allow the filters to work at higher temperatures, around 320°F. This means less electrochemical corrosion problems in the gas cleaning system, including ducts.



- Electricity, instrumentation and control systems upgrades/replacement, including optimization of plant operating controls.
- New demineralized water plant by reverse osmosis (RO) and continuous electrodeionization (CEDI).



**RDF High Production Shredders** 





# Assurance of Continued Service to Customers over the Course of the Redevelopment

During the facility upgrade and/or construction, and commissioning, continued service to contracted customers is guaranteed, at least, in the same way as it is currently provided in the Connecticut Solid Waste System (CSWS) Resource Recovery Facility.

From the beginning of the work and during the first three years, the current WPF will be working as it is currently. Meanwhile, during that same period we will be constructing and commissioning the new mechanical treatment plant. This way no interruptions of service will occur and we will be able to process all the received waste at all times. This solution is possible because:

- 1. NAES will continue operating the facility during this construction period.
- 2. SRRT takes over the O&M responsibility during the construction and commissioning stage, and therefore, we ensure continuous operation of the facility and minimization of interferences between construction and O&M.
- **3.** We benefit from NAES extensive experience and knowledge of the facility to optimize its operation during this development stage.

The mechanical treatment plant will be working from year four. This will help improve the current diversion rate from this year forward.

The complete plant including the biological treatment will be operational from year six (five years for permitting, design and construction). From this moment the diversion from disposal will meet the Connecticut requirements to reach the overall 60% diversion requested in the RFP.

#### **Diversion from Disposal**

Our Sacyr Rooney Recovery Team proposal fulfills the Connecticut diversion goal of 60% even before the projected year 2024. Taking into account the expected RFP timeline, that expects contract negotiations finalized by the end of June 2018, we would comply with the diversion goal by the second half of 2023.

On July 16, 2016, the State of Connecticut has adopted a new Solid Waste Management Plan, named "Comprehensive Materials Management Strategy (CMMS)," to achieve the 60% goal. The strategy outlines that diversion can be achieved through reuse, recycling and composting of 45% of MSW.

# Finally, the total diversion in the Sacyr Rooney Recover Team proposal is 49.24%, significantly higher than the 45% requested in the CMMS.

In conclusion, The Sacyr Rooney Recovery Team offers the best value option going forward. Our team has experience in the design, development, construction, permitting compliance, finance, and operation of the type of facilities that can exceed your waste processing goals. We have used local companies and have agreements to employ local contractors to enact the improvements, local haulers to mobilize the products, and local businesses support of our team.

Our design team is designing a system that will reduce the emissions from the power facility while maintaining a consistent source of power.

No downtime.

Largely exceeding the diversion requirements to help the State of Connecticut meet its 60% goal.





Current situation.



SRRT projected situation.



MIRA can make decisions with certainty with the security of our team's financial strength, which ensures that this project will be completed and be operated in a manor consistent with the desires of the commission and the local communities. It will be a model for other communities nationally to follow.

The points outlined in this executive summary address all of the "high-value" items on the score sheet, which demonstrates our team's capability to deliver the most desired services. We have provided proof of these capabilities in the supporting documentation in our complete proposal response.

Our team welcomes questions and stands ready to start the process at your earliest convenience.

#### 2.3. Other factors

No other factors considered others than the ones already mentioned in previous sections.



