New York City MSW Composting Report

Appendix I
Revised Preliminary Design and Cost Estimate for Material Recovery Facility Front End for Co-Composting[1] Pilot Facility

Proposal by Hertlein Industries, Inc.[2]

1. "Co-Composting" is another term for the composting of municipal solid waste and biosolids.

2. The Reference Drawings (blue prints) that were orignially attached with this proposal have been redrawn for viewing convenience and are presented in Chapter 5.

3. The equipment listed here is based on a preliminary design and is provided to support the cost estimates in this report. The list in no way constitutes an endorsement or a commitment on the part of the City to purchase any of this equipment.

Hertlein Industries, Inc

Cost Estimate - 14-Aug-2002

For: New York City Department of Sanitation - Bureau of Waste Prevention, Reuse & Recycling

Material Recovery Facility for Co-Composting System

Revision 1 - Revised Preliminary Design Cost Estimate

Item	Description	Cost	HP	Type
1A	Pedestal Mounted Grapple Crane - Cost includes Installation	310000	75	Feeder
1	72" Wide Double Beaded Chain Belt Conv.	45465	7.5	Variable
2	72" Wide Standard Chain Belt Conveyor	78897	15	Variable
3	72" Wide x 64'-5" PreSort Conveyor w/ Catwalks	101802	20	Variable
4	60" x 88' Troughing Idler Conveyor w/ Supports	68740	15	Fixed
5	36" x 34'-9" Sliderbed Bag Opener Xfer Conveyor	40309	5	Fixed
6A	36" x 29' Sliderbed Bag Opener Feed Conveyor	28428	5	Fixed
6B	36" x 29' Sliderbed Bag Opener Feed Conveyor	28424	5	Fixed
6C	Bifurcated Chute - with Air Gate & Supports	26547	NA	N/A
7A	Bag Breaker - BHS Model BB-72	72006	17	Mixed
7B	Bag Breaker - BHS Model BB-72	72006	17	Mixed
8A	36" x 29' Sliderbed Bag Opener Disch Conveyor	28428	5	Fixed
8B	36" x 29' Sliderbed Bag Opener Disch Conveyor	28428	5	Fixed
9A	60" Wide Standard Chain Belt Infeed Conveyor	79317	10	Variable
9A-1	Pedestal Mounted Grapple Crane - Cost includes Installation	310000	75	Feeder
9B	60" Wide Standard Chain Belt Infeed Conveyor	79317	10	Variable
9B-1	Pedestal Mounted Grapple Crane - Cost includes Installation	310000	75	Feeder
10A	60" X 28' Catenary Sliderbed Plastic Bag Picking Conv. w/Platform	61345	7.5	Variable
10B	60" X 28' Catenary Sliderbed Plastic Bag Picking Conv. w/Platform	61345	7.5	Variable
11A	Primary Fines Vibrating Screen - Minus 2-1/2" Openings	83370	20	Fixed
11B	Primary Fines Vibrating Screen - Minus 2-1/2" Openings	83370	20	Fixed
11C	Extra Screen Decks (Plate, 3" & 4")	36176	N/A	N/A
12A	30" x 60' Troughing Idler Primary Fines Discharge Conv. W/Supports	31435	10	Fixed
12B	30" x 32' Troughing Idler Primary Fines Discharge Conv. W/Supports	24955	7.5	Fixed

Item	Description	Cost	HP	Type
12C	Dings Model 66 Overhead Magnet w/Supports	36832	15	Fixed
12D	30 x 22'-5" Troughing Idler Primary Fines Xfer Conv.	17546	5	Fixed
13A	60" x 24' Primary Fines Screen "Overs" Disch. Convneyor	22110	5	Fixed
13B	60" x 24' Primary Fines Screen "Overs" Disch. Convneyor	22110	5	Fixed
15A	60" x 65' Main Sorting Sliderbed Conveyor w/Supports	92095	20	Variable
15A-1	Dings Model 66 Overhead Magnet w/Supports	36832	15	Fixed
15B	60" x 54' Main Sorting Sliderbed Conveyor w/Supports	92095	20	Variable
15B-1	Dings Model 66 Overhead Magnet w/Supports	36832	15	Fixed
16A	Final Fines Screen - BHS Debris Roll Screen	72020	6	Fixed
16B	Final Fines Screen - BHS Debris Roll Screen	72020	6	Fixed
17A	60" x 30' Final Fines Screen - Product Stacker Conveyor	30528	10	Fixed
17B	60" x 30' Final Fines Screen - Product Stacker Conveyor	30528	10	Fixed
18A	24" x 31' Troughing Idler Conveyor/w Supports	22865	7.5	Fixed
18B	24" x 31' Troughing Idler Conveyor/w Supports	22865	7.5	Fixed
19	60" x 116' Troughing Idler Conveyor w/ Supports	85774	15	Fixed
21	Electrical Controls & Start-Up	210301		
20	Expanded Metal Cages & Roll Off Boxes (See Schedule)	200800	N/A	N/A
22	Mechanical Erection	295900		
23	Electrical Field Installation	181160		
24	Engineering	185500		
	Sub Totals	$3,856,823		
	Freight	$138,500		
	Contingency - 5% of Sub Total	$192,841		
	Project Total Estimate	$4,188,164	596	

Note: For Optional Environmental Housings on Sort Platforms see separate Schedule.
Note that the Pedestal Cranes were not included in Revision 0 of this estimate.

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Roll Off Boxes & Expanded Metal Cages Schedule

	Qty	Cost	Unit	Ext
Pre Sort Area				
40 YD Roll Off Boxes	4	5000	EA	$ 20,000.00
Secondary Sort Area				
Ferrous Metal Boxes 4.6 YD	6	2000		$ 12,000.00
DeStoner "Heavies" Boxes 8.8 YD	0	2800		$ -
Film Plastic Cages 14.5 YD	12	3150		$ 37,800.00
Main Sort Area				
A & B Main Sort Lines Cages 18 YD	18	3750		$ 67,500.00
A & B Main Sort Lines Cages 16 YD	6	3650		$ 21,900.00
Minus 4" Sort Line Cages 8.5 YD	12	2800		$ 33,600.00
Minus 1" Fines Boxes 5.5 YD	4	2000		$ 8,000.00
Total for all Roll Off, Cage & Box Requirements				**$ 200,800.00**

Note: Ferrous Metal Boxes and Minus 1" Fines Boxes are solid Steel Construction and designed for use with a Forklift with a rotator.

All other Cages are Tube Steel Framing with Expanded Metal walls. They will have a door in the lower section of one side. They are also designed to be used by a forklift with a rotator. The door eliminates the necessity of turning a cage completely over with the forklift. This greatly improves the life of the Cage.

The quantity of each box allows for reasonable change out on each process line.

These boxes would be locally fabricated to our design drawings.

Hertlein Industries, Inc.

New York City Co-Composting MRF
Revised Energy Useage Calculations
14-Aug-02

Power Source - 480V Three Phase 60Hz

Total Plant Connected Horsepower	596
Total Plant Connected Amperes	715
Total Plant Connected kW	475.5
Plant Kwh based on connected load for each 8 hour shift - assuming actual operation of equipment at 6.5Hrs.	3091
Based on actual experience in many of these types of facilities the nominal useage is typically not more than 60% of connected load. This is what I would project as nominal useage for an 8 hour shift.	1854.6

Note that these numbers do not include a baler or other general utility load.

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Environmental Housings for Sort Lines

	Qty	Cost	Unit	Ext
Pre Sort Area				
49' x 17' x 8' Insulated Housing with Climate Control (833 Sq Ft)	1	35069	EA	$ 35,069.00
Secondary Sort Area				
Film Plastic Sort Platform Insulated Housing 17' x 22' x 8' (374 Sq Ft)	2	17980		$ 35,960.00
Main Sort Area				
A & B Main Sort Lines Insulated Housing 57' x 16'-8" x 8' (954 Sq Ft)	2	40762		$ 81,524.00
Total for all Sort Line Environmental Enclosures				**$ 117,484.00**

Each Insulated Housing will have a Heat Pump style all Elecric Climate Conditioning Unit mounted at one end or on top. Each Unit will have appropriate Flourescent Lighting inside.

Hertlein Industries, Inc.

New York City Department of Sanitation
Bureau of Waste Prevention, Reuse & Recycling
Revised Preliminary Design - MRF for Co-Composting Facility
Planned Processing Equipment Descriptions Revision 1 – Dated 14-Aug-2002
Reference Drawings – 023006-NYD-0111 thru 0113

Item #1A – Northshore Manufacturing - Pedestal Mounted Grapple Crane with 35 Foot reach. The crane is Electric/Hydraulic powered with a 75 HP Hydraulic Pump.

Item #1 – 72" x 15'-9", 9" Pitch double beaded steel pan with 36" skirting and powered by a 7.5 HP Energy Efficient Electric Motor with planetary gearbox. Variable Speed via a Variable Frequency Drive from 3 – 18 FPM.

Item #2 – 72" skid mounted standard chain belt conveyor w/ WEAR-LOC 600 belting with a 9' lower flat section, a 29'-0" 30 Degree incline section to a 3'-0" upper flat section with a head shaft height of 16'-0". The Conveyor has 42" skirting and is powered by a 15 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 10 – 40 FPM.

Item #3 – 72" x 64'-5" Fully Skirted Sliderbed conveyor with WEAR-LOC 600 belting and is powered by a 20 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 40 – 120 FPM. The Conveyor is permanently mounted to a Skid Frame with support towers bolt-flanged for shipping. Unit is equipped with Fold Down Catwalks.

Item #4 – 60" x 88' Troughing Idler Conveyor powered by a 15 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed Reversible at 120 FPM. Complete with tower support structure.

Item #5 - 36" x 34'-9"" Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with supports.

Item #6A - 36" x 29' Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #6B - 36" x 29' Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #6C - Bifurcated Chute complete with Electric/Air operated Diverter gate to feed either Conveyor 6A or B or Both.

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Item #7A - BHS Model BB-72 Bag Breaker with 66" x 48" Inlet opening. The Bag Breaker® is sized for processing up to 15 tons per hour of incoming waste. The incoming material will be bagged. The processing rate is based on 10-33 gallon bags at least 70% full. For the standard bag rating the processing efficiency is 90%. This efficiency rating means 90% of the bags will be open and will have 90% percent of the material released from the bag. The empty bags leave the machine with the released material. The Bag Breaker® has been designed to minimize shredding of the bags. The majority of the bags remain in one piece with a small percentage of the bags coming out in two to four pieces. The Bag Breaker has 17 total connected HP. Bag Breaker controls and software will be part of the complete Plant Control System Package.

Item #7B - BHS Model BB-72 Bag Breaker with 66" x 48" Inlet opening. The Bag Breaker® is sized for processing up to 15 tons per hour of incoming waste. The incoming material will be bagged. The processing rate is based on 10-33 gallon bags at least 70% full. For the standard bag rating the processing efficiency is 90%. This efficiency rating means 90% of the bags will be open and will have 90% percent of the material released from the bag. The empty bags leave the machine with the released material. The Bag Breaker® has been designed to minimize shredding of the bags. The majority of the bags remain in one piece with a small percentage of the bags coming out in two to four pieces. The Bag Breaker has 17 total connected HP. Bag Breaker controls and software will be part of the complete Plant Control System Package

Item #8A - 36" x 29' Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #8B - 36" x 29' Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #9A - 60" skid mounted standard chain belt conveyor Scandura 330 belting with a 16' lower flat section, a 24'-2" 30 Degree incline section to a 3'-0" upper flat section with a head shaft height of 15'-0". The Conveyor is powered by a 10 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 10 – 40 FPM. The conveyor is complete with a Splayed push ramp with end and back wall extensions.

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Item #9A 1– Northshore Manufacturing - Pedestal Mounted Grapple Crane with 35 Foot reach. The crane is Electric/Hydraulic powered with a 75 HP Hydraulic Pump.

Item #9B - 60" skid mounted standard chain belt conveyor Scandura 330 belting with a 16' lower flat section, a 24'-2" 30 Degree incline section to a 3'-0" upper flat section with a head shaft height of 15'-0". The Conveyor is powered by a 10 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 10 – 40 FPM. The conveyor is complete with a Splayed push ramp with end and back wall extensions.

Item #9B 1– Northshore Manufacturing - Pedestal Mounted Grapple Crane with 35 Foot reach. The crane is Electric/Hydraulic powered with a 75 HP Hydraulic Pump.

Item #10A – 60" x 28'-0" Catenary Style Sliderbed Conveyor. The Conveyor is powered by a 7.5 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 40 – 100 FPM. The Conveyor is permanently mounted to a Skid Frame with support towers bolt-flanged for shipping. Unit is equipped with Bolt on Catwalks.

Item #10B – 60" x 28'-0" Catenary Style Sliderbed Conveyor. The Conveyor is powered by a 7.5 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 40 – 100 FPM. The Conveyor is permanently mounted to a Skid Frame with support towers bolt-flanged for shipping. Unit is equipped with Bolt on Catwalks.

Item #11A– Primary Fines Vibrating Screen—General Kinematics (GK) Vibrating Finger Screen designed for processing presorted municipal solid waste. The screens will be designed to remove 4" minus (nominal) material. Screen is powered by a 20 HP Energy Efficient Electric Motor at a fixed speed.

Item #11B – Primary Fines Vibrating Screen—General Kinematics (GK) Vibrating Finger Screen designed for processing presorted municipal solid waste. The screens will be designed to remove 4" minus (nominal) material. Screen is powered by a 20 HP Energy Efficient Electric Motor at a fixed speed.

Item #11C–Vibrating Screen additional screening deck plates. One set of 2ea decks – solid plate, 3" Openings & 4" Openings.

Item #12A - 30" x 60' Troughing Idler Primary Fines Discharge Conveyor – The conveyor is powered by a 10 HP Energy Efficient Electric Motor with

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planetary gearbox. Fixed speed at 100 FPM. Complete with transition hoppers and supports.

Item #12B - 30" x 32' Troughing Idler Primary Fines Discharge Conveyor – The conveyor is powered by a 7.5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hoppers and supports.

Item #12C – Dings Model 66 self cleaning Overhead Magnet complete with stainless steel clad belt and 10kW Rectifier unit. The conveyor is powered by a 5 HP Energy Efficient Electric Motor and shaft mounted gearbox at a fixed speed of 400 FPM. The Magnet is complete with all supports and guarding.

Item #12D - 30" x 22'-5" Troughing Idler Primary Fines Discharge Conveyor – The conveyor is powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hoppers and supports.

Item #13A – 60" x 24' Primary Fines Screen "Overs" Discharge Conveyor. The conveyor is a Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #13B – 60" x 24' Primary Fines Screen "Overs" Discharge Conveyor. The conveyor is a Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #15A – 60" x 54' Fully Skirted Main Sorting Sliderbed conveyor with Scandura 330 belting and is powered by a 15 HP Energy Efficient Electric Motor with planetary gearbox. Variable speed via a Variable Frequency Drive from 40 – 120 FPM. The Conveyor is permanently mounted to a Skid Frame with support towers bolt-flanged for shipping. Unit is equipped with Fold Down Catwalks.

Item #15A1 – Dings Model 66 self cleaning Overhead Magnet complete with stainless steel clad belt and 10kW Rectifier unit. The conveyor is powered by a 5 HP Energy Efficient Electric Motor and shaft mounted gearbox at a fixed speed of 400 FPM. The Magnet is complete with all supports and guarding.

Item #15B – 60" x 54' Fully Skirted Main Sorting Sliderbed conveyor with Scandura 330 belting and is powered by a 15 HP Energy Efficient Electric Motor with

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planetary gearbox. Variable speed via a Variable Frequency Drive from 40 – 120 FPM. The Conveyor is permanently mounted to a Skid Frame with support towers bolt-flanged for shipping. Unit is equipped with Fold Down Catwalks.

Item #15B1 – Dings Model 66 self cleaning Overhead Magnet complete with stainless steel clad belt and 10kW Rectifier unit. The conveyor is powered by a 5 HP Energy Efficient Electric Motor and shaft mounted gearbox at a fixed speed of 400 FPM. The Magnet is complete with all supports and guarding.

Item #16A– BHS Model 70-28 Debris Roll Screen® -- Final Fines Screen units are designed for processing secondary sorted municipal solid waste. The screens will be designed to remove 1-1/2" minus (nominal) material. Screen is powered by 2ea 3 HP Energy Efficient Electric Motors. Screen is complete with supports and hopper.

Item #16B– BHS Model 70-28 Debris Roll Screen® -- Final Fines Screen units designed for processing secondary sorted municipal solid waste. The screens will be designed to remove 1-1/2" minus (nominal) material. Screen is powered by 2ea 3 HP Energy Efficient Electric Motors. Screen is complete with supports and hopper.

Item #17A – 60" x 30' Final Fines Screen "Overs" Discharge Conveyor. The conveyor is a Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #17B – 60" x 30' Final Fines Screen "Overs" Discharge Conveyor. The conveyor is a Cleated Sliderbed Conveyor powered by a 5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hopper and supports.

Item #18A - 24" x 31' Troughing Idler Final Fines Discharge Conveyor – The conveyor is powered by a 7.5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hoppers and supports.

Item #18B - 24" x 31' Troughing Idler Final Fines Discharge Conveyor – The conveyor is powered by a 7.5 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 100 FPM. Complete with transition hoppers and supports.

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Item #19 - 60" x 116' Troughing Idler Sorted MSW Transfer to Digester Infeed Area – The conveyor is powered by a 15 HP Energy Efficient Electric Motor with planetary gearbox. Fixed speed at 150 FPM. Complete with transition hoppers and supports.

Item #20 - Expanded Metal Material Cages & Boxes. Roll Off Containers, etc for sorted mate4rials. See Spreadsheet schedule for details

Item #21 – **Electrical Control System** – The MRF System is provided with an "Automated Control System" that will include 2ea Color Flat Panel Display Operator Terminals, one for each of the processing areas. The Terminals will incorporate controls for the operator to select a mode of operation, change direction of reversing conveyors, select the speed for the Variable Speed equipment and Start or Stop the plant areas. The system will have an alarm system which will annunciate plant alarms on the operator terminals such as "Conveyor Safety Pull Cord C4", which will allow the operator to quickly locate the fault condition and fix it. All equipment described as variable speed above will have an Adjustable Frequency Drive with the proper current limiting fusing and circuit breaker. All fixed speed equipment will have a Full Voltage Non-Reversing motor starter unit complete with short circuit and overload protection. The control system will have a Programmable Logic Controller (PLC) which will contain all of the plant operating logic. The main Motor Control Panel will be housed in a Nema Type 12 Oil & Dust tight enclosure with a Main Circuit Breaker interlocked with the door. The Control Panels will carry Underwriters Laboratories (U.L.) certifications for compliance with all regulatory agencies requirements.

Item #22 – **Mechanical Field Erection** – This item covers the compete field erection of all equipment. It includes all of the required labor and miscellaneous materials to provide a mechanically complete and ready to start-up system. It also includes all required erection equipment such as cranes, forklifts, etc.

Item #23 – **Electrical Field Installation** – This item covers the compete field Installation of all Electrical Devices, Conduit & Wire. It includes all of the required labor and miscellaneous materials to provide an electrically complete and ready to start-up system.

Item #24 – **Engineering** – This item covers all of the required Engineering & Design including a complete Drawing Package for all Equipment and Structural Steel required for a complete operating plant. All Drawings will be done with AutoCad and Electronic Files will be submitted to the City at the end of the

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project. All Structural drawings will be Stamped by a Registered Professional Engineer in the State of New York.