



SARASOTA COUNTY

"Dedicated to Quality Service"

June 13, 2002

Kim B. Ford, P.E.
Florida Department of Environmental Protection
3804 Coconut Palm Drive
Tampa, Florida 33619-8318

Re: Food Waste Compost Permit
Sarasota County, Florida

Dear Mr. Ford:

Please find enclosed with this letter an Application for a Permit to Construct and Operate A Solid Waste Management Facility for the Production of Compost at the Central County Solid Waste Disposal Complex.

Also, enclosed is a check for \$1,000 to permit this facility as a research/development/demonstration project. An FDEP Innovative Recycling Grant in the amount of \$536, 820 is funding this project.

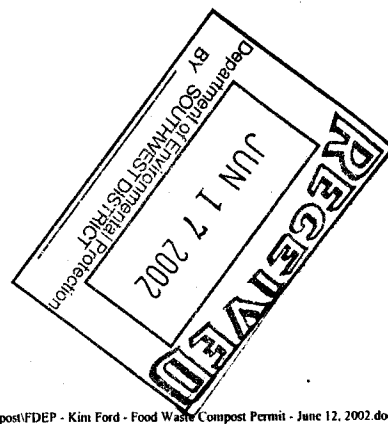
If you have any questions regarding the permit application, please contact Mike Sosadeeter, Project Manager, Resource Management Group, Inc., at (941) 358-7730.

Sincerely,

Gerald L. Bennett
Solid Waste Operations Manager

Enclosures

cc: Carole Favero, Interim General Manager, Solid Waste
Jean Nutter, Resource Conservation
Susan J. Pelz, P.E., FDEP - Tampa
Mike Sosadeeter, Resource Management Group, Inc.
Paul Wingler, P.E., Solid Waste Operations





Department of Environmental Protection

DEP Form #	62-701.900(10)
Ap. for Per. to Construct/Operate a Solid Waste Mgmt. Fac. for Prod. of Compost	
Effective Date	12-23-96
DEP Application No.	(Filed in by DEP)

Application for a Permit to Construct ☒ Operate ☒ A Solid Waste Management Facility for the Production of Compost

General Requirements

Solid Waste Management Facilities for the production of compost or mulch shall be permitted pursuant to Section 403.707, Florida Statutes, and in accordance with Rule 62-709, Florida Administrative Code. A minimum of six copies of the application shall be submitted to the Department district Office having jurisdiction over the facility. Complete appropriate sections for the type of facility for which application is made. Entries should be typed or printed in ink. All blanks should be filled in or marked not applicable. The application shall include all information, drawings, and reports necessary to evaluate the facility. Information required to support the application is listed on the attached pages of this form.

Facility Type: ☐ Existing ☒ Proposed

Materials Processed: ☐ Yard Trash ☐ Manure ☒ Other Solid Wastes ☐ Solid Wastes with Sludge

1. a. Facility Name: Food Composting Facility
b. Facility Location (main entrance): Central County Solid Waste Disposal Complex, Knights Trail Road, Sarasota County
Section 9-16, Township 38S, Range 19E Latitude 27 ° 12 ' 00 " Longitude 82 ° 23 ' 00 "

2. a. Applicant Name (operating authority): Sarasota County
b. Address: 4000 Knights Trail Road Nokomis FL 34275
Street P.O. Box City State Zip Code
c. Contact Person: Gary Bennett 941-486-2620
Name Telephone Number

3. a. Authorized Agent/Consultant: Resource Management Group, Inc.
b. Address: 200 S. Washington Blvd. Sarasota FL 34236
Street P.O. Box City State Zip Code
c. Contact Person: Mike Sosadeeter 941-358-7730
Name Telephone Number

4. a. Landowner (if different than applicant): _____
b. Address: _____
Street P.O. Box City State Zip Code

5. Estimated Cost of Construction, Total: \$ 171,550

6. Anticipated Construction Starting and Completion Dates From: 8/1/02 To: 9/30/02

DEP Form #	62-701.900(10)
Ap. for Per. to Construct/Operate a Solid	
Form Title	Waste Mgmt. Fac. for Prod. of Compost
Effective Date	12-23-96
DEP Application No.	
	(Filled in by DEP)

Required Attachments for Construction/Operation Permit for a Solid Waste Management Facility Producing Compost

General

Permit application and supporting information shall include the following (62-709.300(3), F.A.C.):

- | | |
|--|-------------------------------------|
| 1. A letter of transmittal to the Department; | Completeness
Check |
| 2. A table of contents listing the main section of the application | <input checked="" type="checkbox"/> |
| 3. The permit fee specified in Rule 62-4.05, F.A.C., in check or money order payable to the Department; | <input checked="" type="checkbox"/> |
| 4. Six copies, at minimum, of the completed application for, all supporting data, and reports; | <input checked="" type="checkbox"/> |
| 5. Engineer seal; | <input checked="" type="checkbox"/> |
| 6. Engineer's letter of appointment, if applicable; | <input type="checkbox"/> |
| 7. Copy of any lease agreement, or any other agreement between operator and property owner by which the closing of the facility may be affected; and | <input type="checkbox"/> |
| 8. Proof of publication of notice of application for the proposed activity in a newspaper of general circulation. | <input type="checkbox"/> |

Specific Attachment Item

The following information items must be included in the application. Please explain if they are not applicable.

NOTE: For facilities that have been satisfactorily constructed in accordance with their construction permit, the information required does not have to be resubmitted for an operation permit if the information has not changed during the construction period.

1. Facility Design (62-709.500, F.A.C.)



NOTE: All maps, plan sheets, drawings, or aerial photographs shall be legible; be signed and sealed by the registered professional engineer responsible for their preparation; be of appropriate scale to show clearly all required details; be numbered, referenced to narrative, titled, have a legend of symbols used, contain horizontal and vertical scales (where applicable), and specify drafting or origination dates; and use uniform scales as much as possible, contain a north arrow, and use NGVD for all elevations.

- | | |
|---|-------------------------------------|
| a. A map or aerial photograph of the area, no more than 1 year old, unless not substantially changed for older map or photograph, showing land use and zoning within 1 mile of the facility. (62-709.500(2)(a), F.A.C.) | <input checked="" type="checkbox"/> |
|---|-------------------------------------|

- | | |
|---|-------------------------------------|
| b. Site Plan (62-709.500(2)(b), F.A.C.) | <input checked="" type="checkbox"/> |
|---|-------------------------------------|

Note: The site plan shall be on a scale not greater than 200 feet to the inch showing the following:

- | | |
|---|-------------------------------------|
| (1) Dimensions of the site | <input checked="" type="checkbox"/> |
| (2) Plan for receiving, procession, production, curing (if any) and storage areas | <input checked="" type="checkbox"/> |
| (3) Fencing or other measures to restrict access | <input checked="" type="checkbox"/> |

- | | |
|--|-------------------------------------|
| c. Topographic Maps (62-709.500(2)(c), F.A.C.) | <input checked="" type="checkbox"/> |
|--|-------------------------------------|

NOTE: The topographic maps, which may be combined with the plot plan (item 1b), on a scale not greater than 200 feet to the inch showing the following:

- | | |
|---|-------------------------------------|
| (1) Five foot contour intervals | <input checked="" type="checkbox"/> |
| (2) Access roads | <input checked="" type="checkbox"/> |
| (3) Grades required for proper drainage | <input checked="" type="checkbox"/> |
| (4) Special drainage devices | <input checked="" type="checkbox"/> |
| (5) Other pertinent information based on intended use of facility | <input checked="" type="checkbox"/> |

- | | |
|--------------------------------------|-------------------------------------|
| d. Report (62-709.500(2)(d), F.A.C.) | <input checked="" type="checkbox"/> |
|--------------------------------------|-------------------------------------|

- | | |
|---|-------------------------------------|
| (1) Designed capacity of the proposed facility | <input checked="" type="checkbox"/> |
| (2) Anticipated type and source of solid waste | <input checked="" type="checkbox"/> |
| (3) Any additives to be used in the production of compost | <input checked="" type="checkbox"/> |

DEP Form # 62-701.900(10)
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2. Facility Performance and Design Standards (62-709.500, F.A.C.)

- a. Support for operation (62-709.500(1), F.A.C.)
 - (1) Material type (soil, synthetic, other)
 - (2) Adequate base support
- b. Leachate control and removal system performance(62-709.500(6), F.A.C.)
 - (1) Construction materials
 - (2) Strength and thickness
 - (3) Measures to prevent clogging
 - (4) Central collection point for reused, or treatment and disposal
 - (5) Equivalency to design standards
- c. Stormwater management system performance (62-709.500(3), F.A.C.)
 - (1) Prevention of surface water flowing onto receiving, processing, and curing (if any) areas
 - (2) Stormwater run-off controls; retention, detention ponds
 - (3) Equivalency to design standards
 - (4) Design to minimize ponding of solid waste, composting material and finished compost
 - (5) Water management district approval

3. Operational Features and Appurtenances (62-709.500(4), F.A.C.)

- a. Effective barrier
- b. All weather access road
- c. Signs indicating name of operating authority, traffic flow, hours of operation, contact in cases of emergencies and charges (if any)
- d. Scales
- e. Dust control method
- f. Litter control devices (if needed)
- g. Fire protection and control provisions
- h. Odor control devices, methods or practices

4. Additional Operation Criteria (62-709.510(c), F.A.C.)

- a. Attendant
- b. Communication devices

5. Operations Plan (62-709.500(5)(c), F.A.C.)

- a. Designation of responsible person(s)
- b. Proposed equipment
- c. Contingency operations
- d. Controlling the type of waste received at the site
- e. Weighing incoming waste
- f. Vehicle traffic control and unloading
- g. Method and sequence of processing the waste
- h. Operations of leachate, and stormwater controls
- i. Designation of backup disposal site(s)

6. Water Quality Standards (62-709.500(3) & (6)(c), F.A.C.)

Describe how surface runoff and leachate will be handled to meet water quality standards of Rules 62-3 and 62-4, F.A.C.

7. Compost Facility Data Form

8. Certification by Applicant and Engineer or Public Officer

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Effective Date	12-23-96
DEP Application No.	
	(Filled in by DEP)

Compost Facility Data Form

Permit No.: _____ Issue Date: _____ Expires: _____

Facility No. (DEP identification): _____

DEP Action: <input type="checkbox"/> Add <input type="checkbox"/> Delete <input type="checkbox"/> Change <input type="checkbox"/> Deactivate Site <input type="checkbox"/> Other		
1. County Sarasota	2. Facility Name Food Composting Facility	
3. Date Form Completed June 7, 2002	4. Facility Address 4000 Knights Trail Road, Nokomis, FL 34275	
4a. Facility Phone Number 941-486-2600	4b. Facility Site Supervisor Gary Bennett	
5. Facility Type <input type="checkbox"/> Composting <input checked="" type="checkbox"/> In-vessel <input type="checkbox"/> Static Pile <input type="checkbox"/> Windrow <input type="checkbox"/> Other. Describe _____		
6. Month/Year Begun October 2002	7. Area within Site Boundary 1.4 Acres	8. Area within Property Boundary 550 Acres
9. Security to Prevent Unauthorized Use <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		10. Weighing Scales <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
11. Waste Processed Per Operation Day 4-8 tons		
12. Maximum Processing Rate 624-1,248 tons		
13. Charge/ton N/A	14. Days operated S M T W T F S	15. Hours/Day Operated 4-8 hours
16. Types of Waste Received <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Agricultural <input type="checkbox"/> Septic Tank <input type="checkbox"/> Sludge <input type="checkbox"/> Yard Trash <input type="checkbox"/> Sewage Sludge <input checked="" type="checkbox"/> Other food waste and ground yard waste		
17. Leachate Recycled <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		17a. Treatment Method Used: Pumped to landfill's leachate treatment system
17b. Discharges to: <input checked="" type="checkbox"/> Surface Waters <input type="checkbox"/> Underground		17c. Class Receiving Water N/A
18 Final Residue is 25-50 % of waste intake		18a. Residue is disposed of at (site name) Local farms.
19. Surface Runoff Collected <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	19a Type of Runoff Treatment N/A	19b. Class of Receiving Waters N/A
20 Number of Staff 2	21 Attendant <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
22. Name and Title of Person Completing Form Gary Bennett, Solid Waste Operations		

Note: All blanks for the numbered items must be filled or marked as not applicable.

**Construction/Operation Plan for A Food feedstock Composting Facility
Central County Solid Waste Disposal Complex
Sarasota County**

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**Construction/Operation Plan for A Food feedstock Composting Facility
Central County Solid Waste Disposal Complex
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1. Facility Design

a. Map or aerial photo

b. Site Plan (See Site Plan, Tab II)

The proposed compost facility will be located at the Central County Waste Disposal Complex (landfill) in Sarasota County.

(1) Dimensions of site:

Two Phases of site development are proposed.

Phase I - Proposed site dimensions are 180' x 350' (1.4 acres) for a 4 POD Ag-Bag Eco-POD system for the pilot project. (See the Site Plan, Tab II)

Phase II - The proposed CT-5 Ag-Bag system has the potential of a 61 POD operation. The operation will be further evaluated at the end of Phase I to determine the extent of expansion into Phase II.

(2) Plan for receiving, processing, production, curing and storage:

The compost manufacturing operation will utilize an AG-BAG Eco-POD CT-5® in-vessel compost system (See Tab III). The design and operations plan herein is based on a phased approach. Phase I will establish a 4 POD system. Phase II of the project could expand to the full 61 POD capacity (25,000 tons or 62,000 cubic yards of material annually) of the CT-5 system if the project progresses beyond a pilot stage. Phase II will be contingent upon further evaluation of the project at the end of Phase I. This is a compost production facility. Food is considered a feedstock for the manufacturing process and is referred to throughout this document as "food discards" rather than "food waste".

Receiving

Materials received at the site will include ground yard debris, which will be utilized as a bulking agent, and food discards, which will include associated materials as defined in section 1(d)(2) "Anticipated type and source of solid waste". Food discards and ground yard debris will be weighed at the landfill scales and transported to the compost facility. The project will record both tons and cubic yards of material utilized in the project.

Ground yard debris will be transferred from another permitted operation at the landfill to the compost operation via a dump truck or equivalent.

Food discards will be collected from generators such as Publix Supermarkets and transported on a flat bed truck or equivalent in enclosed containers such as 65 gallon two-wheeled carts, or similar. Size of containers may be adjusted depending on

**Construction/Operation Plan for A Food feedstock Composting Facility
Central County Solid Waste Disposal Complex
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collection requirements and safe handling procedures. Containers may include plastic liners. If plastic liners are utilized, the project will research the possibility of using biodegradable liners and report on this option for safe and effective bulk collection and transport of food discards.

Ground yard debris will be stockpiled at the facility for immediate use in mixing with incoming food feedstock. The food discards will be deposited on a layer of ground yard debris on a concrete mixing pad. Food discards will be incorporated into the ground yard debris within one hour of being tipped to minimize odors and vector attracting. A compost operator shall spot check the incoming food discards as it is being deposited on to the ground yard debris to determine the presence of contaminants. The spotter will note the presence of unwanted materials and report this information to the generator. Prohibited materials (e.g., hazardous materials and debris) shall be removed from the feedstock and placed in an on-site covered roll off or equivalent and/or recycled. The compost operator shall notify the generator of the type and quantity of contaminants so the generator can improve the food discards separation methods. Contaminants and debris will be properly disposed of in the Class 1 landfill at the Central County Waste Disposal Complex.

The mixing pad will contain a grated trough for leachate and stormwater collection and a 1,500 gallon leachate holding tank. Product leachate will exit one end of the trough during mixing and cleaning of the pad. Stormwater will exit the other end of the trough when pad is not being used for mixing. A moveable vertical slide gate will be placed at each end of the trough to manually control either leachate or stormwater collection. A tarp or other could be employed for additional stormwater control as needed. (See Conceptual Site Plan, Tab II)

Product leachate contained within the mixing pad holding tank shall be utilized in the mixing of compost to achieve proper moisture content, or pumped out as needed by a septic-tank-type pump truck or equivalent and transported to the leachate collection system at the Central County Waste Disposal Complex. Following an evaluation of this leachate transport system, the holding tank could be equipped with a pump to transport leachate directly into the existing leachate management system if necessary. (See Conceptual Site Plan, Tab II)

Procession/Processing (See "How the EcoPod System Works" in Tab III)

Ground yard debris will be mechanically mixed with food feedstock (50/50 blend by volume per Ag-Bag specifications). The materials used in the compost matrix are blended together to achieve a uniform consistency and ideal carbon to nitrogen ratio of 25:1 to 40:1. Water or product leachate will be added to increase moisture in the mixture to approximate average of 55% or dry ground yard waste will be added to reduce moisture content.

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The mixed materials will be transferred to the AG-BAG Eco-POD CT-5® Encapsulator via a front-end loader or equivalent by the end of each day food discards are accepted at the facility. The Encapsulator adds a water-based inoculant (Ag-Bag Plus) to the feedstock while inserting the mixture into the POD for composting. As the POD is filled, aeration tubing is fed at the base of the POD along the entire length. This piping has specially sized and spaced slots that are used to introduce oxygen throughout the entire POD. When full, the POD is hermetically sealed on both ends to control the entire environment and composted for 8 to 12 weeks. (See Composting Schedule in Tab I).

A POD is made of 3-ply 7-millimeter plastic seamed into one unit with a UV inhibitor added. The interior ply is a food grade plastic. The middle ply is black and the outer ply is green.

Vents are placed along the length of the POD at 25-30 foot intervals a minimum of 2.5 feet above grade to assist the aeration process. The vents can be controlled as to the amount of exhaust and where it is expelled. These vents can also be adapted with odor control filters although most Ag-Bag operations do not need the filters.

Oxygen is introduced into the PODs using a high-pressure blower system that is controlled with timers. These timers can be adjusted from seconds to minutes to hours, as required by the composting process. The blowers require 2 phase, 20 amp, 110V electric. The POD acts as its own BIOSPHERE because condensation re-hydrates the outside of the materials for bacterial activity.

The mix inside the POD heats rapidly and reaches the appropriate temperatures to kill pathogens and weed seeds (See Sample Temperature Recording Worksheet in Tab V). The project will meet the EPA standards for pathogen reduction (See Olds College temperature/oxygen table in Tab V) by adhering to the U.S. Composting Council's Test Methods for the Examination of Composting and Compost (TMECC) program to ensure quality control (See TMECC Project in Tab V). The project will also seek the U.S. Composting Council's Seal of Testing Assurance that is based on the EPA Code of Federal Regulations Title 40, Part 503, Appendix B, Section B, that ensures pathogen destruction during composting (See STA Program Description and Test Parameters Tab V). "TMECC provides detailed protocols for the composting industry to verify the physical, chemical and biological condition of composting feedstocks, material in process and compost products at the point of sale. TMECC provides protocols to sample, monitor, and analyze materials at all stages of the composting process, i.e., prior to, during and after composting to help maintain process control, verify product attributes, assure worker safety, and to avoid degradation of the environment in and around the composting facility." (US Composting Council)

By enclosing the materials, a higher fraction of nitrogen will be left in the compost as oxidation releases less nitrogen gasses to the atmosphere. This also helps to control potential odors. Leachate is fully contained within the Ag-Bag POD and is intentionally absorbed into the compost during the composting process to support microbial activity.

**Construction/Operation Plan for A Food feedstock Composting Facility
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Harvesting the Pod

During the pilot program/Phase I, compost will be tested one week prior to the end of the 8-12 week composting period before removal from the POD. Samples will be gathered through the vents in the POD in order to eliminate the need for opening the POD. Compost will be tested for Code 1 metals, nitrates, pH, soluble salts, nutrient content, moisture content, organic matter content, bioassay, stability, particle size, pathogens and trace metals per the U.S. Composting Council's guidelines.

The composting pad beneath the POD area shall be constructed of compacted crushed concrete. This will facilitate efficient handling of material by a front-end loader once the composting is complete and the cleaning of the area between the harvesting of one POD and the filling of a subsequent POD. The compost pad shall be swept or otherwise cleaned of residual material from the previous POD prior to filling a new POD.

Prior to commencement of Phase II, a testing plan that is economically and environmentally sustainable will be submitted to FDEP for approval.

After 8 to 12 weeks, depending on feedstock materials, the POD will be harvested. PODs will not be opened when it is raining.

By cutting the outer plastic skin away from the material and removing it, the composted matrix is exposed. The matrix is then removed from the POD with a front-end loader or equivalent and moved to a static pile for curing and maturing. The disposable/recyclable plastic POD materials shall be deposited in a dumpster and/or roll off on site before the end of the day on which the POD is opened. The dumpster/roll off shall be covered to prevent rain entering the container. The dumpster/roll off will be emptied when full and contents properly disposed of.

Curing and Screening

The compost will be cured for 30-60 days. The cure pile will be built in a conical shape to facilitate shedding of rainwater. During curing time the microbial action will slow, the pile will dissipate heat and the compost will dry for easier screening.

The curing pad will be constructed of compacted crushed concrete or equivalent with a small berm around the perimeter for control of any leachate that may be generated by the pile. The performance of the pad will be monitored during the life of the pilot project with possible upgrades if required.

Leachate from the curing pad shall be directed to a grated drain and collected in a 1,500 gallon holding tank. Leachate contained within the holding tank shall be pumped into the existing leachate system at the Central County Waste Disposal Complex. The quality of leachate from the curing pad will be monitored and, during the Pilot Program/Phase I, tested to analyze the environmental impact of food discards compost

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leachate. During Phase I operation, the operator may analyze the impact of covering the curing pile with a tarp or equivalent. A comparative analysis of the leachate will be performed between a covered and uncovered curing pile. If, at any time during the project period, FDEP determines that the quality of leachate requires a more impervious pad, the project can install an asphalt pad or equivalent on the surface of the crushed concrete pad.

Once the compost has cured and determined to meet Class A specifications, it will be screened through a ¼ to ¾ inch screen to remove debris. The debris will be recycled or placed in a covered on-site dumpster and/or roll off for landfilling. PODs are made of #4 plastic and can be recycled but not reused.

Storage

Screened compost will be stockpiled on-site and then hauled to local farms and other markets for use as a soil amendment and/or potting mixture. The initial and primary market for the finished compost will be the CHAC (Children's Haven and Adult Community Services) farm and plant nursery projects, which can utilize 100% of the compost produced during the pilot program. Cured compost shall be transported from the compost facility to the CHAC site every 8-12 weeks or more often if necessary to ensure efficient operation of the compost facility.

(3) Fencing or other measures to restrict access:

The site is located within the campus of Sarasota County's Central County landfill and access to this site is restricted. The facility will have a wire or plastic mesh litter control fence around the perimeter as well as a gated entrance that is locked when not open for operation. There will be an on-site facility operator during operation to restrict access by non-authorized visitors.

c. Topographic Maps

(1) Five foot contour intervals

See maps in Tab II of the binder for contour information. **(2) Access roads**
All weather access roads currently exist to the proposed compost facility.

(3) Grades required for proper drainage:

The site will be graded to slope 1-2% to allow for proper drainage. (See Conceptual Site Plan, Tab II)

(4) Special drainage devices:

Surface water will be collected and retained in an on-site retention area separate from the leachate management system. A perforated underdrain and overflow weir will be installed in the retention area to filter incoming surface water and channel overflow

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into the existing stormwater system at the Central County Solid Waste Disposal Complex. (See drawings in Tab II).

(5) Other pertinent information based on intended use of facility

d. Report

(1) Designed capacity of the proposed facility: (See Proposed Design Capacity, Tab I)

Phase I of the proposed facility will manage up to 48 cubic yards of material per week or approximately 2,500 cubic yards per year of food and yard waste. At an estimated average weight of 500 to 1,000 lbs. per cubic yard, the operator estimates that less than 1,000 tons will be processed on the site during the pilot program's first operating year, assuming a continuous 12 months of operation.

Capacity of 2,500 cubic yards per year assumes the operation of four in-vessel Ag-Bag PODs simultaneously. While one POD is in active composting mode, the next POD is being filled.

Phase II of the proposed compost facility could process up to a maximum of 25,000 tons or approximately 62,000 cubic yards of material per year. The operation will be evaluated at the end of Phase I (pilot project) to determine the extent of expansion into Phase II.

(2) Anticipated type and source of solid waste:

There will be three main sources of compost feedstock:

- Food discards from generators participating in the Food Recovery and Recycling Pilot Program, such as selected Publix Supermarkets and restaurants; and
- Ground yard debris routed to the compost facility from other operations at the landfill.
- The project will also pilot the use of unmarketable paper discards, shredded paper and cardboard as feedstocks mixed with food discards.

Approximately 24 cubic yards per week of food feedstock will be collected from generators, transported, and processed at the facility. The operator will have education programs in place at all generator facilities to ensure proper handling of food feedstock. Generators will source separate organics, separating out acceptable materials from the waste, and deposit it into 65-gallon containers. Organic waste will consist of: blemished produce, produce trimmings, food-soiled paper, food discards, scraps of deli products, bakery items, and other food products. Waxed cardboard may also be collected for composting.

**Construction/Operation Plan for A Food feedstock Composting Facility
Central County Solid Waste Disposal Complex
Sarasota County**

An average of 24 cubic yards per week of ground yard waste will be utilized at the compost facility each week. The ground yard waste is produced at a designated yard debris processing area at the landfill and will be free of plastic and other unwanted materials. The ground yard debris will be weighed for data gathering purposes and used to mix with the food debris as a bulking agent and carbon source.

(3) Any additives to be used in the production of compost:

The Ag-Bag system incorporates a water borne inoculant (Ag-Bag Plus) into the incoming feedstock to enhance the breakdown of the feedstock while composting in the POD.

In addition, BAT 505/506 may be used as an alternate inoculant for the treatment of odors. BAT 505/506 are applied using water as the carrier and can be used at all phases of the compost process from the initial delivery of food feedstock to the pile of curing compost. BAT 505/506 have been used successfully at Purdue University's commercial scale (10,000 tons compost/year) windrow compost facility to enhance growth of facultative bacteria and reduce odors. "Since we started incorporating BAT 506 into our compost we have not had a single odor complaint." (Dr. Jody K. Tishmack, Purdue University, 2000)

2. Facility Performance and Design Standards

a. Support for operation (see Conceptual Site Plan, Tab II)

(1) Material type (soil, synthetic, other)

The compost facility pad will be constructed of a minimum of 12 inches of compacted clean fill as a base with a minimum of 8 inches of compacted crushed concrete.. Both the composing area (beneath the PODs) and the curing area will be constructed of the same materials.

(2) Adequate base support

The compost facility pad will be designed and constructed to withstand continuous use by a front-end loader or equivalent, feedstock delivery truck, screening equipment such as a Morbark trommel screen and other heavy equipment without causing rutting, pot holes and/or other indentations in the surface that would cause ponding and potential odor producing situations.

b. Leachate control and removal system performance

(1) Construction materials

The reinforced 3-sided concrete mixing pad will contain a grated collection trough and 1,500 gallon holding tank for leachate collection/management. A surface drainage collection area will contain a concrete structure with overflow weir, crushed stone

**Construction/Operation Plan for A Food feedstock Composting Facility
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Sarasota County**

perimeter and perforated underdrain to collect and manage surface water separate from product leachate. s(See Conceptual Site Plan, Tab II).

(2) Strength and thickness

The concrete mixing pad will be reinforced with #4 steel reinforcing bar or equivalent. The pad will be 4 – 8 inches thick to withstand heavy equipment use (front-end loader and mixing equipment).

(3) Measures to prevent clogging

The grated trough drain on the mixing pad shall be located at the opposite end of the pad from where incoming material will be piled for mixing. This will eliminate most clogging of the grated drain and product leachate system. The compost facility operator will hose down and clean the concrete mixing pad and grated trough drain as needed to ensure that clogging does not occur.

(4) Central collection point for reused, or treatment and disposal

Leachate management will be dealt with via the combined concrete mixing pad, curing pad surface drainage collection, /holding tanks, pump to existing leachate system and possible septic-tank-type pump truck. Following an evaluation of this mixing pad leachate collection system, the holding tank could be equipped with a pump to transport leachate directly into the existing leachate management system if necessary. As proposed, the leachate collection system at the curing pad will include pumping leachate from the holding tank into the existing leachate management system at the Central County Waste Disposal Complex.

(5) Equivalency to design standards

See Tab II for details pertaining to the design of the leachate system.

c. Stormwater management system performance

Surface water will be collected and retained in an on-site retention area separate from the leachate management system. A perforated underdrain and overflow weir will be installed in the retention area to filter incoming surface water and channel overflow into the existing storm water system at the Central County Solid Waste Disposal Complex. (See drawings in Tab II).

(1) In order to prevent surface water from flowing onto receiving, processing, and curing areas

The site will be raised approximately 2 feet to the same elevation as the surrounding roads with ditches around the perimeter of the site to divert any surface water from entering the site.

(2) Equivalency to design standards

See Tab II for details pertaining to the design of the compost facility.

**Construction/Operation Plan for A Food feedstock Composting Facility
Central County Solid Waste Disposal Complex
Sarasota County**

(3) To minimize ponding of solid waste, composting material and finished compost:

The site will be graded to slope approximately 1-2% toward a stormwater collection system. The Ag-Bag PODs will be parallel to the sloped surface of the pad to eliminate water collection along the bags. Daily management of the compost facility will further ensure that any ponding that does occur will be dealt with immediately to avoid muddy site conditions or standing pools of water that could produce odor or vector problems.

(4) Water management district approval

Sarasota County has submitted a permit inquiry letter to the Southwest Water Management District office for clarification about the need for a permit or not.

3. Operational Features and Appurtenances

a. Effective barrier:

The entrance to the compost site will be fenced, gated and locked during non-operational hours. Only the operators of the compost facility will have access to the site. No public tipping at the facility will be allowed. The managers of the composting facility will also be in charge of the waste collection system to eliminate unauthorized entry onto the site. Public admittance will be done on an appointment basis only with the project manager for tours of the site.

b. All weather access road:

All weather roads leading to the site already exist as part of the landfill. The road that enters the compost facility will be an all weather road.

c. Signs indicating name of operating authority, traffic flow, hours of operation, contact cases of emergency:

Signs indicating the name of the operating authority, traffic flow, hours of operation, and emergency contact will be posted at the site as needed. Signs will meet all specifications set by the managing authority of the Central County Waste Disposal Complex.

d. Scales:

Incoming food feedstock from offsite will be weighed at the landfill scale house and control booth. Ground yard debris from on site will also be weighed at the scale house. Any and all other material utilized in the compost operation will be weighed at the scale house prior to transport to the compost facility.

e. Dust control method:

This is a one-truck operation so dust will not be a major issue. Water will be used as needed to control dust. The receiving/mixing area will be cleaned with water as needed

**Construction/Operation Plan for A Food feedstock Composting Facility
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Sarasota County**

to control dust. Loading and processing areas will be kept free of spilled compost to avoid drying out and causing dust problems. The facility operator will be responsible for monitoring the need for further dust control methods as needed. Perimeter roads at the landfill are maintained and cleaned by on-site contractors to minimize dust.

f. Litter control devices:

A wire or plastic mesh fence will be placed along the perimeter of the compost facility. This will help contain any windblown debris. The facility operator will ensure that litter is picked up on each day of operation. The site will be inspected on a regular basis by the Project Manager to ensure proper litter control measures are being adhered to.

g. Fire protection and control provisions:

With the volume and system proposed, fire is not likely to be an issue. Temperature levels of the material in the Ag-Bag PODs will be monitored weekly to reduce risk of fire. Water will be accessible on site in the event of a fire. Access roads will be able to accommodate fire trucks in the event of a larger fire.

h. Odor control devices, methods or practices:

The Ag-Bag in-vessel system was chosen because of its reputation to eliminate most odor problems that occur in the compost operation through proper blending of feedstocks, incorporation of forced aeration, and an inoculant (Ag-Bag Plus). Each Encapsulator is equipped with an inoculant tank and spray attachment. The nozzles are adjusted to spray evenly over the material as it is placed into the Encapsulator. The inoculant is a powder that comes in pouches to be mixed with clean water. It is then sprayed into the Encapsulator along with the material being added to assist with material decomposition.

The raw materials will be delivered to the site in closed containers and dumped onto a bed of ground yard waste to absorb the moisture and odors generated by the materials. A mechanical mixer (see Tab IV) will blend the raw material (50% ground yard waste and 50% food discards) before being transferred to the Encapsulator. The blended feedstocks will be transferred to the Encapsulator/PODs on the same day as it is delivered to the site to reduce potential odors from the food feedstock. The facility operator will hose down the concrete mixing pad (and other areas as necessary) after each use to eliminate any residual waste that may cause odor. Mixing equipment will also be washed on the mixing pad with water after each use to eliminate any potential odors from residual waste. On the same day they are received, empty food feedstock transport containers will be washed out on the mixing pad as needed.

A bio-filter attachment for the POD vents is available as an additional odor control measure. Few Ag-Bag operators utilize these filters since most odors are controlled during the composting process. (See Ag-Bag filter, Tab III)

In addition, BAT 505/506 may be used as an alternate inoculant for the treatment of odors. BAT 505/506 are applied using water as the carrier and can be used at all

**Construction/Operation Plan for A Food feedstock Composting Facility
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phases of the compost process from the initial delivery of food feedstock to the pile of curing compost. BAT 505/506 have been used successfully at Purdue University's commercial scale (10,000 tons compost/year) windrow compost facility to enhance growth of facultative bacteria and reduce odors. "Since we started incorporating BAT 506 into our compost we have not had a single odor complaint." (Dr. Jody K. Tishmack, Purdue University, 2000)

4. Additional Operation Criteria

a. Facility operator:

Resource Management Group Inc. will operate the pilot program as part of the FDEP approved innovative recycling grant – Food Recovery and Recycling Demonstration Project. (See grant proposal and contract with FDEP, Tab VIII)

The purpose of this operation is to demonstrate the feasibility of food feedstock composting on a small, but scalable, commercial basis. The project will conduct intensive data gathering and reporting to FDEP to develop a body of knowledge about food feedstock composting. RMG anticipates working closely with FDEP to monitor the facility operation and develop best management practices recommendations that may be helpful to FDEP in siting future food recycling/composting operations. This is envisioned as a pilot scale project, which aims to prove the commercial potential of food feedstock composting. There will be a facility operator and an assistant on-site weekly, approximately 3 days per week. In addition, the Project Manager will be trained in on-site operations as a back up measure.

b. Communication devices:

The use of a cellular telephone will be available to the facility operator at all times.

5. Operations Plan

a. Designation of responsible persons:

Resource Management Group, Inc. (RMG) will operate the site and will provide staffing to assure compliance with permit rules, including three positions: Project Manager, Facility Operator, and Assistant Operator.

The Project Manager has the overall responsibility for the facility operations and is responsible for backup in the event that the Operator or Assistant Operator is unable to perform any of the duties as stated. The Project Manager is also in charge of ensuring quality control, reporting to and communicating with FDEP, and the development of best management practices at the facility.

The Facility Operator will be responsible for the following duties:

- Collect food feedstock from Publix Supermarkets and restaurants a minimum of 3 times per week.

**Construction/Operation Plan for A Food feedstock Composting Facility
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- Deliver food feedstock containers to the compost facility and deposit food feedstock onto a bed of ground yard waste.
- Operate the designated machinery to properly mix (50/50) the food and ground yard waste.
- Place the blended feedstock into the Ag-Bag Encapsulator.
- Operate Ag-Bag system; monitoring temperatures and air flow as required.
- Gather compost samples for testing using the U.S. Composting Council Test Methods for the Examination of Composting and Compost (TMECC).
- Remove finished compost from the Ag-Bag PODs and place in a pile for curing.
- Screen cured compost to remove contaminants.
- Move the non-organic contaminants to the on-site dumpster.
- Manage the overall operation of the compost facility including odor, fire remediation, litter control, and any other duties as necessary to keep the facility in good operating condition.
- Work closely with the Project Manager and other staff to ensure overall quality control.

The Assistant Operator shall assist the Facility Operator with any and all job duties described above.

b. Proposed equipment:

Collection vehicle, front-end loader, mixer, screener, Ag-Bag Encapsulator, Ag-Bag PODs, Blowers, leachate collection system and pumps.

c. Contingency operations:

The Project Manager will hold regularly scheduled meetings with the facility operators to identify any potential problems before they arise. If problems do arise, the following corrective procedures will be followed as needed:

1. Feedstock mixtures will be checked regularly to ensure the proper ratio and consistency of materials being fed into the Ag-Bag PODs that will ensure proper composting and reduced odor.
2. Temperatures and airflow into the Ag-Bag PODs will be checked regularly to ensure proper function of the system. Airflow can be adjusted, as needed, to ensure proper composting.
3. The facility operator is also in charge of waste collection. Type and consistency of incoming food and ground yard waste can be adjusted at the generators location if feedstock quality is contributing to the operational difficulty.
4. If an Ag-Bag POD fails to function properly, incoming food and ground yard waste can be mixed and fed into a separate POD while adjustments are made to the 'failed' POD.

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5. Incoming food feedstock can be stored temporarily in an Ag-Bag POD should it be deemed necessary to do so.
6. If odors become a problem, the Ag-Bag bio-filters can be attached to the POD vents for increased control.
7. If PODs are damaged (torn, ripped open, etc.), Ag-Bag offers a special tape for repairing damaged PODs.
8. If bird vectors become a problem and cause damage to the PODs, Ag-Bag offers a bird netting that can be attached to posts to enclose the PODs and protect them from birds.
9. A 'failed' POD can be opened, the feedstock remixed and fed into a new POD.
10. As a last resort, feedstock or other product could be disposed of in the adjacent Class I landfill.

d. Controlling the type of waste received at the site:

Because the operator will do the collection, waste will be monitored closely and rejected at the generators site if it is found to be contaminated with unwanted materials. As part of the project, extensive generator education will take place.

e. Weighing incoming waste:

Incoming food discards from offsite will be weighed at the landfill scale house and control booth. Ground yard debris from onsite will be weighed at the scale house before being brought to the compost facility. Any other material utilized in the compost operation will be weighed at the scale house.

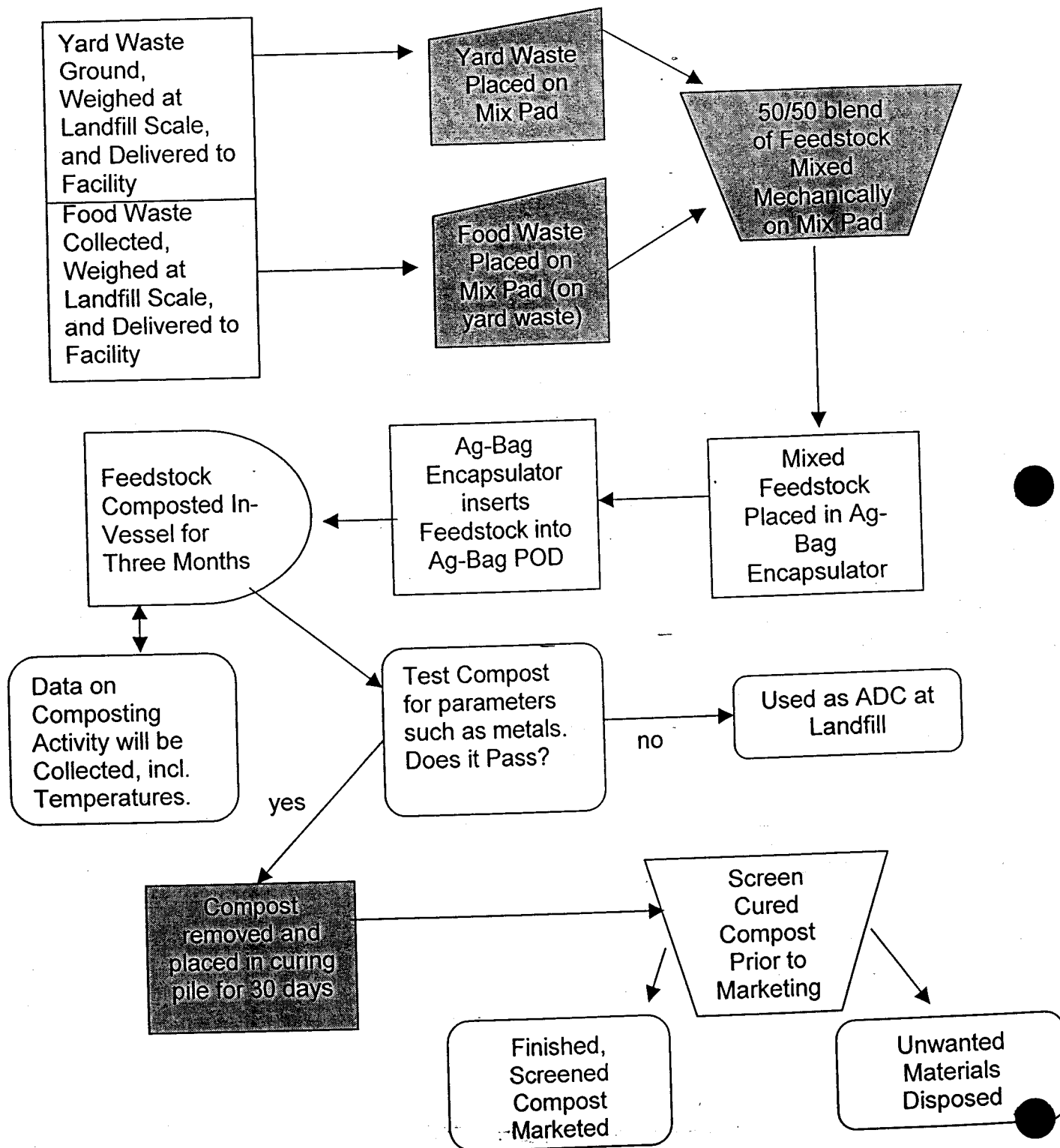
f. Vehicle traffic control and unloading:

The facility is closed to all unauthorized traffic. Only trained operators will be entering the site and unloading waste materials.

**Construction/Operation Plan for A Food feedstock Composting Facility
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Sarasota County**

g. Method and sequence of processing the waste:

The following chart shows the sequence of the processing of food and yard waste into compost for local farms. Leachate catchment areas are shown in gray:



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Sarasota County**

h. Operations of leachate, and stormwater controls:

Leachate management will be dealt with via a combined concrete mixing pad with leachate collection, curing pad with leachate collection and separate surface drainage collection area.

The concrete mixing pad will have a grated trough drain with movable slide gates at each end. One end of the grated trough will lead to a 1,500 gallon leachate holding tank. The other end of the grated trough will lead to a swale to divert stormwater to the stormwater collection area. When leachate collection is desired, the slide gate at the leachate end of the trough drain will be open and the slide gate at the stormwater end of the trough will be closed. During stormwater collection, the stormwater slide gate will be open and the leachate slide gate closed. The compost facility operator will hose down and clean the concrete mixing pad and grated trough drain as needed to ensure that clogging does not occur. Leachate from the mixing pad holding tank will be utilized in the mixing of compost to achieve proper moisture content or pumped out as needed by a septic-tank-type pump truck or equivalent and transported to the leachate collection system at the Central County Waste Disposal Complex. (See Conceptual Site Plan, Tab II)

The curing pad will be bermed on four sides to collect product leachate. Product leachate will be directed to a grated drain and 1,500 gallon holding tank. The holding tank will be equipped with a 60 gallon/minute grinder pump to pump the leachate to the existing landfill leachate management system. for leachate management. (See Conceptual Site Plan, Tab II)

A surface water drainage collection area will contain a concrete structure with overflow weir, crushed stone perimeter and perforated underdrain to manage on-site stormwater.

The site will be raised approximately 2 feet to the same elevation as the surrounding roads with ditches around the perimeter of the site to divert any surface water from entering the compost facility. The site will be graded to slope approximately 1-2% toward a stormwater collection system. The Ag-Bag PODs will be parallel to the sloped surface of the pad to eliminate water collection along the bags. Daily management of the compost facility will further ensure that any ponding that does occur will be dealt with immediately to avoid muddy site conditions or standing pools of water that could produce odor or vector problems. (See Conceptual Site Plan, Tab II)

i. Designation of backup disposal site(s):

Generators will dispose of food with solid waste if the project experiences temporary closure.

6. Water Quality Standards

Water quality standards shall be maintained via leachate collection from the mixing pad and curing pad and stored in a holding tank at each location. Leachate will be used to

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Sarasota County**

add moisture to the compost mixture as needed and/or pumped to the existing leachate management system at the landfill.

The compost facility shall be approximately two feet above the surrounding area to minimize stormwater from entering the compost facility. Stormwater from on-site shall be collected separately from the leachate collection system. Stormwater shall be collected in an on-site collection area, filtered and discharged to an existing drainage swale as part of the overall stormwater management system at the Central County Waste Disposal Complex.

7. Compost Facility Data Form

See attached.

8. Certification by Applicant and Engineer or Public Officer

See application form attached.

**Proposed Design Capacity
Food Waste Composting Facility
Central County Solid Waste Disposal Complex**

PHASE I:

CT5 Ag-Bag System

1 CT5 Ag-Bag POD = 190 cubic yards
190 cubic yards = 95 cubic yards food
plus 95 cubic yards ground yard waste

4 PODs will be utilized

Food Waste

1 cubic yard = (3) 65-gallon containers
6 containers/store = 2 cubic yards/store/collection

2 cubic yards/store x 3 collections/week = 6 cubic yards/store/week

6 cubic yards/store/week x 4 stores = 24 cubic yards/week
24 cubic yards/week x 4 weeks = 96 cubic yards/month
= 1,152 cubic yards/year

Ground Yard Waste

24 cubic yards (cubic yards)/week
96 cubic yards/month
1,152 cubic yards/year

PHASE II (potential capacity; actual capacity will be determined following an evaluation of Phase I):

CT5 Ag-Bag System

Additional 61 PODS/year

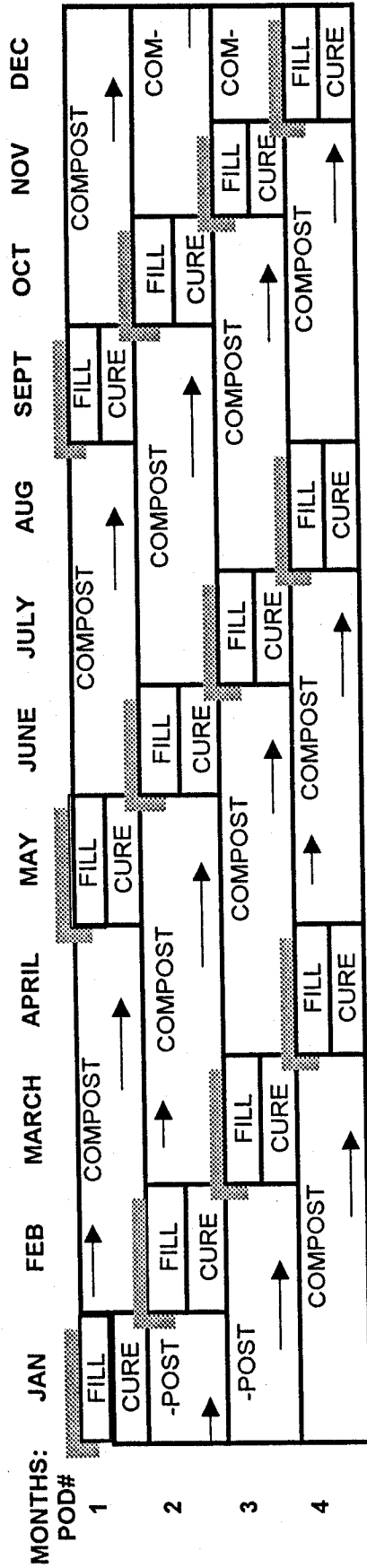
Food Waste

Additional 30,500 cubic yards/year

Ground Yard Waste

Additional 30,500 cubic yards/year

Ag-Bag Eco POD Composting Schedule



Assumptions:

1. Based on initial volumes of material (48cy/ week), it will take approximately One month to fill an Ag-Bag Eco POD. Each POD holds 76 tons of material (190 cubic yards.)
2. A full POD will need approximately 3 months to compost.
3. Compost will be removed from the PODs and cured for 30 days. A new POD will be filled during the same 30 day period.
4. A four POD system will service a continuous flow of material through the Ag Bag composting system based on proposed volumes.
5. Full capacity, including Phase I and Phase II, could involve approximately 5 composting cycles of 8-12 weeks each per year.

FOOD COMPOSTING FACILITY



CENTRAL COUNTY SOLID WASTE DISPOSAL COMPLEX
SARASOTA COUNTY

RESOURCE MANAC FOOD RECOVERY

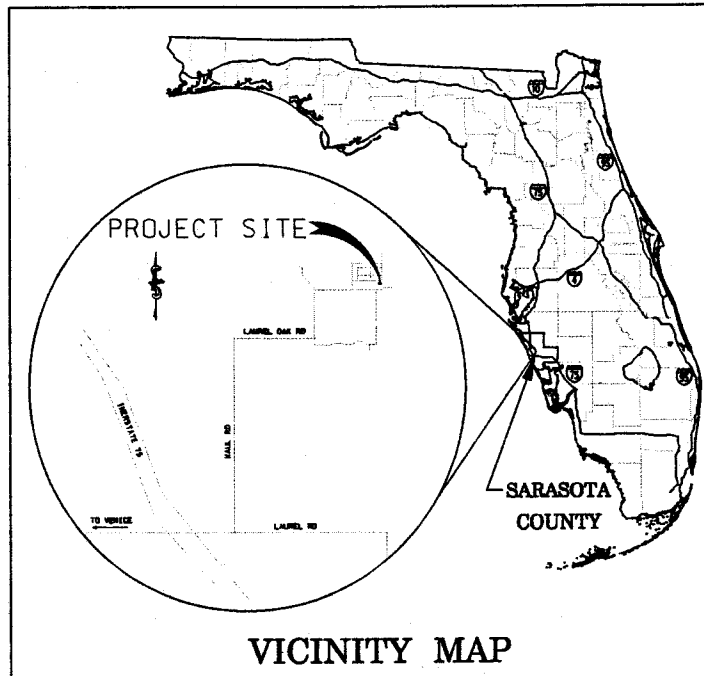
PRE

RESOURCE
GRO

200 S. WASHINGTON
SARASOTA,

PRE

PBS



EMENT GROUP, INC. COMPOST PROJECT

RED FOR

MANAGEMENT
UP, INC.

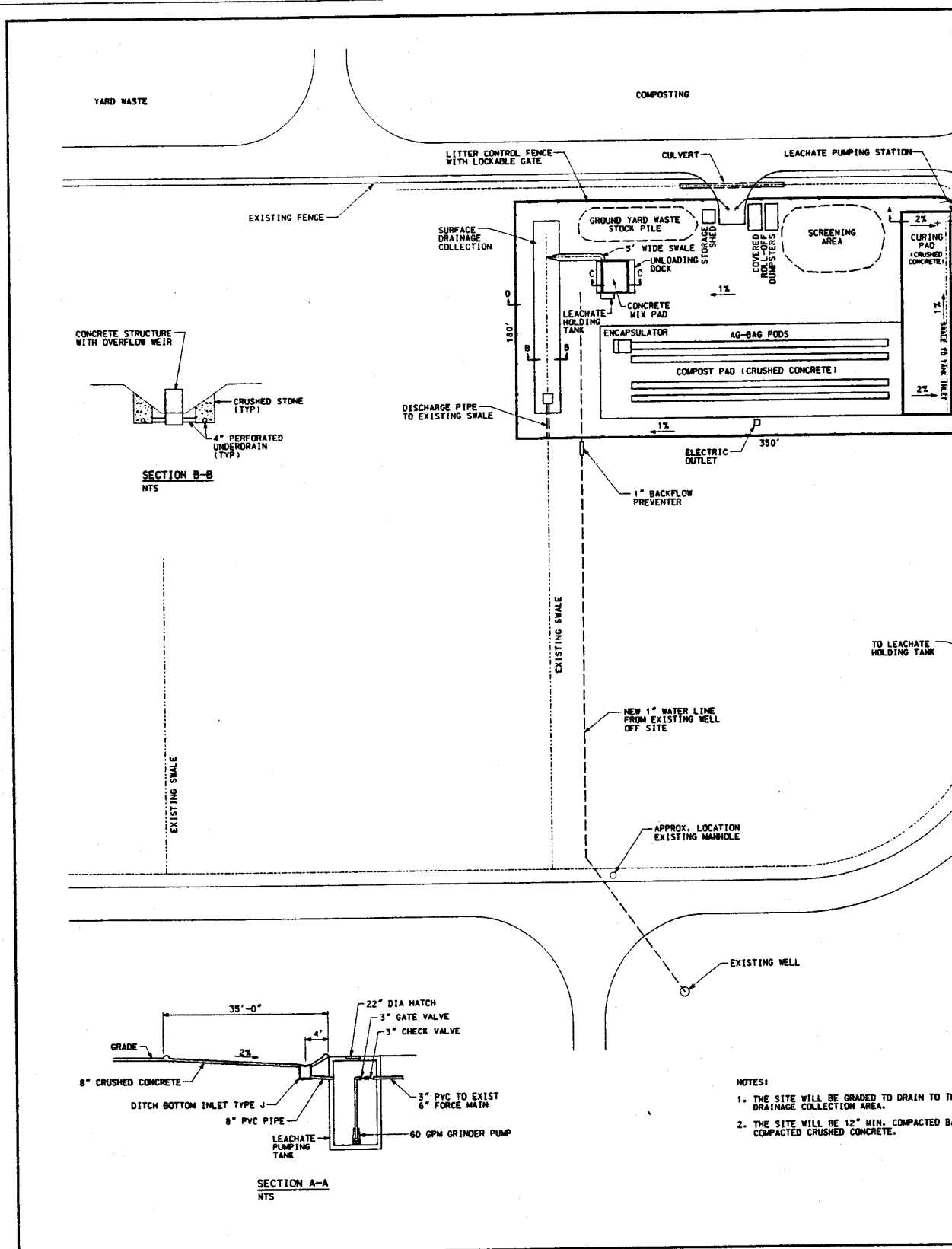
ON BLVD., SUITE 10
FLORIDA 34236

ARED BY

INDEX	
SHT. NO.	TITLE
1	COVER SHEET
2	SITE PLAN



2803 FRUITVILLE ROAD
SUITE 130
SARASOTA, FLORIDA 34237
Ph. (941) 954-4036



PORT, BUCKLEY, MOHAN & JEWISSAN, INC., DBA/



PRINCIPAL ADDRESS:
2001 NW 107th AVENUE
MIAMI, FL 33172-2607
FBPR CERT. OF AUTH. No. 24

PRODUCTION ADDRESS:
2803 FRUITVILLE RD., STE. 113
SARASOTA, FLORIDA 34237
PH. (941) 954-4036

CLIENT

RESOURCE MANAGEMENT GROUP, INC.

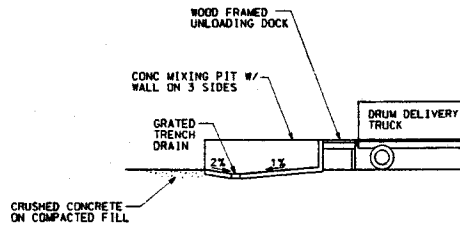
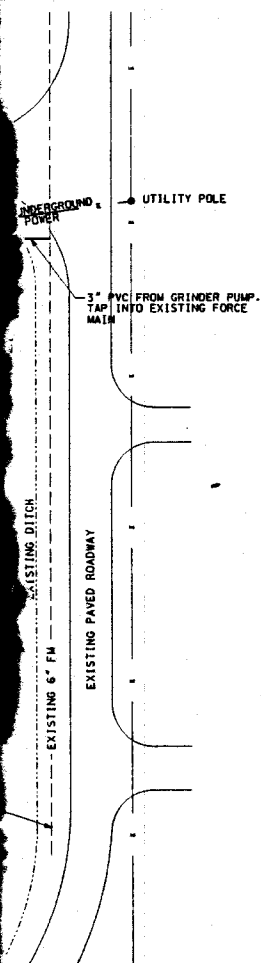
200 S. WASHINGTON BLVD., SUITE 10
SARASOTA, FLORIDA 34236

PROJECT

FOOD RECOVERY

CENTRAL

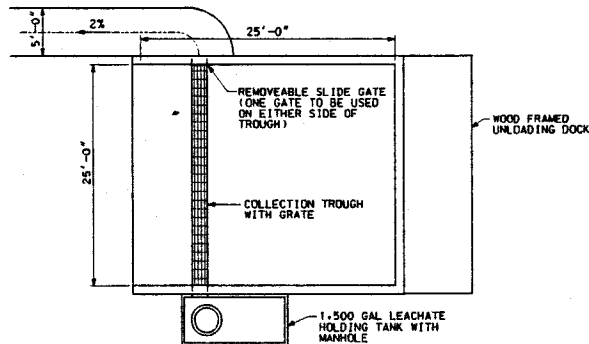
WASTE DISPOSAL



SECTION C-C
NTS

SCALE: 1" = 50'

NORTH



PLAN-MIXING PIT & HOLDING TANK
NTS



SECTION D-D
NTS

COMPOST PROJECT	TASK	ORIGINAL:	6	NOT VALID FOR CONSTRUCTION UNLESS SIGNED IN THIS BLOCK	JOB NO.
COUNTY	CONCEPTUAL SITE PLAN	REVISIONS:	7		DRAWN
COMPLEX		1	8		DESIGNED
		2	9		CHECKED
		3	10		QC
		4	11		SHEET 2/2
		5	12		

CT-5 Compost System

Specifications

2320 SE Ag-Bag Lane
Warrenton, OR 97146

503-861-1644

800-334-7432

503-861-2527 - fax

compost@ag-bag.com - email

<http://www.ag-bag.com>

The Ag-Bag Environmental CT-5 compost system is designed for the small volume operator, without sacrificing speed or efficiency. The Ct-5 works in conjunction with the 5'x 200' EcoPOD and had a storage capacity of approximately 76 tons or 190 yards.

DESCRIPTION:

The unique design incorporates a hydraulic ram, which pushes the material through the tunnel and into the EcoPOD. It is equipped with a 13 hp Honda engine (with an option for a 10 hp Yanmar diesel engine) to power the hydraulics and features a remote control unit to operate the ram, making this system efficient and easy to use. The feed hopper will hold approximately 3.5 yards of material at one fill. By pushing the hydraulics ram forward and leaving it extended against the material, the product remains confined. Retracting the ram prepares the hopper for another load of material.

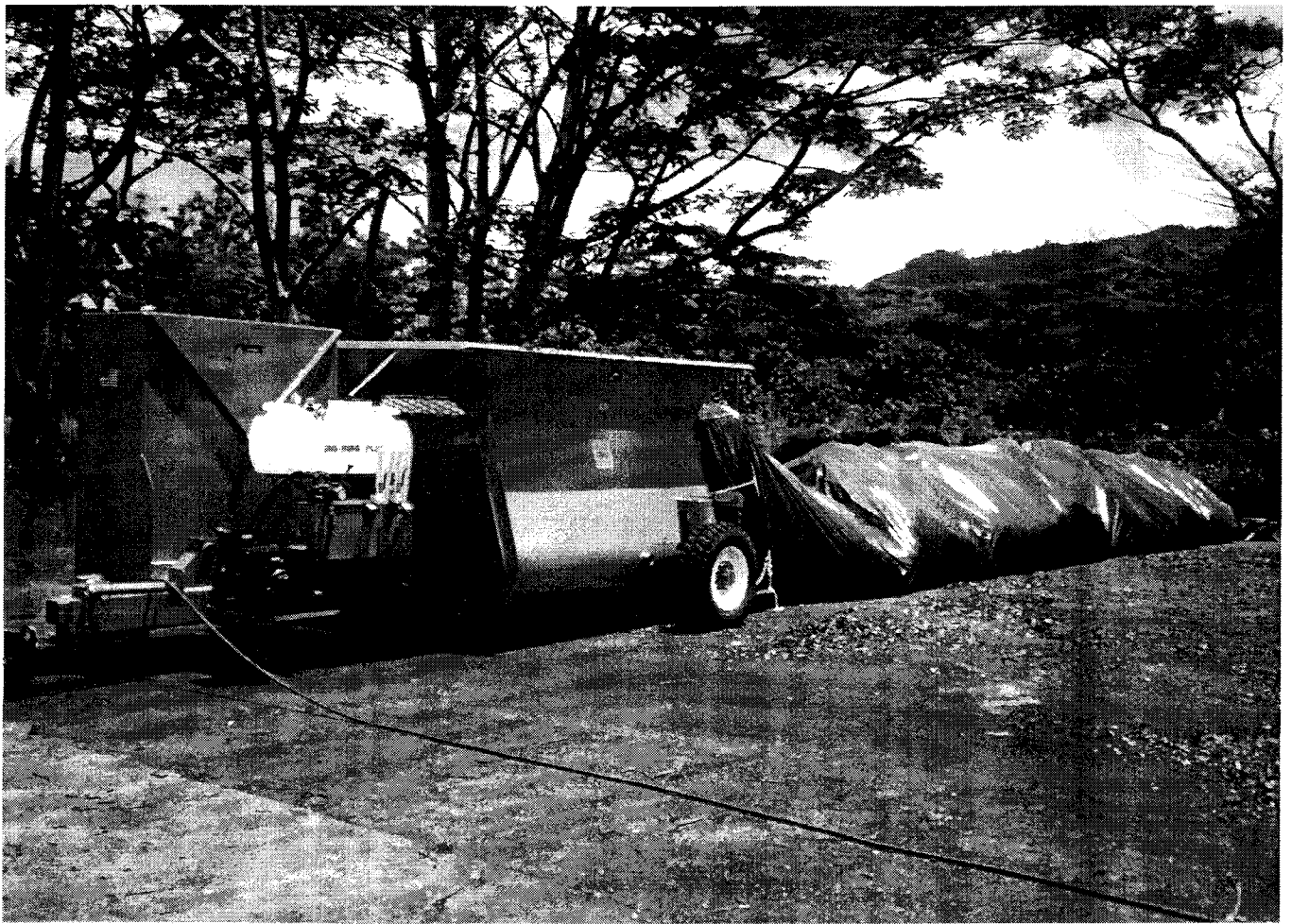
A large air receiver tank installed on the machine holds the perforated pipe for feeding into the EcoPOD. This allows the EcoPOD to be aerated and odor to be controlled at any stage of filling. If an excess of two weeks time is required to fill pne EcoPOD, the composting stages become varied throughout the bag, prolonging composting time overall. *This is the only system available to do small batches on a continual basis.* To start a new EcoPOD: place the POD plastic on the tunnel, open the air receiver, put in a new roll of pipe, and start filling.

Standard equipment includes:

- 5' tunnel uses 5'x 200' EcoPOD
- 3-stage 48" telescopic cylinder – pushes material through in one stroke
- 31" tires with 1-ton hubs
- 13 hp Honda engine
- 2-Mico disk brakes per wheel for compaction control
- Adjustable hitch – fits various size tractors
- 27-gallon inoculum tank w/spray applicator and nozzle tip
- Bag pan assembly
- Air receiver with viewing window, 5' diameter by 30" deep with pipe reel holder
- Self-contained hydraulic tank and pump
- Accessories include: Masterseal tool, vent valve tool, and temperature probe

DIMENSIONS:

LENGTH	16'
WIDTH	8'
HEIGHT (to hopper top)	6'
3.5 YARD HOPPER	10' wide fill throat
10' LONG CHAMBER	
WEIGHT	6,000 lbs.
FILL RATE	1+ Tons Per Minute



HOW THE EcoPOD SYSTEM WORKS

Composting:

Composting is the biological breakdown of organic matter into simpler compounds that are more usable for soil and plant life. The bacteria and enzymes use the organics for food to grow and multiply. The other necessary elements are water and oxygen for the air breathing life forms. However, there are also many non-oxygen-using bacteria. These are anaerobic, and some are facultative, which can be anaerobic or aerobic, depending on circumstances.

As long as proper food sources, water and oxygen, are present, the microbes will multiply. The chemical break down creates CO₂, heat and water. The proper balance of the Carbon to Nitrogen ratio should be between 20 and 40 to 1 with 30:1 being ideal. Moisture between 45% and 60% creates an ideal habitat for microbial growth.

The next requirement is a suitable environment in which to propagate. There are many types of structures and means by which to compost. One method is a static pile. This is where material is piled and left for a year or more to break down. Another method is windrows. In windrows, material is piled in an elongated row at the proper height for turners to pass over, so that **oxygen may be introduced into the mass**. Each time the turner passes through the material, it is oxygenated to some degree, but most times not completely. A good oxygen level is 13 to 17% after turning, which can dissipate in a matter of hours, depending on microbial activity. If the oxygen level reading is too low, another turning is required.

One of the essential factors in any type of composting structure is porosity. Porosity allows oxygen to move through the matrix. Each time the turner passes through the mixture, moisture and porosity are reduced. The turner produces finer material with each pass. As material is exposed to the atmosphere, moisture is lost and re-hydration is required. Proper turning and re-watering are expensive with the cost of labor and equipment. Without turning the outer layer, the material dries and microbial action halts until water is reapplied.

Exposure to the elements is a common problem in keeping the moisture at a desired level. Material such as animal manure or vegetable matter and straw exposed to the heat and dryness would require constant irrigation and turning to achieve proper results. Also, rain causes leachate runoff. Therefore, if the material is not on a solid base, turning will not be effective in winter operations.

AG-BAG EcoPOD System:

Since all composting is microbial action, a prime environment for the bacteria is essential.

All materials used in our compost matrix are blended together to achieve the preferred C/N ratio of 30:1, as well as moisture at an average of 55%. The materials will be ground to the ideal size and consistency. At this time, our inoculant is introduced to enhance the breakdown of the lignin factors in the straw. It is specifically designed to breakdown straw.

The matrix materials are then loaded into the large plastic PODs using an Ag-Bag Encapsulator. The material is pressed into the POD at the proper density to maintain porosity. As the POD is filled, aeration tubing is fed into the mix along the entire length. This piping has

specially sized and spaced slots that are used to pressurize oxygen throughout the entire length of the POD.

The POD is then hermetically sealed on both ends to control the entire environment. All the oxygen and CO² that is exhausted from the mass exits through special vents that are controllable as to the amount and where expelled.

The oxygenation is introduced using a high-pressure blower system that is controlled with timers. These timers can be adjusted from seconds to minutes to hours, as required by the composting process. At the beginning of the process, more oxygen is required to feed the rapidly expanding bacteria colonies, which are expanding and moving through the matrix. Later in the process, less oxygen is required, so blower cycle times can be reduced to facilitate the microbial needs while finishing and drying the material.

As the material decomposes, it changes shape in the POD and new oxygen paths are created. The matrix inside the POD heats rapidly and reaches the appropriate temperatures to kill pathogens and weed seeds. The POD acts, as its own BIOSPHERE because condensation re-hydrates the out side of the materials for bacterial action. This eliminates drying on the outside, as in a windrow system.

The plastic skin of the POD is green to promote function and visual aesthetics. The green color attracts 20 to 30 degrees more heat than a white surface, which helps the exterior of the POD with additional heat, much like a solar panel. This ideal environment for microbial growth is the secret to better and more efficient decomposition. The environment is a wet, warm and dark place for growth of microbes and fungi, both required for successful composting. By having an enclosed vessel, there is less volatilization, which in turn, leaves a higher quality composted material. More active microbes are available for the soil and plant growth. This is different than turning the windrow every several days and having to re-water as well, which slows down the whole process, as the microbes have to re-multiply and re-build. By enclosing the materials, a higher fraction of nitrogen will be left in the compost as oxidation releases less nitrogen gasses to the atmosphere. Thus, we are able to control the potential odors.

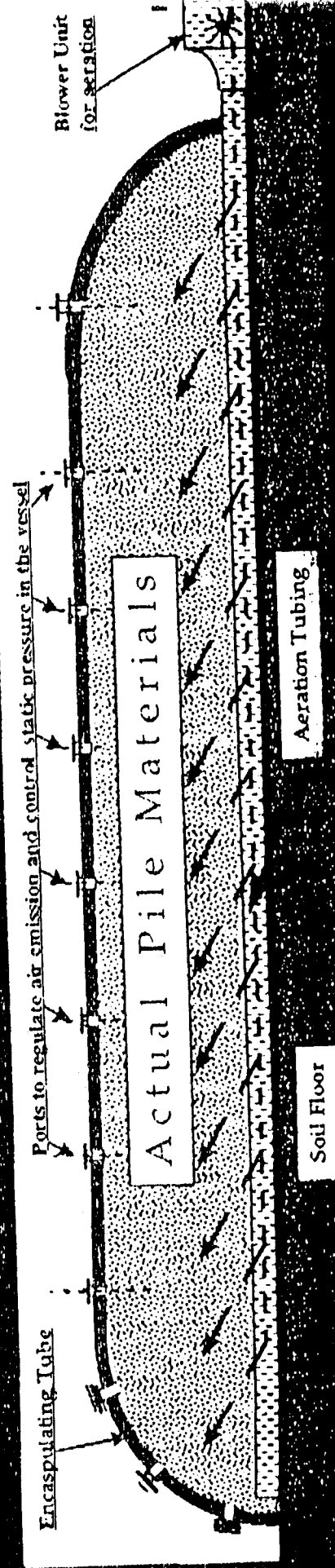
After 8 to 12 weeks (depending on feed stock materials) the POD can be harvested. By cutting the outer plastic skin from the material and removing it, the composted material is exposed. The matrix is then removed from the Pod with a loader and moved to a **static pile for curing and maturing**. This ensures uniform compost. We recommend leaving the matrix in the pile for 30 to 60 days for maturing. This will give an opportunity for the microbial action to slow, to dissipate heat and dry down for screening.

After screening the matrix, the oversized materials can be reintroduced into the next compost batch. This will add an additional inoculant into the next cycle of material. If the compost is to be sold for mulch, screening may not be required. The compost is then ready for marketing.

In-Vessel Aerated Static Pile Composting Process Diagram

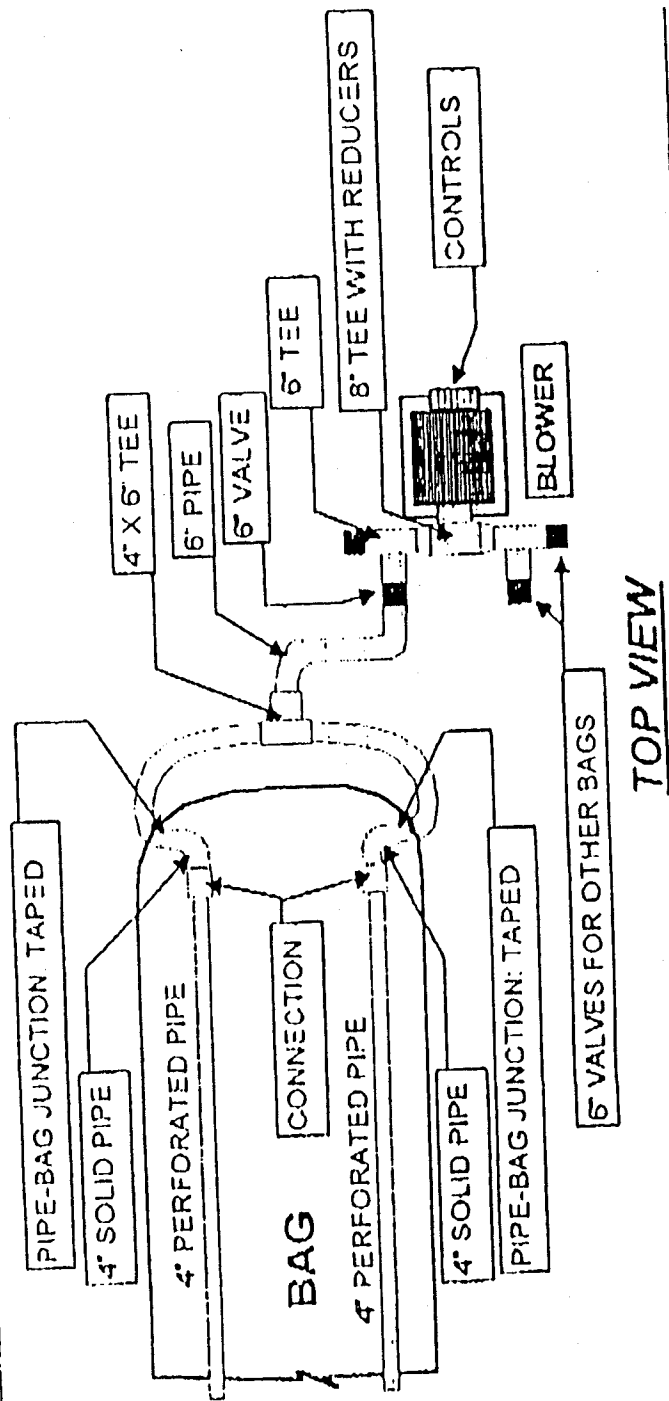
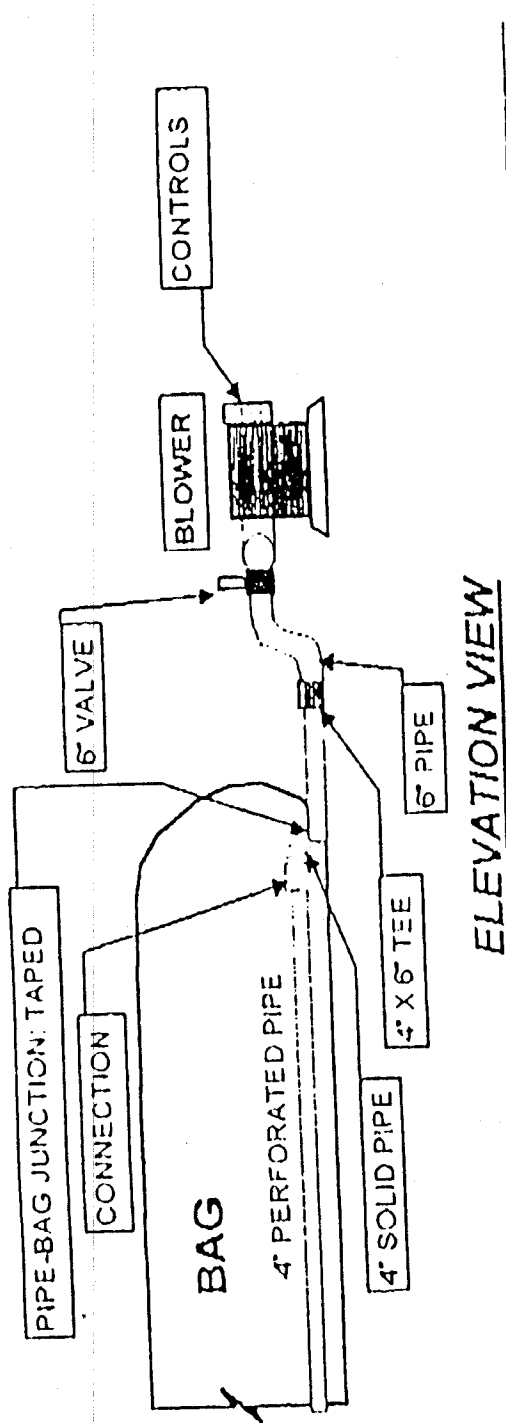
Features

- Complete encapsulation of the composting mass eliminates odor and leachate runoff concerns at site and allows 100% process containment
- Composting process can safely take place outdoors as a result and eliminate costly and permanent composting support buildings
- Narrow space between each digester is possible in layout configurations which allows efficient use of available land space
- Pile materials can be safely allowed to remain in the digester indefinitely which allows more efficient site process management
- System allows infinite scale expandability options which creates greater flexibility in project business planning
- Easily interchanges between agricultural objectives and environmental objectives at the same site.



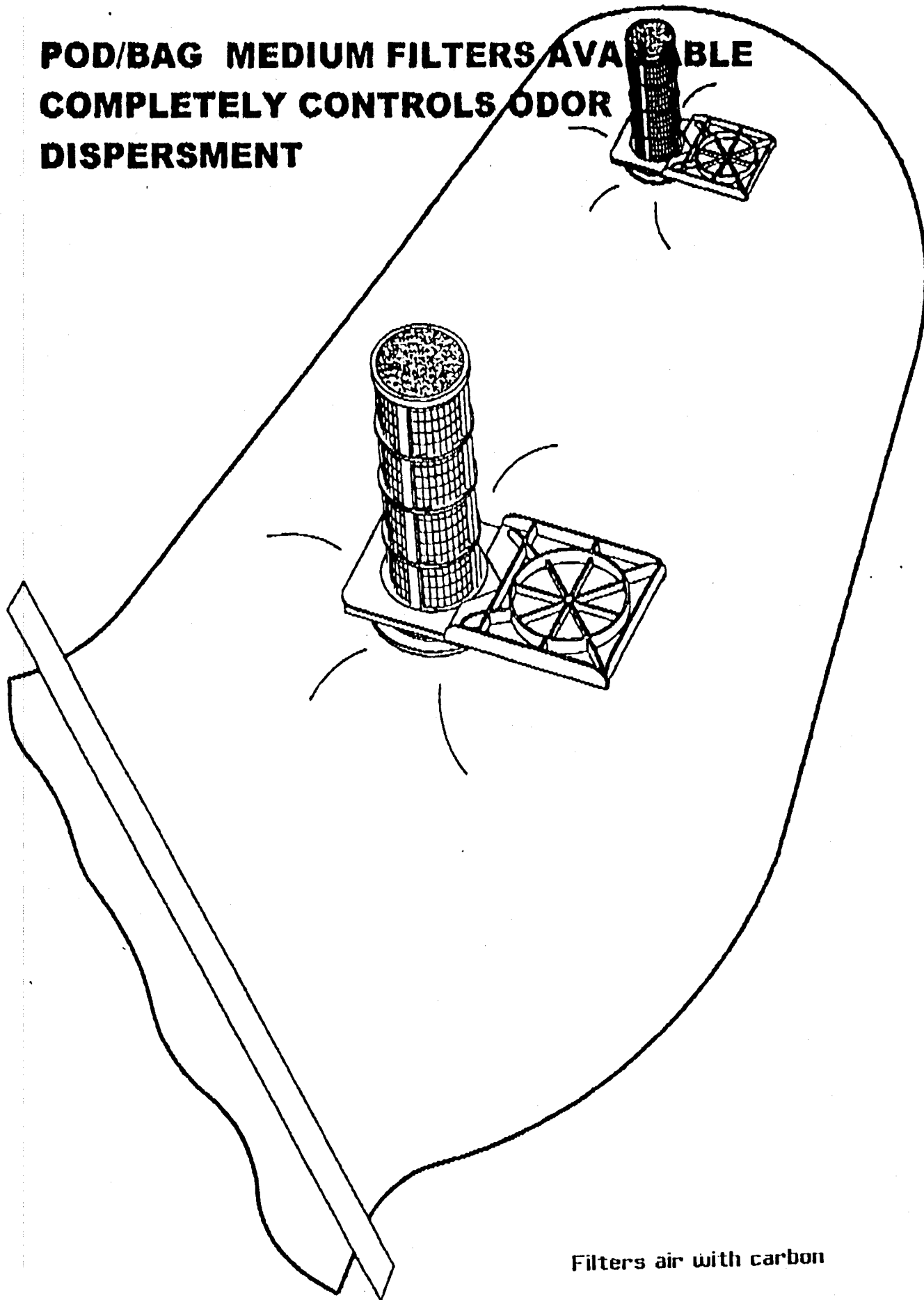
Process Description

- Compost feedstocks are mixed thoroughly, with specifications of 20% solids, a C:N ratio of 20-30:1, and proper bulk density
- Mixed compost feedstocks are then loaded into the digester along with aeration tubing and the digester is then sealed
- Ports are inserted in the walls of the digester, adjusted, and the blower is setup and begins to provide oxygen to the digester
- Temperatures will reach EPA 503 PJRP requirements within several days. The process is usually complete within 30 - 60 days



ABE AERATION SYSTEM

**POD/BAG MEDIUM FILTERS AVAILABLE
COMPLETELY CONTROLS ODOR
DISPERSMENT**



Filters air with carbon

Composting Made Simple

with Ag-Bag Environmental's EcoPOD® Technology

As the world's population grows, along with the volume of commercial products we use, so has the total amount of solid waste generated. Attention to waste management problems increases as new regulations result in fewer landfills at greater cost. Decision-makers are focusing their attention on recycling and composting as an economic and environmental solution to landfilling.



Waste composition studies show that on average 60-70% of the typical waste stream is organic materials and of that, nearly 20% is yard trimmings. This has led many states to ban yard waste from landfills. Composting is a logical choice as it reduces material volume through natural biological action and produces a product that enhances soil structure and benefits new growth.

The influx of composting projects has ushered in a new set of problems, including odor complaints, weather-related control problems, leachate control, blowing debris, and high operating costs. Organic waste is often composted by piling material in windrows and mechanically turning the piles to achieve aerobic decomposition. However, if the weather does not cooperate, process control becomes difficult, if not impossible.

Ag-Bag Environmental offers a unique and patented waste management solution that makes composting simple via a low cost in-vessel system using forced aeration.

Proven technology is used for filling the elongated flexible plastic tube called an EcoPOD® (Preferred Organic Digester) with positive aeration and control. The equipment is derived from more than 20 years of successful agricultural feed storage usage. The controlled compaction is used for all types of materials, densities, moistures, and textures. Each EcoPOD® is adjusted with its own valving and aeration controls to individualize the composting process, yet use a minimal amount of labor and supervision. Our system is reliable and efficient with capacities to match any requirement. Ag-Bag Environmental offers a low tech solution with a high degree of process control.



Composting is a logical choice. It reduces material volume and produces a product that enhances soil structure and benefits new growth.

AG-BAG
ENVIRONMENTAL

1-800-334-7432
www.ag-bag.com



Odor Control

The aerobic process with the EcoPOD® prevents the production of objectionable odors while maintaining aerobic activity during the composting cycle. With the sealed EcoPOD®, odor containment is also assured.



Leachate Control

Starting with 40-50% moisture, condensation is created as the feed stock heats, eliminating costly rewatering, while controlling liquid in the sealed EcoPOD®.



Blowing Litter

With all material contained inside the EcoPOD®, there is no exposure to weather and the problems of wind blown litter and pathogens are eliminated.



Vector Control

Complete containment of material in the EcoPOD® eliminates health problems related to the exposed food and habitat sources found with other methods of composting.



Reduced Site Area

Composting in an EcoPOD® significantly reduces the land area requirements by one-third. The ease in siting closer to urban areas reduces transportation costs and increases profitability.



Reduced Cycle Time

The Ag-Bag® Environmental system provides a cycle time of as little as 8 weeks. Curing adds another 30 to 60 days. Annually, three composting cycles are easily obtained.

AG-BAG

Environmental

2320 SE Ag-Bag Lane
Warrenton, OR 97146
1-800-334-7432
www.ag-bag.com

Site Considerations

Site locations close to urban areas, and the waste stream, is simple with Ag-Bag Environmental. This cuts hauling costs and ensures a better profit picture.

Improvements to the site are as simple as a slope of 1-3 degrees with a gravel or hard-packed surface. Asphalt or concrete are not necessary, but will improve efficiencies. With a homogenous mix and blending of materials on an all-weather surface, a better product goes into the EcoPOD® and results in a higher quality end-product.

The area needed to compost is determined by the volume of waste material. An EcoPOD® requires one-third the space needed for a windrow. Eleven 10' PODs fit on one acre and based on our recommended density of material equals 5,500 yards. The cycle can be completed in 60 to 90 days and the same area reused for the next cycle. With the potential of 3-4 cycles per year, as much as 22,000 yards per acre per year can be expected.

Electric power (110v) needs to be available to run the blower systems. This can be sized and engineered at the time of site approval. Also water should be available to the compost site as the material mix should be 40-50% moisture going into the EcoPOD® for optimal results.

Feed Stock

Only organic materials will compost. Some examples of materials are listed below. Bag Environmental is available to help you balance the mix of your feed stocks for optimal results.

BIOSOLIDS

COW MANURE

FISH WASTE

FOOD WASTE

GRASS CLIPPINGS

HORSE MANURE

LEAVES

MSW

MIXED ORGANICS

PAPER MILL SLUDGE

PAPER WASTE

POULTRY MANURE

SAWDUST

CONTAMINATED PAPER

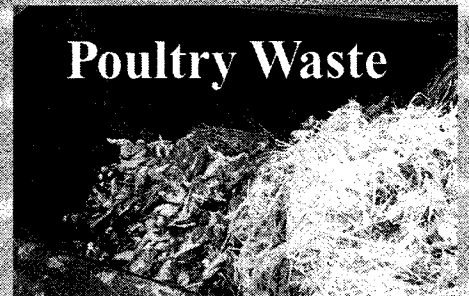
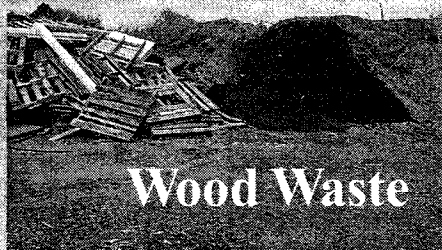
STRAW

CONSTRUCTION DEBRIS

WAXED CARDBOARD

WOOD PALLETS

YARD TRIM/BRUSH



Feed Stock Preparation

Sizing – Materials need processing to 4" minus in size. Brush trimmings, shrubs, lumber, etc. show best results after being processed through a grinder or shredder.

Mixing – A composite mix of material needs to be balanced for proper carbon to nitrogen (C:N) ratio. This means a mix of greens (nitrogen sources) to browns (carbon sources). The best ratio is between 20 to 40:1, with 30:1 being ideal.

Moisture – Some materials require additional water to bring a uniform moisture to between 40 and 50% throughout the compost mass.

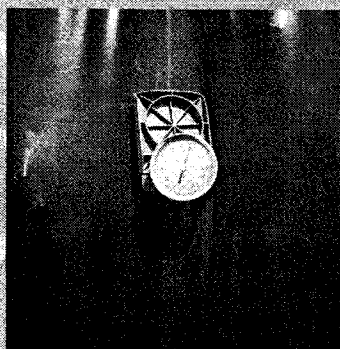


Supplies

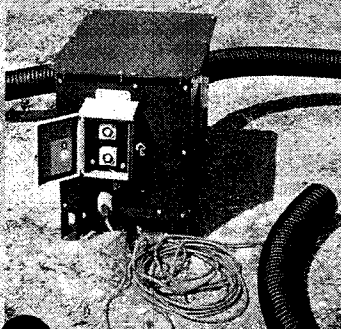
The EcoPOD® is manufactured from LDPE plastic and is completely recyclable. It is sold as a complete unit with all the parts necessary to finish an EcoPOD® of compost. The EcoPOD® comes in either 5', 10' or 12' diameters and 200' length. When full, it is sealed on each end with a special sealing strip that prevents leachate loss to the ground surface. Dark green in color, the EcoPOD® blends with surroundings, and attracts solar heat. Depending on the size used, an EcoPOD® will hold between 250-1000 yards of pre-ground materials that are mixed or blended with the right amount of moisture. Included in the complete EcoPOD® is the aeration piping with all fittings, seal strip sealing equipment with tools, controllable vents, temperature probes and starter inoculant.



The Ag-Bag Environmental composting system provides excellent control of moisture content, oxygen supply, and temperature. Free air space is controlled during the filling process by density compaction controls on the compaction machine. The oxygen supply is replenished by forced aeration and eliminates the labor intensive need to turn. Temperature monitors indicate when the air flow



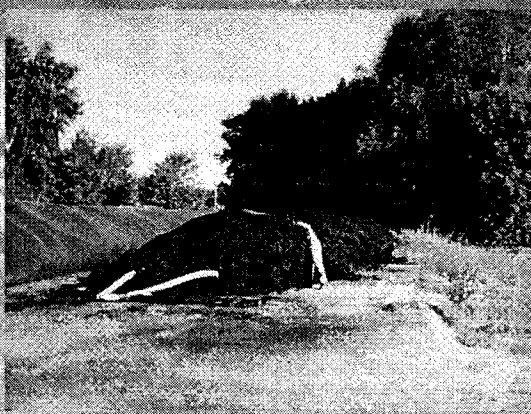
needs adjusting to maintain proper temperatures. Moisture is adjusted at time of filling or added to the total mixture upon blending. We maintain consistent moisture and temperature throughout the process while other systems do not. The compost matrix is sufficient in size to maintain



heat, even in cold climates. Considered an in-vessel system, the Ag-Bag Environmental composting system is easily permitted.

Harvest

After 8-12 weeks of composting residence time, the compost cycle is completed and it is time to harvest the EcoPOD®. The POD is opened and the material static piled for 30 - 60 days to cure or mature. This is a natural biological process. Mature compost adds nitrogen back into the soil. Immature compost has the potential to withdraw nitrogen from the soil.



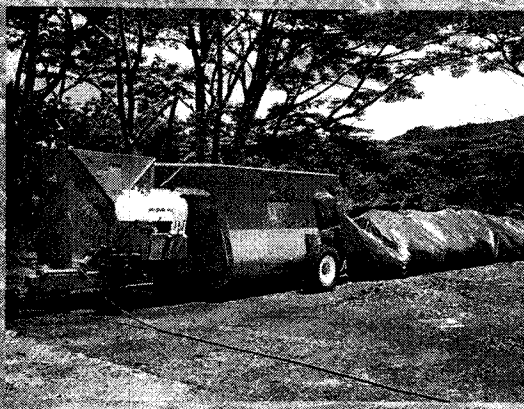
There is no need to cover the curing piles as the material is stable from the composting residence time.

Once the compost is mature it should be screened. Screening creates a more uniform end product and any large wood chips can be reintroduced into the next EcoPOD®.



Equipment

Model CT-5 – An economical system that comfortably processes up to 25,000 tons of material annually.



Using a 5' diameter x 200' length EcoPOD®, this system has a 3-yard hopper and is designed to accept batches of

material until the EcoPOD® is completely filled. To compost on a batch basis, the operator can leave the hydraulic ram extended to seal the fill end of the EcoPOD®. Aeration can then be started to control odors and leachate. Powered with a 13 hp Honda engine, (a diesel engine option is available) it features a remote control unit to operate the hydraulics. This system can be used by a single operator and has a fill rate of 1+ tons per minute.

Model CT-10 – Designed for operators wanting the ability to easily process a high volume contaminated waste stream, the CT-10 fits the bill. This system



handles up to 50,000 tons of material annually. Using a 10' diameter x 200' length EcoPOD® with a 7-yard hopper, this system is powered with

a Yanmar diesel engine and features a remote control unit to operate the hydraulics. This system can also be used by a single operator and has a fill rate of 2-3 tons per minute.

Model CG-610 – This compost system uses a cross-conveyor system requiring a side delivery unit

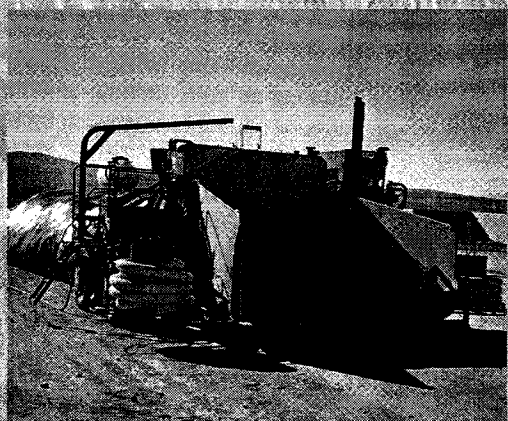
to fill the EcoPOD®. Designed for operations using a mixer wagon or truck to blend and feed the materials, the CG-610 has a fill rate of 1-3 tons per



minute. Using the 10' diameter x 200' length EcoPOD®, this system requires a 70-plus horsepower tractor with 540 PTO to power it.

Model CM-710 – This system uses a feed table conveyor that can be loaded with a front-end loader, or live floor trucks. Also, using the 10' diameter x 200'

length EcoPOD®, operations processing large quantities annually can best use this system. It is self-powered with a 120 hp John Deere®



engine and has wheel drive to move from EcoPOD® to EcoPOD®. The CM-710 has a fill rate of 3-5 tons per minute.

Note—Certain models can accommodate the 12' diameter EcoPOD®.

Commonly Asked Questions

"How can you compost without turning?"

"Turning is used as a method of introducing oxygen to the materials because oxygen is required to create the heat necessary to obtain mandated temperatures. The Ag-Bag Environmental system uses forced aeration and eliminates the labor-intensive turning."

"How can you control temperatures inside the EcoPOD®?"

"With our patented aeration system, temperature control becomes simple and we eliminate weather factors. There are vent valves installed at twelve locations on the EcoPOD®. If temperatures or oxygen levels inside the EcoPOD® go higher than optimal, the air flow is reduced causing the oxygen levels to drop and the compost to cool. If the temperatures become lower than optimal, the air flow is increased causing the oxygen levels to increase and the compost will heat up. The control is up to the operator, and not effected by ambient temperature."

"What limitations are there to the materials that can go into the EcoPOD®?"

"All organic materials can be composted in an EcoPOD®. The quality of the final compost is determined by the feed stock and balance of the mix of materials that went into the EcoPOD®. Contamination by inorganic materials will effect the final compost quality, but any material sized to our specifications can be put in the EcoPOD®."

"What kind of difficulties are there to permitting the Ag-Bag Environmental system?"

"Because the EcoPOD® completely contains the waste materials, controlling odors and leachate, the Ag-Bag Environmental composting system is viewed very favorably and has been permitted under some of the most stringent requirements. Additionally, siting near urban areas to reduce transportation cost is possible with this patented in-vessel system."



INTRODUCTION:

Demonstration projects often fail to exhibit economic promise even when the demonstration process meets or exceeds other performance goals. Almost by definition, demonstration projects function at levels well below those where efficiencies of scale greatly reduce operating costs.

Regardless of project size, equipment and time are required for each operation in the process. The magnitude of equipment requirements cannot be reduced below minimums set by what is available in the marketplace. Likewise, process operation times cannot be reduced below certain minimum values. This is especially important in a time-intensive process such as composting. Considerable effort has been dedicated to minimizing fixed costs with respect to the size of this specific project.

THE PROCESS:

Resource Management Group proposes to use the proprietary Ag-Bag CT-5 EcoPOD for this project. This "closed vessel" system minimizes many of the common objections to composting – odor, source of pathogen vectors, and leachate generation. It also requires less material handling in the course of the complete composting operation than "open" systems.

To take advantage of this material handling benefit a single piece of equipment, with attachment, is utilized for all loading, mixing and material movement functions. The Publix provided baseline of 12,600 pounds/week translates into a volume of approximately 25 cubic yards per week using the generally accepted value of 500 pounds/cubic yard as the specific weight for mixed food wastes.

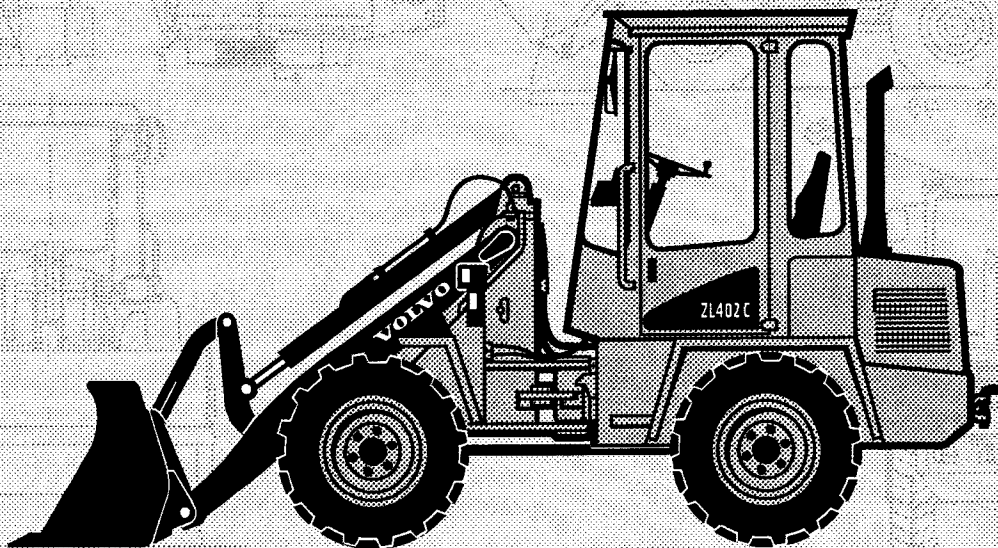
With an anticipated three collections per week, each incoming process increment consists of 8 cubic yards. In the process, this volume of food waste is mixed with an equal volume of shredded yard waste. The combined 16 cubic yard volume can be handled by a small skid-steer or articulated loader ½ to 1 cubic yard capacity.

The small loader (Volvo Compact Wheel Loader ZL402C or equivalent) would utilize an available bucket-mixer attachment (ALLU Versatile Attachment or equivalent) to achieve the mixing function rather than additional equipment. With all operations considered, multi-purpose utilization of the small loader should still be well below 100% of time available. This will allow for unanticipated operational requirements or some growth in planned initial capacity.

Only a finished product screen (Morbark trommel or equivalent) and a truck for transport of input food and output compost should be required in the way of additional powered equipment.

VOLVO COMPACT WHEEL LOADER

ZL402C



- **Gross Power:**
SAE J1995 28/38 kW/hp
Net Power:
SAE J1349 27/37 kW/hp
- **Operating Weight:**
3.4 - 3.5 t
7,500 - 7,630 lb
- **Bucket Capacities:**
0.5 - 1.0 m³
0.7 - 1.3 yd³
- **High-performance, low environmental impact diesel engine:** quiet, low emissions, economical fuel consumption.
- **Hydrostatic drive with significant advantages:**
 - Easy to operate due to automatic drive facility.
 - Maintains high drawbar pull even when working hydraulics are engaged.
 - Advantageous hydrostatic brakes, wear-free and safe.
- **Powerful parallel loader linkage** for excellent loading-fork lifting ability.
- **Operator-selected 100% differential lock** on both axes to give optimum traction.
- **Standard hydraulic quick change attachment bracket:** Various tried-and-tested attachments for a wide range of applications.
- **Purpose designed cab comfort:**
 - Audio-visual warning system for monitoring operating systems
 - Multi-function lever.

VOLVO

WASH
DOWN
THE
SIDE



ALLU Versatile Attachment. A unique solution for fast and effective processing of different materials.

The ALLU SM Versatile Attachment concept came from the idea to develop an attachment for loaders/excavators that would screen, crush, mix and pulverize as many materials as possible.

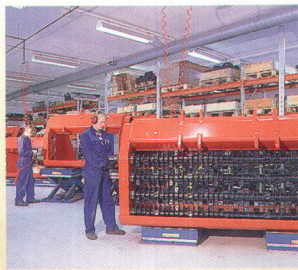
The reliability, versatility, easy maintenance and cost effectiveness are the reasons that make the ALLU attachment special.

Our ideas, continuous product development, and our thousands of machines worldwide, are things that I am genuinely proud of.



A handwritten signature in black ink, appearing to read 'Markku Jönköping'. The signature is stylized and fluid.

Markku Jönköping



Numerous ALLU applications worldwide



1. Screening of peat e.g. separation of stumps from fuel peat.



2. Aeration of sludge and other compost speeds up the composting process.



3. Bio waste and a bulking agent can be crushed and mixed in one step.



4. Pre-screening, aerating and loading directly

The wide ALLU-product range can be easily installed on almost any base machine, creating an effective screening/crushing unit, which can replace expensive specialized machinery. Here you will find some applications.



5. Construction waste can be screened and crushed.



6. Screening of aggregate back into the pipe ditch speeds up the filling process.



7. ALLU separates the fine from oversized materials.

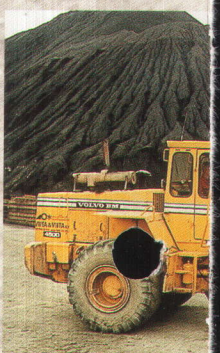
How Does

The ALLU attachment is operated by the backhoe/wheel loader operator. The ALLU is attached to the backhoe/wheel loader via a quick coupler.

The ALLU is an attachment that replaces the bucket of the backhoe/wheel loader. In place of the bucket, the ALLU is attached with hammer discs with hammer material. After loading



8. Screening and



9. Pulverization of



It Work

ent is designed for hydraulically
ines such as skidsteers,
loaders and excavators. The
o the host machine by a bracket

attachment, which is installed in
o either a loader or excavator.
ottom, the ALLU has rotating
mers that pulverize and size
ading the bucket, the operator

activates the auxiliary hydraulic controls, which
rotate the drums breaking up soft materials and
screening fines out by gravity. Once all fines have
come out, the operator dumps the oversized to
another location. The cycle is fast, reliable and
extremely cost-effective. Variable speed and
direction, forward or reverse, are controlled by
the hydraulic oil pressure provided by the host
machine carrier and operated by a joystick (3rd
valve) in the cab of the machine.



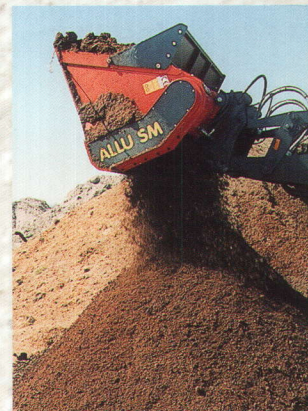
pulverizing of any soil.



f frozen soil or materials in the



10. Stabilization of clay and contaminated soil.



11. Easy way to make
different soil mixtures.



12. Crushing of glass.



13. Crushing of lightweight
concrete.



14. Crushing of bark.

The ALLU Versatile Attachment can be adapted according to the material at hand.

1. Perforated Extra Screens

Extra screens are one of the ALLU Attachment accessories, which are available in different sizes. The screens are used for fine screening of dry materials such as soil or peat. The screens are also used when pulverizing e.g. glass.

3. Adapters /

All ALLU models come with basic plates.

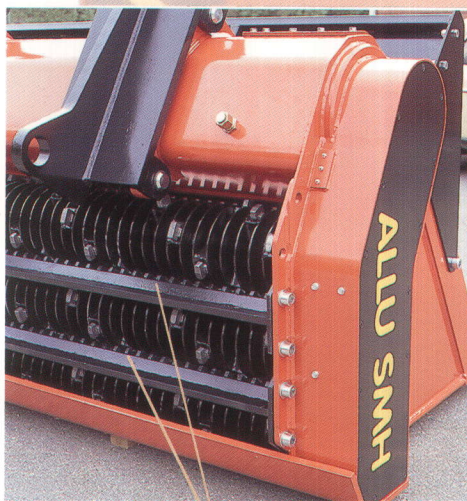
Adapter or basic plate for wheel loaders

Adapter or basic plate for excavator



2. Crushing Bars

The crushing bars are mounted between the drums when additional crushing effect is needed e.g. crushing bark.



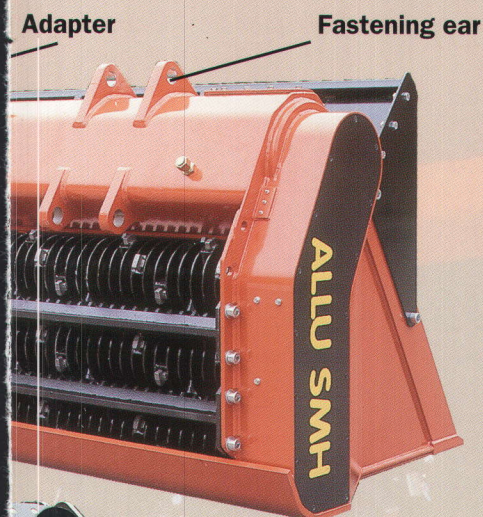
4. Extra Sides

The extra sides are mounted when additional bucket volume is required. When mounted on a wheel loader the extra sides also function as an effective splash guard. The bucket volume

Drums

Basic Plates

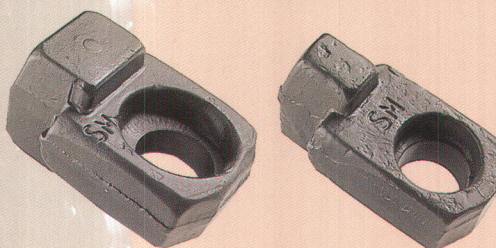
with fastening ears for adapters or



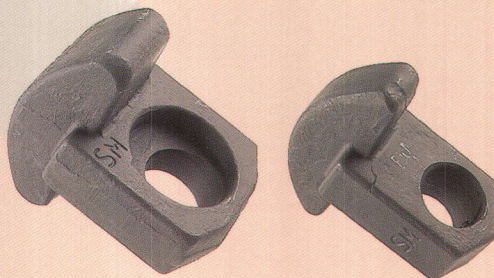
When designing the ALLU Screener Crusher, one of the most important criteria has been the easy maintenance and interchangeability of the wear parts. The unit comes with either 60 mm or 40 mm drum disc spacing. Also specially designed drums for stabilization of contaminated soil and processing of wet compost are available upon request.

Hammers

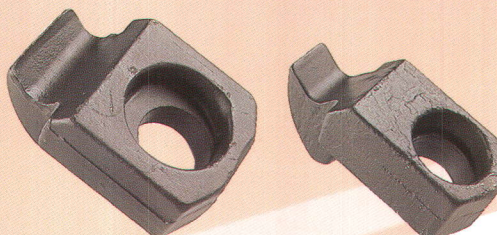
The hammers are manufactured by forging. The high wear resistance of the hammers is the result of this manufacturing method. The rigidity of the hammer is approximately 600 HB.



60 mm and 40 mm standard hammers. The most common type of hammer, because it is applicable for almost any type of operation. This hammer type has more crushing power than the oval hammer.



60 mm and 40 mm oval hammer. This hammer is used when processing materials that have a high stone content e.g. moraine.



60 mm and 40 mm axe hammer. This hammer is used when processing materials that require additional shredding e.g. bio waste and bark and municipal solid waste.

Listening to customer needs and putting a lot of effort into product development, are the reasons why ALLU has been the market leader in its field for 10 years.

ALLU

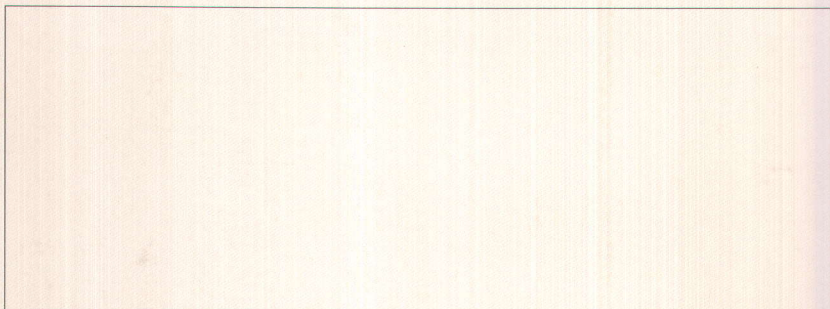


At your service:



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Home Page: www.allugroup.com

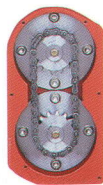


**ALLU is patented worldwide.
ALLU products are manufactured
by Ideachip Oy, Finland**

Light SML



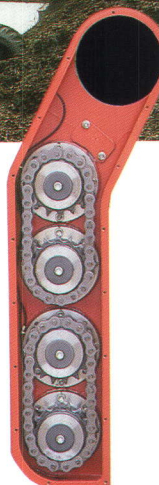
- light construction
- small base machines
- light applications
- screening of soil
- landscaping
- screening of peat



Standard SM



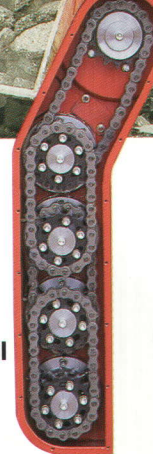
- strong construction
- middle sized and large base machines
- heavy applications
- screening of topsoil
- stabilization
- processing of compost
- crushing of bark
- crushing of glass
- also the SML applications



Heavy Duty SMH



- heavy duty construction
- large base machines
- very heavy applications
- processing of contaminated soil
- crushing of lightweight concrete
- crushing of glass and bricks
- processing of black top
- also the SML & SM applications.



Model SM	Base Machine Recom. 1000 LB	Volume ISO/SAE CU. YD.	Weight 60 mm Drums LBS	Hydr. Recom. GPM	Screening Area SQ.YD.	Hammers per bucket		Width IN.	Power Continuos/ Peak KW
						60 mm Drums	40 mm Drums		

SKID STEERS AND TRACTORS (ALSO FOR 10.000-18.000 LB. BACKHOE LOADERS)

SML 2-12	3-4	0,50	840	8-16	0,7			59	20/37
SML 2-17	4-11	0,75	1100	8-16	0,9			80	20/37

15.000 - 75.000 LB. EXCAVATORS

SM 2-12	28-33	0,85	2460	21-35	0,8	32	44	59	50/60
SM 2-17	35-48	1,20	3040	21-35	1,2	48	68	80	50/60
SM 3-12	34-46	1,30	2950	29-44	1,2	48	66	59	60/70
SM 3-17	48-55	1,80	3650	29-44	1,6	72	102	80	60/70
SM 4-12	46-55	1,70	3500	29-44	1,5	64	88	59	60/70
SM 4-17	55-66	2,50	4290	37-55	2,1	96	136	80	60/70
SMH 3-12	47-56	1,30	3800	43-68	1,2	48	66	59	100/120
SMH 3-17	56-66	1,80	4600	43-68	1,6	72	102	80	100/120
SMH 4-12	56-66	1,70	4400	43-68	1,5	64	88	59	100/120
SMH 4-17	62-75	2,50	5400	43-68	2,2	96	138	80	100/120

15.000 - 51.000 LB. WHEEL LOADERS

SM 2-12	13-20	0,85	2460	21-35	0,8	32	44	59	50/60
SM 2-17	15-22	1,20	3040	21-35	1,2	48	68	80	50/60
SM 2-23	20-26	1,60	3586	21-35	1,5	64	92	101	50/60
SM 3-12	16-22	1,30	2950	29-44	1,2	48	66	59	60/70
SM 3-17	20-26	1,80	3650	29-44	1,6	72	102	80	60/70
SM 4-12	20-26	1,70	3500	29-44	1,5	64	88	59	60/70
SM 4-17	24-31	2,50	4290	37-55	2,1	96	136	80	60/70
SM 3-23	24-31	2,50	4500	37-55	2,1	96	138	101	60/70
SM 3-27	28-35	3,00	5050	37-55	2,5	114	162	117	60/70
SM 4-23	28-35	3,20	5070	37-55	2,7	128	184	101	60/70
SM 4-27	33-44	4,00	6000	37-55	3,2	152	216	117	60/70
SMH 3-17	25-31	1,80	4600	43-68	1,6	72	102	80	100/120
SMH 4-17	29-35	2,50	5400	43-68	2,1	96	136	80	100/120
SMH 3-23	29-35	2,50	5530	43-68	2,1	96	138	101	100/120
SMH 3-27	33-44	3,00	6300	58-88	2,5	114	162	117	120/140
SMH 4-23	33-44	3,20	6500	58-88	2,7	128	184	101	120/140
SMH 4-27	40-51	4,00	7420	74-110	3,23	152	216	117	120/140

ALLU SML-series



The SML – series has a light construction in order to be suitable for small loaders.

The SML – series have drums with unchangeable hammers.

The SML – series is designed for tractors, skid steer loaders and excavators under 7 tons. This model can also be fitted on backhoe loaders.



ALLU SML mounted on a small wheel loader



ALLU SML mounted on a backhoe loader



ALLU functions well in demanding conditions.



Managing Director Valto Tikkanen
Hyvinkään Tieluiska Oy

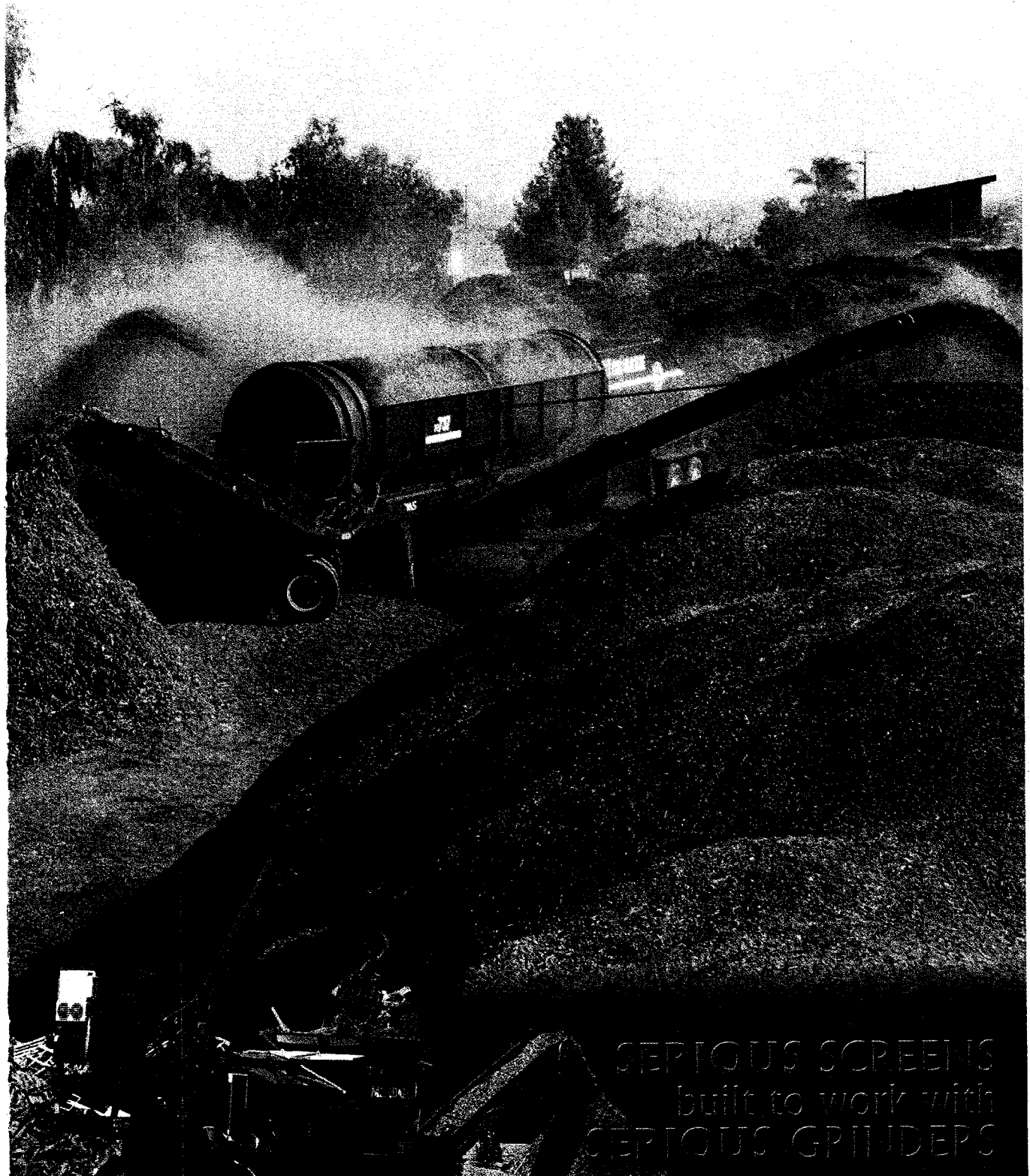
Our company has operated in the demanding Finnish market for dozens of years. During this time, the biggest influence and change to our existing working methods has come from the ALLU Versatile Attachment.

The ALLU Attachment made it possible for us to handle difficult materials in a way that previously was not possible. We process contaminated soils, stabilize soft bulk and we mix, blend and crush different materials for composting purposes with the ALLU bucket. We also use the ALLU Attachment on all our landscaping job sites. On most job sites the ALLU Attachment replaces expensive specialized machines that are difficult to transport.

We get a wide variety of materials on our numerous job sites. We process these materials with the ALLU Attachment for re-use on the job site or for transportation to another job site or depot. Previously most of this material was handled as waste material which resulted in high waste material costs.

The strong construction, the high capacity and the low operating costs have made the ALLU into an investment that has paid back itself in a short period of time. The ALLU Attachment will be an essential part of our equipment fleet in an ever more demanding market.

S E R I E S II
TROMMEL SCREENS
from **MORBARK**



SERIOUS SCREENS
built to work with
SERIOUS GRINDERS

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The Composting Council Research and Education Foundation



The US Composting Council Research and Education Foundation

TMECC • Test Methods for the Examination of Composting and Compost
CAP • Compost Analysis Proficiency
STA • Seal of Testing Assurance

The TMECC Project

THE TMECC PROJECT TABLE OF CONTENTS TMECC FOUNDATION TMECC PROJECTS TMECC PROJECTS TMECC PROJECTS TMECC PROJECTS

TMECC provides detailed protocols for the composting industry to verify the physical, chemical, and biological condition of composting feedstocks, material in process and compost products at the point of sale. Material testing is needed to verify product safety and market claims. TMECC provides protocols to sample, monitor, and analyze materials at all stages of the composting process, i.e., prior to, during and after composting to help maintain process control, verify product attributes, assure worker safety, and to avoid degradation of the environment in and around the composting facility.

Standardized methods for testing and evaluating compost quality are needed by compost producers, state regulatory and permitting agencies, compost product marketing specialists, state and commercial testing laboratories, and agriculturalists, horticulturalists, landscapers, and other consumer sectors. Compost and compost blends are subject to extensive interstate transit and use on public and private lands. Compost is produced from a variety of feedstocks and thus provides for beneficial use of a variety of by-products:

- *Food Processing Residuals*—compostable material remaining after fruit, vegetables, grains, nuts, and meat are processed for consumption.
- *Manure and Agricultural By-Products*—originate at racetracks and feed lots, on the farm, and in greenhouses. Farms and greenhouses can typically recycle compostable residuals easily at the site of generation and are valued, but huge quantities of manure generated at racetracks, feedlots, and swine and poultry confinement facilities can pose a severe recycle/disposal problem.
- *Forestry and Forest Product Residuals*—includes bark and sawdust, and fiber fines residue and biosolids generated by the papermaking process. Bark and sawdust can be used in the composting industry as a carbon source with other feedstock material or as a bulking material to increase porosity of the feedstock mix.
- *Biosolids, or Sewage Sludge*—the solid material generated by the biological treatment of sewage at a wastewater treatment plant. In addition to being composted, sewage sludge can be recycled for beneficial use by direct application to land as a fertilizer.
- *Leaves, Brush and Yard Trimmings (Yard Waste)*—typically consists of leaves, brush, grass clippings, plant trimmings, and plant remains. Historically this material has been collected with municipal solid waste and incinerated or landfilled. Many communities now separately collect this "green waste" to be recycled for beneficial use by directing it to a mulching or composting facility.
- *Source Separated Organic Waste (SSOW)*—consists of the compostable and composting compatible fraction of municipal solid waste, accumulated and presorted by the generator, and collected separately from household hazardous material and sometimes non-compostable material. The compostable and composting compatible fraction can be directed to a central composting facility. For example, a generator source separated organic waste compostables collection program

could include material like leaves, brush and yard trimmings, food scraps, wet and soiled paper, diapers and sanitary products, pet waste, and dry paper packaging that is not recycled because of weak or nonexistent markets. Source separated organic waste includes residential, institutional and commercial sources, and can include the domestic portion of the industrial solid waste stream.

Use of standard methods and protocols for sampling, analysis, reporting, and interpretation of test results will promote production and marketing of quality composts that meet a core set of analytical standards. The methods and protocols in the TMECC form the basis for the U.S. Composting Council's grant from the US Environmental Protection Agency to develop a Seal of Testing Assurance (STA) for the commercial composting industry in the United States. Also, the Compost Analysis Proficiency Testing program (CAP) was initiated through collaboration with managers of NAPT to provide the Compost Laboratory Analysis Industry with an inter-laboratory QC program, to develop reference materials, and to measure the performance and reliability of TMECC analytical methods. Representatives of the composting industry in Canada, the European Union, and Japan have expressed support for development of these standards and have indicated their interest in adopting them once the TMECC is published and released in the United States.

Test Methods for the Examination of Composting and Compost:

TMECC is a laboratory manual modeled after American Society for Testing and Materials (ASTM). TMECC provides benchmark methods for compost analysis to enable comparison of analytical results. Each parameter is presented in its own section and generally includes more than one protocol or test method. The manual contains more parameters than might be of concern or interest for a particular situation.

- o Some compost parameters are regulated for the protection of public health, safety, and the environment, while others are product performance attributes that are important for managing specific uses of the product. Other test parameters and their methods are of academic interest for research use.
- o Detailed instruction is presented for sample collection, preparation, analysis and reporting to address all phases of composting, including feedstock and composting process evaluation, and final compost product characterization.
- o Sections are grouped into chapters that cover sampling and sample preparation (02); physical properties (03); inorganic chemical properties (04); organic and biological properties (05); synthetic organic compounds (06); and pathogens (07).
- o Each section includes a brief description of the parameter's function in the composting process, for safety of the product, or in product performance.

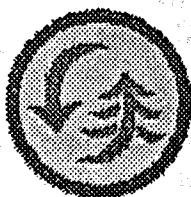
List of Sources

Compost sampling and testing protocols included in TMECC were either provided by individual contributors or adapted for compost analysis from methods in the following reference sources:

- Analytic procedures used in US EPA Report SW-846, Test Methods for Evaluating Solid Waste, 3rd Edition, November 1990, as revised.
- Association of Official Analytical Chemists (AOAC) Official Methods of Analysis, 1990, 15th edition.
- Methods of Soil Analysis, Parts I, II and III. Soil Science Society of America. 1996
- North Central Regional (NCR) Publication No. 221 (Revised). Recommended Chemical Soil Test Procedures for the North Central Region Bulletin No. 499 (Revised) October 1988 "Recommended Test Procedures for Greenhouse Growth Media".
- Standard Methods for the Examination of Water and Wastewater, 18th Edition, 1992.
- The American Society for Testing and Materials (ASTM) Standard Test Methods, 1988.

Audience: Compost producers; regulators; marketing specialists; federal, state and commercial analytical laboratories; and interested consumers.

The Composting Council Research and Education Foundation

US COMPOSTING
COUNCILSeal of Testing
AssuranceSTA Program
Description[HOME](#)[TMECC](#)[CAP](#)[STA](#)

Seal of Testing Assurance (STA) Program Details

PROGRAM
DESCRIPTION

What is Compost?



Compost is the product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and 'processed to further reduce pathogens' (PFRP), as defined by the U.S. EPA (Code of Federal Regulations Title 40, Part 503, Appendix B, Section B), and stabilized to the point that it is beneficial to plant growth. Compost bears little physical resemblance to the raw material from which it originated. Compost is an organic matter source that has the unique ability to improve the chemical, physical, and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer.

■ Compost definition modified from the USCC's "Field Guide to Compost Use"

Key Elements of the STA Program:

1. All enrolled manufacturers or marketers ("Participants") will regularly sample and test their compost products based on production volumes, or as otherwise prescribed by the STA program administrators **for each facility they enroll.**
2. Participants will complete test analyses for the compost properties listed below.** **ALSO**, any and all testing required by applicable State and/or Federal regulation (e.g., pathogens, heavy metals, pesticides, inerts, etc.) to assure public health/safety and environmental protection must be completed **at the frequency so regulated.** It is not necessary to provide laboratory analysis for particle size. The participant must simply report the screen size in which the product passes during screening.
3. All lab analyses will be conducted at 'approved laboratories' which have certified that they are capable of performing the test methods specified in the Program Rules. **A list of approved program laboratories will be made available to Participants and can be found on the USCC website.** Test methods used in the Seal of Testing Assurance program are found in the Test Methods for the Examination of Compost and Composting Manual (TMECC), jointly published by the USDA and the USCC (2002 publishing as a part of the USDA National Resource Conservation Technical Bulletin Series).
4. The Participants, or their compost testing lab, will provide the appropriate lab analyses results (and updated Compost Technical Data Sheet) to the USCC at the prescribed frequency. **This data will not be distributed to compost customers by the USCC.** This responsibility lies solely with the program Participants.
5. All Participants will make test results available to any person, upon request, using

the STA Program's "Compost Technical Data Sheet". The Compost Technical Data Sheet includes directions for product use, a list of product ingredients and analytical test results. **The USCC will not assess whether or not, or to what extent, these directions are appropriate; this is solely the responsibility of the Participant.**

6. A Participant's composting facility must certify that it is in compliance with all applicable local, state, and federal regulations with respect to the certified compost product(s), and it must remain compliant to remain in the STA Program.
7. The USCC will certify an applicant's compost product on the basis of the criteria specified in the "Program Rules", allowing Program involvement with respect to the approved product, and use of the STA Program Logo, promotional opportunities, etc. If a compost manufacturer or marketer represents multiple facilities, the compost product from each individual facility requires separate enrollment in the Program. Where more than one compost product (significantly varied feedstocks) is produced at a given facility, each individual compost product must be enrolled in the Program.

However, products that are simply re-screened or further aged (cured) to produce addition products, are not required to be enrolled separately.

8. Participants will pay an annual STA Program application fee of \$650 per product. Participants who are USCC members will receive an application fee discount of \$150 per product (\$500). This discount reflects the extent to which USCC members' dues underwrite the development and management of the STA Program.
9. Participants have the right to use the STA Program Logo in their promotional activities, with respect to certified compost product(s), as long as they stay compliant with the program rules.

■ Composts produced from yard trimmings, manure, or food residuals may test for pathogens and trace metals at half the required frequency.

Required Customer Information:

Information to be placed on the product bag or literature, or by using the Seal of Testing Assurance's Compost Technical Data Sheet:

1. The Seal of Testing Assurance logo, accompanied by the following written statement:

"This compost product has been sampled and tested as required by the Seal of Testing Assurance Program of the United States Composting Council (USCC). Test results are available upon request by calling (Licensee Name) at (Telephone Number). The USCC makes no warranties regarding this product or its contents, quality, or suitability for any particular use."

2. Directions for product usage.
3. An ingredient statement

Compost Testing Frequency Table:

The initial frequency of testing required by Participants is based on the volume of compost produced annually, per facility:

Compost Quantity

1 - 6250 tons
6251 - 17500 tons
17501 tons and above

Frequency

1 per quarter
1 per 2 months
1 per month

Certified Compost Products will be analyzed for the following properties:

pH

soluble salts

nutrient content (total N, P₂O₅, K₂O, Ca, Mg)

moisture content

organic matter content

bioassay (maturity)

stability (respirometry)

particle size (report only)

pathogen (Fecal Coliform or Salmonella)

trace metals (Part 503 regulated metals)

Getting Started - The STA Program Participant Checklist

- Please contact a program manager for more information.

Links to Related Sites:



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Seal of Testing Assurance

U.S. COMPOSTING COUNCIL • 10000 W. 10TH AVE. • SUITE 100 • DENVER, CO 80202 • (303) 733-1000 • FAX (303) 733-1001 • WWW.USCOMPOSTINGCOUNCIL.ORG

EVALUATING COMPOST QUALITY: What do the test results mean?

Since growing conditions and plant requirements vary, compost users can benefit from information that accurately characterizes the compost products they use. This data can improve the utilization of compost in ways to best meet particular needs and to fit a specific situation. The specific characteristics of a compost product determines how, and in which applications it can be best utilized. Characterization data helps the compost user obtain product that is appropriate for use with their project or application.

What is Compost? Compost is the product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and Processes to Further Reduce Pathogens (PFRP), as defined by the U.S. EPA (Code of Federal Regulations Title 40, Part 503, Appendix B, Section B), and stabilized to the point that it is beneficial to plant growth. Compost bears little physical resemblance to the raw material from which it originated. Compost is an organic matter source that has the unique ability to improve the chemical, physical, and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer. - Adapted from *The U.S. Composting Council's (USCC) Field Guide to Compost Use*.

Pertinent Compost Characteristics

pH • pH is the measure of acidity (or alkalinity), or hydrogen ion activity of a soil or compost (on a logarithmic scale). The pH scale ranges from 0 to 14, with a pH of 7 indicating neutrality. A pH change of 1 unit means a 10-fold increase or decrease of acidity. Most composts have a pH of between 6 and 8. Each specific plant species requires a specific pH range. Based on the amount of compost applied, as well as its pH, its addition can affect the pH of the soil or growing media. Therefore, to estimate the effect, which in turn will affect maintenance practices or system management, pH is a necessary parameter of which to be aware. Soil pH is often adjusted through the utilization of materials such as lime (to raise pH) and sulfur (to lower pH). When liming agents are used in the production of the compost product you use, or are present in the source materials of the compost, it may be more or less appropriate for your specific application (please confer with your compost supplier).

SOLUBLE SALTS (Conductivity) • Soluble salts refers to the amount of soluble ions in a solution of compost and water. The concentration of soluble ions is typically estimated by determining the solution's ability to carry an electrical current, i.e., electrical conductivity. The units of measure for soluble salts are either mmhos/cm or dS/m (they are 1:1 equivalent). Plant essential nutrients are actually supplied to plants in a salt form. While some specific soluble salts, (e.g., sodium, chloride), may be more detrimental to plants, most composts do not contain sufficient levels of these salts to be a concern in landscape applications. Plant species have a salinity tolerance rating and maximum tolerable quantities are known. Excess soluble salts can cause phytotoxicity to plants. Compost may contribute to, or dilute, the cumulative soluble salts content of a growing media or soil. Reduction in soluble salts content can be achieved through thorough watering at the time of planting. Most composts have a soluble salt conductivity of 1.0 to 10.0 dS/m, whereas typical conductivity values in soil range from 0 to 1.5 in most areas of the country.

NUTRIENT CONTENT (N-P-K) • Nitrogen (N), Phosphorus (P, usually expressed as P₂O₅), and Potassium (K, usually expressed as K₂O) are the three nutrients utilized by plants in the greatest quantities, and therefore, are the nutrients most often contained in commercial and retail fertilizers. When purchased in bags of fertilizer, these three nutrients are measured and expressed on a dry weight basis, in the form of a percentage (%). In compost, nutrient content may be expressed on a dry, or wet weight (as received) basis. Knowing the content of these nutrients will help you make correct decisions regarding the addition of supplemental fertilization. Although concentrations of nutrients found in compost are typically not high, in comparison to most fertilizer products, compost is usually applied at much greater rates, and therefore, can represent a significant cumulative quantity. The nutrient content of compost products vary widely; however, biosolids and animal manure based composts typically contain more total nutrition. The use of certain composts may reduce or eliminate the necessity to fertilize certain plants during the first 6–12 months following its application. In general, nutrients found in compost are in an 'organic' form thus released slowly as the compost decomposes. Aside from N, P and K, Calcium (Ca) and Magnesium (Mg) are also monitored in STA Program testing. The content of these nutrients are reported in the STA Compost Technical Data Sheet on both a dry weight basis (just like fertilizers), and on 'as received' or 'wet weight' basis (because composts contain a much higher amount of moisture, than do fertilizers).

ORGANIC MATTER • Organic matter content is the measure of carbon-based materials in compost. Organic matter content is typically expressed as a percentage of dry weight. Organic matter is an important ingredient in all soils and plays an important role in soil structure,

nutrient availability, and water holding capacity. Being aware of a product's organic matter content is useful for estimating the age and physical properties of the compost. It may also be necessary for determining compost application rates on certain applications, such as turf establishment and agricultural crop production. In these applications, standard agricultural soil test kits are often used to determine recommended application rates of organic matter. However, these application rates are specified as the quantity of organic matter needed on a per acre basis. Therefore, the organic matter content of the compost must be known in order to convert the suggested application rate into a usable form (tons/acre). There is no ideal organic matter content for compost, and it may vary widely, ranging from 30 to 70%.

MOISTURE PERCENT • Moisture percent (content) is the measure of the quantity of water present in a compost product; expressed as a percentage of total weight. The moisture content of compost affects its bulk density (weight per unit volume) and, therefore, affects handling and transportation. Overly dry compost (35% moisture, or below) can be dusty and irritating to work with, while very wet compost (55 to 60%) can become heavy and clumpy, making its application more difficult and delivery more expensive. A preferred moisture percent for finished compost is 40 -50%.

PARTICLE SIZE • The way in which compost particle size is measured, and expressed, is typically based on the product's end use. For most applications, merely specifying the product's maximum particle size, or the screen size through which it passes, is sufficient. However, for certain applications, such as golf 'greens' mix or potting media production, a complete particle size distribution may be required. Particle size distribution measures the amount of compost meeting a specific particle size range, by using a series of sieves (screens) to capture compost particles of specific size. A compost product's particle size may also determine its usability in specific applications. For example, a compost product with a maximum particle size of 1/2 inch or greater may not be acceptable as a turf top-dressing, whereas a product with a maximum particle size of 1/4 to 3/8 inch or less could be acceptable. Most composts that are used as soil amendments are screened through a 3/8 or 1/2 inch screen.

MATURITY (BIOASSAY) • Maturity is the degree or level of completeness of composting. Maturity is not described by a single property and therefore, maturity is best assessed by measuring two or more compost characteristics. Some immature composts may contain high amounts of free ammonia, certain organic acids or other water-soluble compounds which can limit seed germination and root development, or cause odor. All uses of compost require a mature product free of these potentially phytotoxic components. The bioassay used in the STA Program uses a seed germination and growth test to measure the percent of seed emergence and relative seedling vigor.

STABILITY (RESPIROMETRY) • Stability refers to a specific stage or state of organic matter decomposition during composting, which is related to the type of organic compounds remaining and the resultant biological activity in the material. The stability of a given compost is important in determining the potential impact of the material on nitrogen availability in soil or growth media, and maintaining consistent volume and porosity in container growth media. Most uses of compost require a stable to very stable product that will prevent nutrient tie up and maintain or enhance oxygen availability in soil or growth media.

INERTS • Man-made inerts consist of materials created by humans and may be a part of the waste stream. These include: textiles, glass, plastic, and metal objects. When put into the composting process, these materials are not decomposed but may be degraded to some extent in physical characteristics, primarily through size reduction. These materials can decrease the value of the finished compost product because they offer no benefit to the compost and, in many cases, are aesthetically offensive. A common means of controlling man-made inerts is to minimize their entry into the waste stream being composted. Control is also accomplished through separation at the source during feedstock recovery at the composting facility, or during product refinement, (e.g., screening, ballistic separation). Other 'non' man-made inerts, such as stones, rocks, twigs, may also be found in compost and are considered to be aesthetically offensive.

TRACE METALS • Trace metals are elements whose concentrations are regulated due to the potential for toxicity to humans, animals, or plants. Regulations governing the heavy metal content of composts derived from certain feedstocks have been promulgated on both the State and Federal levels. Similar limits have even been developed for fertilizers and certain other horticultural and agricultural products. Specific trace elements, often referred to as heavy metals include arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc. The quantity of these elements are measured on a dry weight basis and expressed as mg/kg (milligram per kilogram) or ppm (parts per million). Many of these elements are actually needed by plants for normal growth, although in limited quantities. Therefore, measuring the concentration of these elements, as well as other plant nutrients, can provide valuable management data relevant to the fertilizer requirements of plants and subsequent fertilizer application rates. Certain heavy metals and trace elements are also known to cause phytotoxic effects in plants (when available in very high quantities), and specific plant species are known to be more sensitive than others. These elements include boron, manganese, molybdenum, nickel, and selenium. However, these elements are not typically found in compost in detrimental quantities. All composts that contain regulated feedstocks must meet national and/or state safety standards in order to be marketed.

WEED SEED AND PATHOGENS • Pathogens are disease causing organisms including, bacteria, viruses, fungi, helminths, and protozoa which may be present in raw wastes or by-products. Both plant and human pathogens are found in living organisms and are present at some background levels in the environment. Therefore, the composting process must eliminate or reduce pathogens to a level that is below the threshold where the danger of transmitting diseases will occur. Weed seeds and pathogens are inactivated or destroyed by elevated temperatures over a period of time within the composting process. The time-temperature relationship used as the Process to Further Reduce Pathogens effectively destroys weed seeds and pathogens in compost. The time-temperature requirement ensures plant and human pathogen destruction in compost, and is considered an effective means to determine that compost is relatively weed free.

For additional information, or numerical test analysis data regarding any of these compost characteristics, ask your Seal of Testing Assurance compost supplier.

Links to Related Sites:

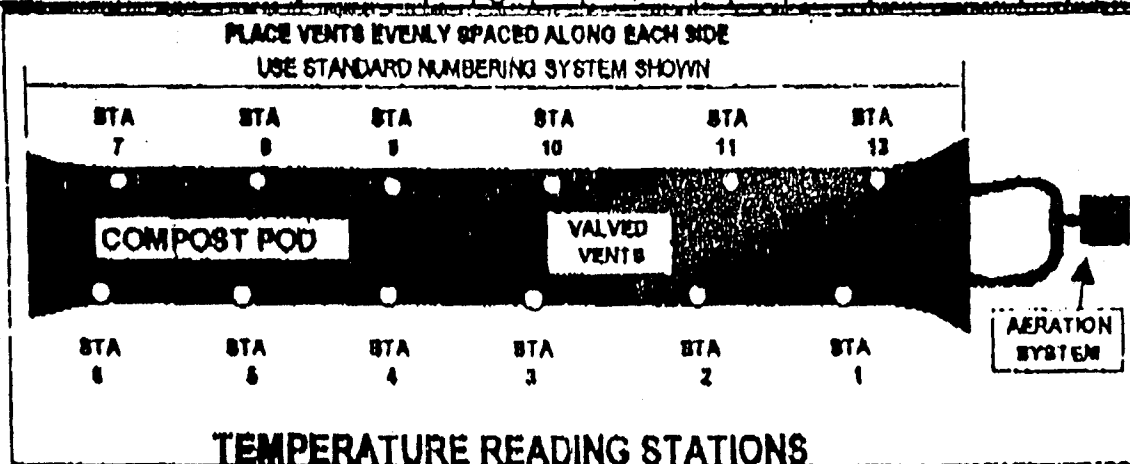
© 2001 CCREF · 11/12/2001 11:57:54 -06 GMT

Ag-Bag Temperature Recording Worksheet (Sample)

BAG NUMBER: 42
 DATE STARTED: 10-12-01
 BLOWER SETTING: _____ HRS/DAY
 NO. OF TIMES ON/OFF: _____ PER DAY

WEEK NUMBER: _____
 FILLED BAG SIZE: 10x200
 MATERIAL TYPE: Cow manure
Sawdust

Date		10-19	10-25	11-7	11-16	11-27	12-5	12-13
Time		11:00 AM	2:00 PM	10:45 AM	11:30 AM	10:00 AM	10:00	12:20
Temp		26°F						
	<u>3/25</u>							
1	<u>105</u>	140°	153	156	155	153	150	140
2		151	159	155	153	150	149	144
3		130	161	162	151	141	141	139
4	<u>106</u>	131	156	160	158	151	144	142
5		140	148	152	150	149	142	141
6	<u>125</u>	132	144	154	151	148	143	145
7		161	148	149	147	125	140	144
8		170	160	156	150	152	141	141
9		157	158	157	157	154	145	138
10	<u>123</u>	166	160	158	156	154	150	142
11		150	156	160	160	158	152	140
12		120	154	159	155	148	146	144

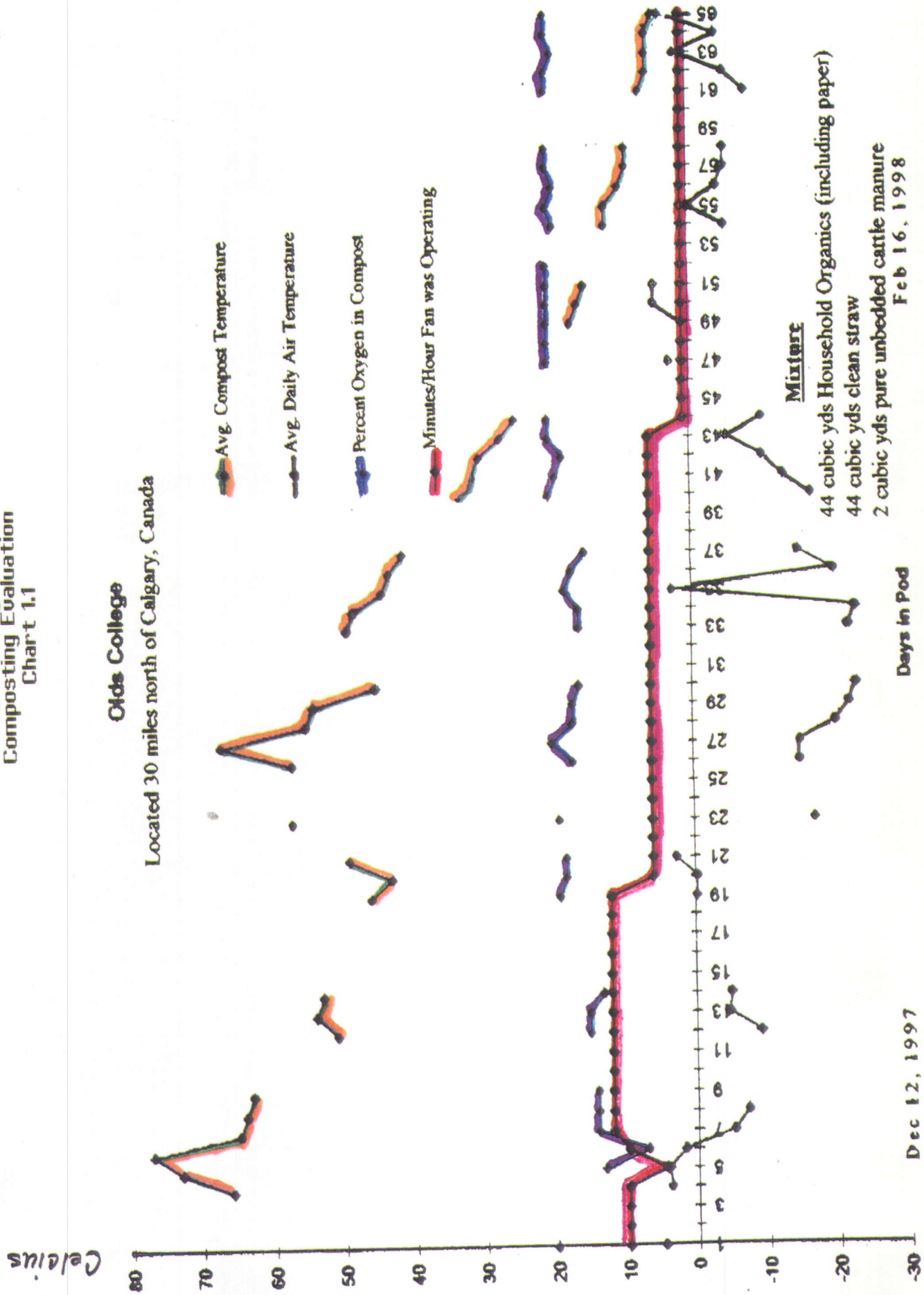


REMARKS

Ag-Bag EPOD
Composting Evaluation
Chart 1.1

Olds College

Located 30 miles north of Calgary, Canada



Dec 12, 1997

Days in Pod

Mixture

44 cubic yds Household Organics (including paper)

44 cubic yds clean straw

2 cubic yds pure unbedded cattle manure

Feb 16, 1998

Ellie Gibeau

From: Dale Mickle [dmickle@ag-bag.com]
Sent: Friday, April 05, 2002 3:34 PM
To: egibeau@recyclesmart.com

.TO: Ellie
FROM: Dale Mickle
Ag-Bag Environmental

The composter with the most experience in the U.S. composting food waste using the Ag-Bag system is:
B & J Sanitary Landfill
Greg Pryor. Landfill Manager
6426 Hay Rd.
Vacaville, Calif. 95687
Compost's 150 tons per day of food waste mixing an additional 150 t.p.d. of carbon amendment

All past Florida composting projects completed using the Ag-Bag Environmental composting system.

Successful Test project using biosolids mixed with wood chips
done summer of 2001

University of Florida
Ph.D., Monica Ozores-Hampton
Research Associate
Institute of Food And Agriculture Sciences
S.W. FL. Research & Education Center
2686 State Road 29 North
Immokalee, FL. 34142-9515
941-658-3400

Successful Test project using potting industry flower, soil blend, potting mix, waste mixed with ground wood chips.
Project done summer of 2000

Univ. of Fla.
H. H. Bryan
Professor, Horticulturist
Inst. of Food & Ag. Services
18905 SW 280 Street
Homestead, FL. 33031-3314
305-246-7001 X 280
305-246-7003

Successful Test project done at the Okaloosa County Landfill with materials from Eglin A.F.B. using pre/post consumer commissary food, C & D, waxed/regular cardboard, paper waste. Done summer of 2000.
Finished compost was used as organic soil amendment on local farmers peanut fields.

Eglin Air Force Base
University of

Okaloosa County Landfill

Florida
AFDTC/EMCP
R.
Edmondson
501 DeLeon St., Suite 101
Okaloosa
Co.Cooperative Ext.
Eglin, Fl. 32542-5133
Old Bethel Rd.
850-882-6282

In conjunction with

Jim Reese

& Gerald

Recycling Coordinator

Fort Walton Beach, Fla.

5479

850-689-5774

689-7867

Successful project using food, biosolids, wood, animal manure/bedding waste.
Done summer of 1999.

Reedy Creek Energy Services At Walt Disney World

David Wright

Solid Waste and recycling

2151 Bear Island Rd.

P.O. Box 10000

lake Buena Vista, Fl. 32830-1000

407-824-5275

Industry Case Studies

Study #1: Hannaford Bros. Company - Scarborough, Maine

Retailer

Hannaford Bros. operates 95 supermarkets in Maine, Vermont, New Hampshire, New York, and Massachusetts and is headquartered in Scarborough, Maine. Over 40 stores are collecting organic waste for composting.

Benefits

- ▼ Overall lower waste costs after program is fully implemented
- ▼ Employees gained sense of pride and responsibility
- ▼ Enhanced corporate image

Challenges

Regulatory Issues

- ▼ State permits can take years to issue
- ▼ Lack of communication between state and private sector caused start-up delays

Operational Issues

Getting Started

- ▼ Long process involved to secure qualified composters
- ▼ Increased labor cost required for sorting
- ▼ More frequent pick-ups required, increasing cost
- ▼ Overcame human reluctance to change
- ▼ Developed open and continuous dialogue with regulators
- ▼ Utilized composting experts prior to getting started
- ▼ Negotiated and finalized contracts for haulers and composters separately
- ▼ Developed specific responsibilities for all parties
- ▼ Involved composter and hauler in employee training sessions
- ▼ Obtained a total management commitment

Program Evaluation

- ▼ Ensured potential cost-savings by auditing entire program monthly
- ▼ Reported savings/findings to all participants

Where To Go From Here

- ▼ Evaluate alternative pick-up points or schedules to further minimize hauling costs
- ▼ Promote the program illustrating concept and environmental benefits, not economic benefits
- ▼ "Close the loop" by selling compost when public awareness matures
- ▼ Purchase composted material for store landscaping
- ▼ Integrate with smaller waste generators

Industry Case Studies

Study #2: Wakefern Food Corporation - Elizabeth, New Jersey

Retailer

Wakefern Food Corporation operates 180 stores in four states and is headquartered in Elizabeth, New Jersey. Wakefern has been interested in composting for five years and implemented a one-store program in 1992 which continued until compost operator lost permit. In September 1993, Wakefern re-started with an advanced composting program.

Benefits

- ▼ Qualified haulers and composters are readily available
- ▼ Fifty percent reduction in waste removal cost
- ▼ Employee support of program
- ▼ Positive customer relationship opportunities

Challenges

Regulatory Issues

- ▼ Limited number of compost sites in New Jersey

Operational Issues

- ▼ Cost-effective handling on non-compostable waste
- ▼ Development of efficient collection and transportation system
- ▼ Employee training
- ▼ Contact, visit, lobby state department officials
- ▼ Have established internal environmental position
- ▼ Develop "what's in it for me" benefits for composters and haulers

Getting Started

Program Evaluation

- ▼ Believe "economics" are right
- ▼ Results must be more than marginal to continue
- ▼ Employees and customers strongly believe in program
- ▼ State recently changed the classification of food organics from solid waste to recyclable material

Where to Go From Here

- ▼ No reporting or system changes have been required
- ▼ Dealing with state regulators to move ahead
- ▼ Prepare/publish results of New Jersey Audubon test
- ▼ Integrate small waste generators into program
- ▼ Create "milk run" collection distribution system

Industry Case Studies

Study #3: Larry's Markets, Inc. - Seattle, Washington

Retailer

Larry's Markets is a five-store chain in the Seattle, Washington area. Larry's has been involved in composting since 1991. Compostable tonnage has increased from 30 tons in 1991 to a 500-ton estimate for 1993. Program began as a result of an environmental audit.

Benefits

- ▼ Thirty-three percent savings realized in waste removal costs
- ▼ Met the 50% recycling goal for 1995 set by the state
- ▼ Reduced water usage by 250,000 gallons annually

Challenges

- ▼ Hauling operations was biggest challenge
 - ◇ Evaluating/selecting correct containers, issues are water and its added weight to container and leakage
 - ◇ Experienced minor problems with inert contamination and under-utilization of containers

Getting Started

- ▼ Developed the source separation and collection system
- ▼ Coordinated hauling and composting services
- ▼ Produced employee training video

Industry Case Studies

Study #4: H.E. Butt Grocery Company - San Antonio, TX

Retailer

H.E. Butt is a chain of 223 grocery stores, headquartered in San Antonio, Texas. They have developed a program and are testing it in two stores. H-E-B has expressed an interest in developing a "zero waste" store concept.

Benefits

- ▼ Avoidance of higher future tipping fees
- ▼ Vertical integration of waste (bakery plant and store bakery department)
- ▼ Reduced waste water cost
- ▼ Employee participation
- ▼ Conservation principles practiced in other areas

Challenges

Regulatory Issues

- ▼ Lack of state regulations, H-E-B developed proposed regulations for state to review
- ▼ Low tipping fees
- ▼ No regional solid waste policy
- ▼ Private ownership of major landfills

Operational Issues

- ▼ Lack of qualified composters particularly in rural areas
- ▼ Developing accurate composting information
- ▼ Finding effective method for hauling high liquid content waste
- ▼ Extreme weather/climate
- ▼ Employee training
- ▼ Incremental labor cost
- ▼ Selecting proper containers

Getting Started

- ▼ Spent years dealing with state regulators, providing relevant reports and test results
- ▼ Focused on finding established/successful composters
- ▼ Efforts aimed at use of a cost-effective, efficient, low-risk logistical and transportation system for compostables

Program Evaluation

- ▼ Little progress since program has begun
- ▼ Target is break-even cost
- ▼ Continue to address handling cost vs. alternatives
- ▼ Developed a "partner share" incentive program for employee participation
- ▼ No report or system changes necessary

Where To Go From Here

- ▼ Finalize compost guidelines and receive state approval
- ▼ Continue use of in-store programs to reduce tonnage

Food waste

The site area was prepared for the arrival of the New York D.E.P. At approximately 11:00 on Friday, October 29, various state officials arrived including the New York State grant analyst and approval person, a representative from the New York Division of Solid and Hazardous Materials, a representative from Division 3 D.E.C., and the farm's environmental consultant.

The officials walked around the unopened PODs and examined the plastic material for damage or rodent punctures. The third POD was cut open and the degradation of the feed stocks was inspected. A loader harvested approximately 25 feet of the completed end of the third POD. At this point, the material was processed through a screen and had an excellent appearance.

Next, PODs one and two were opened and 15 feet of the finished end of each POD was harvested. The officials appeared impressed and began discussions on getting the farm approved to use the ABE system.

The Division 3 D.E.C. representative stated she observed no problems with the ABE system and would submit a favorable report to her supervisor, the number one contact in the D.E.P. for the state of New York. She also stated she would return in two weeks to re-examine the cured material.

The officials were on site for approximately two hours, after which the remaining material in all three PODs combined was harvested (an estimated 600 tons). The material was made into one windrow and two pyramid curing piles. The material would still be turned as it was presently generating temperatures over 100 degrees.

The material in the third POD, which was the driest, appeared to be the most thoroughly composted and had no odor while harvesting. The first and second PODs, which were filled at a higher moisture, were not as completely composted or mature, as small amounts of partially decomposed foods were visible. Mild odor was apparent during the harvest of these two PODs.

Overall, the farm views the ABE system as the solution to continue taking food waste, which is their most profitable incoming feed stock. This feed stock is also vital to produce the quality retail compost and soil mixture that they market. The farm plans to purchase the ABE system once the D.E.C. grants a minor amendment. This grant is expected by the end of the year.

The project was viewed as a success. The more rough bulking in the feed stock mixture going into the POD, the more completely composted is the end product. The same can be said for maintaining the total moisture content at 45 percent. The rotor-style encapsulator also gives an additional "mix or blend" to the feed stocks, further combining the feed stocks, bulking, and bacteria.



2320 SE Ag-Bag Lane
Warrenton, OR 97146
503-861-1644
800-334-7432
503-861-2527 - fax
compost@ag-bag.com - email
<http://www.ag-bag.com>

Foodwaste

The date is February 2, 1999 and the location is Charlottesville, VA. The CG-610 was assembled in a couple hours. There was very little cardboard available to dry down the mixture to be composted. The waste streams composted were primarily rice with peas and carrots in the mix. There was already a 40-yard container (approx. 2-3 full) and a 20-yard container full when it was mixed with 50/50 wood waste. Ground wood waste was abundantly available. The food waste and wood waste were blended 50/50. Cardboard was blended in, as approximately 25% of the overall mixture, as it became available when they had personnel to operate to operate the shredder. The waste streams were blended in a Knight tractor powered wagon-type mixer and off-loaded the Knight mixed product into the CG-610 machine.

The first day no product was bagged due to manpower and cardboard shortage. On the second day, approximately 10 feet of the of the POD was filled. On the third day, another 10 feet was filled. On the fourth day, 15 feet was filled, using the remaining amount of material, after which the POD was sealed. A total of 35 feet of POD was filled.

Maintenance of the CG-610 was demonstrated and explained to the site manager, including how to seal the POD, install the aeration system and set the aeration timer. Also, how to maintain the POD if it became damaged, how to take temperature reports and how to complete the temperature report. Information was also provided on how and whom to get in touch with at Ag-Bag for questions, recipe adjustments or to order components. The pad was asphalt and sized approximately 150ft w x 6-700ft L with a cyclone fence around it. The pad had a tremendous percentage of grade, 6%, which made it difficult to compost on since power was only installed along one fence line so far. This required that the encapsulator be operated downhill powered by an approximate 100 hp 4x4 tractor. This, in turn, created a situation of a lot of pull by a heavy tractor as we were bagging. Additionally, the encapsulator had touchy brakes, since it was new, and the brake pads were a little rusty creating a hold-and-release situation. This created a lumpy POD and the POD had "camel humps" on top. After installing the vent valves, the POD displayed appropriate aeration. Since determining aeration, the lumpy characteristics of the POD would not negatively affect the composting process.

Overall, the project was successful. All personnel were both impressed and satisfied with the project start-up.

THE B&J Composting Facility in Vacaville, California has cut its composting and materials handling teeth on one of the largest organics diversion programs in the country — servicing the City and County of San Francisco's commercial and residential organics collection program. The operation, which is owned by Norcal Waste Systems, a regional solid waste company in the Bay Area, is located on the same site as a landfill and a wood recovery operation (both operated by B&J as well). And what started out as a 50 tons/day yard trimmings composting site has turned into a facility permitted to handle 300 tons/day of feedstocks.

Norcal Waste Systems is the franchised hauler in the Vacaville area, collecting garbage and taking it to the B&J landfill. To comply with California's recycling law, AB 939 (mandating 50 percent diversion by 2000), Vacaville encouraged B&J to start a yard trimmings composting operation, which was permitted in 1995.

From the outset, the decision was made to compost yard trimmings in Ag Bags (essentially aerated static piles enclosed in long plastic bags). "Originally, the enclosed method was selected to accommodate the relatively harsh site conditions, but it also provided a real comfort level to the permitting authorities as we moved into the food waste programs," says Chris Choate, manager of B&J's composting operation. "One of the conditions we have to deal with is that 80 percent of the time, the wind blows ten to 20 miles an hour and in the summer months, we get temperatures well over 100°F so a lot of evaporation is going on. Our water supply is about a half-mile away, so we have to truck it in when we need it, which is a tremendous cost. We also compared the labor involved in running a windrow operation versus an enclosed system, and felt there was more labor involved with windrow management during the active composting phase."

Based upon the results from a pilot study, B&J expanded its permit in 1996 to process all food material including pre and postconsumer residuals. "Adding food waste in concert with the enclosed system allows B&J to dramatically reduce moisture addition to the compost, which is often one of the higher operating costs in Western composting operations," says Matthew Cotton of Integrated Waste Management Consulting in Nevada City, California, who provides technical assistance to B&J.

WORKING WITH SAN FRANCISCO

In 1998, B&J was approached by the City and County of San Francisco recycling office about receiving material from its commercial organics diversion program. The city's program got underway in 1996, collecting nonedible produce from the San Francisco Food Bank. That material was taken to a composting facility in the Oakland area. "We were looking for a facility that could

GROWING WITH THE FLOW

FLEXIBLE PROCESSOR SIMPLIFIES COMMERCIAL ORGANICS DIVERSION

Like any composter, B&J prefers receiving a clean separated stream. But its operators also know that having the capability to handle contamination is of great value to the collection programs it serves.

take all food residuals — pre and postconsumer," says Jack Macy, San Francisco's organics recycling coordinator.

Being able to take materials to B&J enabled the hauler servicing the commercial organics collection route, Sunset Scavenger (also owned by Norcal), to expand. By the end of 1998, the company had close to 180 businesses in the program, including produce wholesalers, supermarkets, juice bars and restaurants. (See "San Francisco Expands Commercial Organics Recycling," February, 1999.) Because it receives a subsidy via additional rate funding from San Francisco, Sunset Scavenger can offer participating businesses a lower rate to source separate food residuals and soiled paper and corrugated from noncompostable organics. This results in a cleaner stream.

The composting operation receives about 60 tons/day of food residuals, which are composted with ground wood and yard trimmings.



A windy site and hot summer temperatures led to the decision to compost feedstocks in aerated bags. After 60 days, the compost is cured in windrows, then put through two screens (inset) to maximize contaminant removal and improve product quality.



Golden Gate Disposal, San Francisco's other hauler, had an existing commercial organics collection route that it inherited from a hog

cisco programs are taken to a transfer station operated by Norcal, then put into transfer trucks. At B&J, incoming material is unloaded on a paved tipping pad. (The large transfer trucks are unloaded using a truck tipper.) Large contaminants are removed, and workers slice open any bags. (Sunset and Golden Gate collect materials in wheeled carts to minimize the amount of material put in plastic bags.)

"We've run a demo using a trommel to separate contaminants from the ground food residuals and it appears to be effective."

farmer. (Golden Gate is owned by Norcal as well.) After looking at various options for the food residuals, Golden Gate started taking the material to B&J. Early in 1998, Golden Gate set up an experimental route to service large volume produce generators in San Francisco. This stream is more mixed, with visible plastic and other nonorganic material. Unlike Sunset, Golden Gate does not get any additional monies to enable it to offer generators a lower rate incentive to source separate. Golden Gate sent a load to B&J to test processing of this mixed organic stream and B&J found it could compost it effectively and separate out contaminants (although it prefers the cleaner stream).

"It has been a big advantage to us to work with a processor who has the capability to handle not just a real clean stream but a higher level of contamination," says Macy. "The more flexibility a processor has to take in different kinds of streams, the more flexibility it gives the hauler and the city to target different kinds of generators. At the same time, we are very aware that the cleaner the material is, the better it is for the processor, so we are always looking to maximize source separation. But the reality is that with the density and different kinds of generators that we have in San Francisco, getting a clean stream is very hard. Knowing we have flexibility on the processing end is good. B&J has had to draw the line sometimes, but they are willing to be flexible."

UPFRONT PROCESSING

Currently, B&J is processing an average of 175 tons/day (five day week basis) of organic feedstocks, including food residuals and yard trimmings. Of that total, about 60 tons/day are food residuals (also on a five day/week operating basis). Total throughput is expected to grow to 300 tons/day or more over the next few years.

Food residuals collected in the San Fran-

isco programs are taken to a transfer station operated by Norcal, then put into transfer trucks. At B&J, incoming material is unloaded on a paved tipping pad. (The large transfer trucks are unloaded using a truck tipper.) Large contaminants are removed, and workers slice open any bags. (Sunset and Golden Gate collect materials in wheeled carts to minimize the amount of material put in plastic bags.) Loads of food residuals are blended with loads of yard trimmings. The combined material is put in a Willibald grinder. (Food residuals from a local prison are added directly to the mix going into the bags.) B&J is changing its upfront processing to go with a larger grinder and initial screening to remove as many contaminants as possible before composting. "Originally, we thought it was better to use a low energy grinder so we wouldn't grind up the bags too much, making it easier to pull the plastics out of the finished product during screening," explains Choate. "That has been working well, but we have more overs that we have to deal with. We are changing to a more versatile grinder, and we'll see if there is an increase in the plastics in the finished product."

B&J is purchasing a Peterson Pacific grinder, and will decrease the grind size it currently uses. The machine also will be used to process wood that B&J receives from a Norcal construction and demolition sorting facility in San Francisco. "The wood fines screened out of the grinder will be blended in with our finished compost and sold as a landscape blend," says Choate. "The overs are sold as boiler fuel."

Another operational change — to be instituted in tandem with the new grinder — is to prescreen feedstocks before composting. "We are considering prescreening the yard trimmings brought in from curbside programs, and then only grinding the overs," he says. "We can't really prescreen the food residuals because we are dealing with a lot of whole fruits and vegetables. We are talking about grinding that organic stream first, then running it through a screen to pull out plastics. Our plan is to blend the unders from the yard trimmings screening with the

ground and screened food residuals and load those into the bags. We've run a demo using a trommel to separate contaminants from the ground food residuals and it appears to be effective."

COMPOSTING PHASE

The composting bags are on a cement pad. B&J worked with Ag Bag to adapt its hydraulic ram loading system to its operation. "We started out with the loading technology used to put silage into the bags," explains Choate. "The equipment has a lot of moving parts, teeth and so forth. Using it to load compost required us to do a lot of maintenance on the equipment. The company developed a hydraulic ram unit that works with its ten foot segment bags."

The moisture content of the mix going into the bags is 50 to 60 percent. Each bag is 200 feet long and is designed to hold approximately 200 tons of material. The blowers cycle on and off following a prescribed regimen. Temperatures are monitored to ensure pathogen reduction. Material remains in the bags for 60 days. The bags then are opened, and the plastic is cut, folded, stored and eventually recycled. The contents of the bags are formed into piles, and the material goes through an additional 30 day curing period which includes some turning and additional monitoring.

B&J is changing its second phase (curing) of the composting operation to do more aggressive windrow management. "We've found that the bag system does a good job of inoculating the food waste and making it safe pathogen wise — as well as maintaining moisture levels, which would be difficult in open windrows at this windy site — but it will help the windrow operation to reduce the particle size so we get a better return on our screening," says Choate. The company plans to purchase a small turner.

PRODUCT SCREENING

After curing, material is initially screened in a Powerscreen trommel to remove any remaining contaminants. A second screening with a Wildcat trommel yields a product that meets market standards. The majority of the plastic is removed in the first screen. Moisture content going into the screens is about 30 to 40 percent. "The two-stage screening system allows B&J to maximize compost and chip production given the relatively high incoming contamination."

The oversize material (consisting mostly of film plastic and other contaminants) is landfilled on-site. Medium size particles are used for various purposes, including blending with biosolids for use as a liner construction material. All fines are sold as compost or blends to turf grass growers, local landscapers and home gardeners. B&J is starting to diversify its markets to include organic and conventional agriculture to accommodate the planned expansion of its collection program. The company also has plans to start backhauling compost into the San Francisco market.

— N.G. ■

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Composting opportunities improve food waste management

by Elizabeth Cotsworth

Composting food scraps can trim the fat from waste disposal costs.

The U.S. Environmental Protection Agency (Washington) estimates that in 1998 the U.S. generated 22 million tons of food residuals. About half of this food waste was from institutions (such as prisons and schools), commercial establishments (such as restaurants and grocery stores) and industrial sources (such as employee cafeterias and food processors). Only 2 percent of these 22 million tons of food waste (about half a million tons) was composted, leaving 21.5 million tons going to disposal. That represents 14 percent of all municipal solid waste (MSW) disposed in landfills or incinerators.

EPA believes it is completely unnecessary to dispose of food residuals because recovery methods exist today. Composting food scraps can and is being done. For example, through a prohibition of organics (including food scraps, newspapers and yard debris) from landfills and incinerators. Halifax, Nova Scotia has reduced its landfill waste by 61 percent since 1995.

Why compost food waste?

The EPA Office of Solid Waste, working with the U.S. Department of Agriculture (Washington), jointly developed *Waste Not Want Not*, which puts forth the food residuals hierarchy: feed hungry people; feed animals; use as an industrial feedstock (e.g., grease to renderers); compost; and disposal. EPA's primary focus has been to promote composting of food waste, as well as other organic waste materials, based on several reasons:

- Food wastes constitute a surprisingly large portion of the MSW waste stream — almost 30 percent. EPA estimates that 60 million tons of organic materials (including food residuals) can be composted instead of landfilled each year at an estimated annual savings to local governments and their residents and businesses of \$1.3 billion.
- The rapid decomposition of food waste is a major factor in leachate generation and



leachate (containing organic acids) produced from decomposing food waste not only can cause a problem if released, but the acids also facilitate decomposition of other materials in the landfill and extract metals from certain waste materials. Basically, they get the landfill pot stewing.

- Food residuals should not be considered a waste material. They are a valuable resource and can be utilized to the benefit of both the environment and the economy.

Lower costs of collection and disposal

How can the food waste stream be better managed? One first should look at the large institutional and commercial generators of food residuals.

Institutional sites. Based on data from case studies published in EPA's 1999 report *Organic Materials Management Strategies*,

universities, correctional facilities, schools, hospitals, military bases and other institutions generated 2.4 million tons of organic waste material (e.g., food residuals, paper and yard trimmings) in 1998. Food residual made up about half of this total waste generation. These facilities are uniquely suited to undertake composting because they typically generate large quantities of organic materials and have land available on which to site a composting operation. On-site institutional composting can, in many instances, significantly reduce the disposal costs of this wet, bulky material.

The cost of on-site institutional composting in 1998 was estimated at \$49 per ton. This cost is more than offset by national average savings of \$38 per ton in avoided landfill cost and \$23 per ton in average collection costs. The savings of \$33 per ton in landfill costs assumes an institution is paying tip fees that will

not be paid if landfill disposal is not used. The collection savings assumes that excess food is only part of the waste being collected. Since costs for the remaining pick-up will increase on a per-ton basis, only \$23 out of a total collection cost of \$64 will be saved.

Composting also can become a source of revenue, generating income through sale of the resulting compost product. And, in the case of universities, operating their own composting programs can provide opportunities for research and development of new composting technologies and agricultural or horticultural applications.

Commercial sites. Similarly, commercial generators of organic waste materials that currently receive commercial garbage collection services (such as supermarkets and restaurants) have the potential to divert large amounts of food residuals. The commercial sector generated 25 million tons of organic

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Composting Supplement

waste materials (e.g., food residuals and soiled, unrecyclable paper and cardboard) in 1998. Again, food residuals made up half of this total generation on average.

In a supermarket, for example, organic waste materials can represent 75 to 90 percent of the total waste stream. In restaurants, organic waste materials make up an average of 74 percent of the total waste stream. Again, composting this material has the potential to result in significant savings in waste disposal costs to these generators.

Commercial composting is assumed to cost \$72 per ton. This cost is offset by a savings of \$38 per ton for disposal and \$23 per ton for collection. When the \$20 per input ton revenue for compost in the Northeast is added, a facility can realize a potential net savings of \$9 per ton by composting instead of landfilling.

Analysis of commercial food residuals assumes off-site composting. If on-site in-vessel composting were used, however, an additional \$41 per ton in collection (transportation) savings would offset the increased cost of in-vessel composting (equipment and labor) over the assumed \$72 cost of off-site composting. In this example, a facility could afford to spend \$113 per ton for on-site commercial composting and still have a savings of \$9 per ton.

More compost, less gas

Reductions in global warming can be achieved by producing and using compost. Decreasing the organic waste in landfills also decreases the amount of methane gas generated as a result of anaerobic decomposition. Accumulation of carbon dioxide and other "greenhouse gases" such as methane in the atmosphere causes the sun's rays to be reflected back and leads to global warming.

Food residuals have a greater impact than yard trimmings in terms of greenhouse gases because food scraps are the most decomposable segment of municipal solid waste. Food residuals decompose more completely and more quickly than leaves or branches and slightly more quickly than grass. If the 21.5 million tons of food residuals generated annually were composted instead of being sent to landfills, this would result in a reduction of about three million metric tons of carbon dioxide equivalents in greenhouse gas

emissions. This is equivalent to taking more than two million cars off the road.

Added to this attribute of composting is the potential to mitigate the impact of more extreme rainfall events that are being predicted as a consequence of global warming. In the case of heavier rainfall conditions, compost-amended soils absorb water more readily and reduce the potential for erosion to occur. In the case of less rainfall, compost-amended soils retain water longer and thereby mitigate potential adverse impacts on vegetation and soil erosion from winds.

The EPA Office of Solid Waste also is in the process of documenting the carbon sequestration benefits of amending soils with compost. This includes measuring to what extent potential carbon emissions are reduced when carbon remains in compost-amended soils rather than released as a greenhouse gas.

Technical difficulties

Institutional composting facilities, including small on-site systems, often are required to undergo the same regulatory and siting processes as large solid waste disposal and

processing facilities. Permit requirements probably represent the single largest barrier to widespread composting by this sector.

For commercial generators, compacted food scraps can generate odorous liquids that

leak from collection vehicles. Also, containers used to store food scraps before collection can become quite odorous themselves and need to be cleaned or exchanged, which itself can cause logistical problems.

Potential revenue from expanding markets

Organic Materials Management Strategies estimates a potential market for nearly 800 million tons of finished compost in the U.S. alone, triggered largely by consumers discovering new, beneficial uses for compost. These include:

- improving the physical, chemical and biological properties of soil
- providing nutrients to grow larger, more robust fruits, vegetables and flowers
- reducing the need for the use of pesticides, fertilizers and fungicides
- degrading contaminants in soil, such as oil and pesticides
- reducing and, in many cases, eliminating soil erosion and compaction, while increasing water retention and drought resistance.

Traditionally, however, composting operations have been weak on marketing their finished materials, creating a gulf between demand and supply. The market value of compost is influenced by a variety of factors,

availability of competing products, compost quality and the effectiveness of the producer's marketing strategy. Compost from source-separated food scraps (typically collected in commercial and institutional programs) has an advantage of generally containing higher nutrient value and lower contamination. The extent of pre- and post-processing (e.g., curing, screening, bagging and mixing) of compost feedstocks also has a direct effect on the market value of compost.

EPA has been working on various projects that stimulate market development and demand. One program involves a grant to the U.S. Composting Council (Amherst, Ohio) to establish standardized testing methods that finally have taken root and seem to be working well. (For further discussion of compost markets and standards, see "Compost Marketing Efforts Take Root" on page 27 of this issue. For a look at one state's approach to develop a food scrap composting infrastructure, see "Turning Food Scraps into Feedstock" on page 32 of this issue.)

In addition to use as a soil enrichment amendment, compost is being used increasingly in pollution remediation and prevention. For example, compost has been used to clean up storm water run-off and to remedy contaminated soil. Many state highway depart-

Maine, to name a few) are using compost for erosion control and beautification. EPA is working with the Federal Highway Administration (Washington) and USCC to further promote state and local highway department applications for compost. (See this month's "Composting Update" on page 9 for a report from a roadside erosion study in Iowa.)

In April 2000, the federal government also stepped up the demand by specifying the use of compost (including compost generated from food scraps) through Executive Order 13148, which states, "In implementing landscaping policies, each agency shall purchase environmentally preferable and recycled content products, including EPA-designated items such as compost and mulch, that contribute to environmentally and economically beneficial practices."

EPA sees opportunities for environmental benefits and cost savings through better management of food residuals and other organic materials. Food residuals present a rich opportunity that can help the country to meet and exceed our national goal of 35 percent recycling by 2005.

RR

Organic Materials Management Strategies and other documents are available from the EPA Web site at www.epa.gov/compost or by calling (800)

HAULER BEAT

San Francisco hauler plans food recycling

Composting program would help the city meet California recycling mandate

By Walt Wiley

SAN FRANCISCO — Norcal Waste Systems Inc. and its subsidiary, Sunset Scavenger, have applied for a 58 percent increase in San Francisco's residential rates to pay for a recycling program that would include the first food waste recycling effort of any large American city.

The rate request goes first to the city public works director, whose decision can be appealed to a three-member rate board that has the final say.

People in the pilot program are enthusiastic because it makes it so easy to recycle.

Robert Reed
Norcal Waste Systems Inc.

If the city approves the program, it would push San Francisco's recycling rate past 50 percent. Norcal spokesman Robert Reed said.

State law mandated a 50 percent reduction from 1990 landfill rates by last year. San Francisco will come in at about 42 percent when the state waste board calculates the figures, said Peter Holtzclaw, city recycling programs manager.

The program as presented formally for approval is essentially what the city and the company worked out as an answer to San Francisco's lagging recycling effort, Holtzclaw said.

"There weren't any big surprises in what Sunset presented to us," he said. "It's essentially what we've been talking about. We'll have to wait and see what happens to the rates."

The new recycling program would require that Norcal buy a new fleet of 100 dual-chamber automated trucks; 400,000 wheeled 32-gallon carts; and new equipment for the company's existing material recovery facilities, an investment of \$130 million over five years, Reed said.

Under the program, which already is achieving more than 50 percent diversion in neighborhoods where pilot projects are under way, residents receive blue, green and black carts. Cans, bottles, plastics and paper go into the blue container; organics, including kitchen waste, yard waste and wet or soiled paper

and waxed cardboard, go into the green container; and everything else goes into the black container. A bucket for carrying kitchen scraps to the cart is included.

"People in the pilot program are enthusiastic because it makes it so easy to recycle," Reed said. "They just put all the recyclables in the one bin."

Organics collected in the program will go to Norcal's composting facility at the B&J landfill near Vacaville, Calif., where the company already composts about 200 tons per day of food scraps and yard waste.

Food waste from hotels and restaurants goes into the mix through another pilot program for

commercial customers that is not involved in the rate application.

Norcal, through its subsidiaries, has a monopoly on the city's hauling that stems from the consolidation of nearly 100 haulers who in the early 1990s were granted exclusive franchises to cover separate sectors of the city, Holtzclaw said. ■



Q: What about odor?

A: Just ask those who use the system...

"We demonstrated that we could produce a quality compost without odors or run-off."

- Ed Crotty, NJ, Department of Corrections

"...the system really does stop odor and leaching."

- Joel Parrott, Oakland Zoo

"...one of the major benefits is the complete absence of annoying odors..."

- Lt. Col. Roger Forsyth, F.E. Warren AFB

"...there was no evidence of objectionable odors.."

- Dennis M. Shuler, Stanislaus County, CA

"The in-vessel system eliminates rodents, odor, and leachate problems."

- Ken Kraft, Croton-on-Hudson Public Works

"...we have not had any issues with leaching or odors..."

- Paul Sherman, B & J Landfill

Corporate Facilities

Disposal of Organic Wastes at Publix stores

Publix Super Markets, Inc.



Publication Date: DRAFT April 4, 2002

About This Document

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Overview

Objective

To define the process for recycling of organic wastes from selected Publix stores in Sarasota.

Background

The cost of disposing of solid waste keeps increasing. A hauler transports the waste placed in the trash compactor to the local landfill. In some cases, the waste is taken to a waste-to-energy incinerator/ facility. Publix pays the hauler for the hauling and disposal of the waste. The cost of fuel also impacts the solid waste disposal charges. In addition the City or County in which the store is located, may charge a franchise fee ranging from about 3% to as much as 20% of the solid waste charges.

Sarasota County applied and was awarded an Innovative Recycling Grant from the Florida Department of Environmental Protection. The Innovative Grants are given to develop new recycling projects that will help communities in Florida increase their recycling rates and save landfill space. If the projects are successful, they are shared with the other municipalities in Florida.

Sarasota's Innovative Grant is for the development of the first integrated food discard management program in Florida. They plan to collect food discards from supermarkets, institutions and restaurants, and distribute it as appropriate. The edible food will be donated to a local food bank; food that is still edible but not for people's consumption will be taken by farmers for their farm animals. The rest of the food discards will be composted into "plant food" or compost/ soil amendment.

Publix is partnering with the County to develop the collection methodology for the supermarkets and other businesses. We already follow the processes of donating food to food banks, and produce trimmings to farmers at most of our stores in North Sarasota. The stores in South Sarasota could not donate the food to a food bank because the food bank did not have a refrigerated truck to collect the food items. A refrigerated truck will be purchased as part of this project.

The only part of this program that Publix lacks is the composting component. This is because there are no composting facilities to take the compostable organics. Sarasota's program includes two types of composting – one through putting the material in piles for traditional composting, and the other through vermi-composting (using worms to compost the organic wastes).

Sarasota County plans to design the collection route with the selected Sarasota stores as anchors. They will then approach restaurants and other businesses with food discards to join the program. The price of collecting organics will be more reasonable if more businesses participate and send their organic wastes for composting.

Benefits to Publix

There are several benefits to Publix:

- If food must be discarded, then we should donate it to the highest use, which is to give the food to the food bank or local shelter.
 - Tracking the quantities of the discards will help Publix determine how to reduce the shrink.
 - We divert organic wastes from our trash compactor, saving some of the costs of disposal. (There will probably be a charge, but it is anticipated to be lower than garbage disposal costs)
 - The organic or food wastes decompose quickly in the hot months, and release smelly liquids. These liquids tend to leak out of the compactor and onto the ground, where they smell worse. Keeping food/ organic wastes out of the compactor should reduce the amount of liquid, reducing the bad odors.
 - The County provides Publix and other businesses a convenient way to divert organics from the trash.
 - The organics are converted into a useful product that can be used to improve the sandy soils in Florida, and grow produce. Since we participate, we can consider ourselves responsible citizens in our communities for helping our environment and saving the County's landfill space.
 - Publix contributes to increasing the County's recycling rate.
-

What are organic wastes?

The solid waste or garbage can be sorted into two components – organic and inorganic wastes.

Organics are materials that were once alive. Examples of organic wastes at a store are blemished produce, produce trimmings, paper, wood, contaminated cardboard, wax cardboard, food wastes, scraps of deli products most bakery items.

Another way to look at organics is to define the inorganic wastes that cannot be composted. Inorganics are materials that are made of synthetic or inert materials. Glass, plastics, aluminum, rubber, metals – shelving, cans ,etc. are some examples of inorganic materials.

The majority of wastes from a store (about 85%) is estimated to be organic

Participation of Publix stores

Publix associates in each Department of the store will be asked to participate in the program. Training will be held, and the guide will be given to show the associates how to sort the organics, and package the edible food for the food bank. Posters and recycling containers will be delivered to the stores to assist in training our associates.

New associates will be trained in separation of organics as part of their job class training

The associates will put the inorganics into the regular trash can. A separate, differently colored can will be provided to collect the organics. The organics will be collected every other day by the hauler contracted to the City of Sarasota.

Concerns

1. The main concern is getting only the organics into the recycling bin. Contamination of the organics with plastic, glass and cans will lower the quality of the resulting compost. The increased sorting or processing that has to be done to remove the contaminants raises the cost of producing the compost.

If these materials cannot be screened out, the compost may be unmarketable, and will have to be disposed in the landfill.

Contamination of the food discards for the cattle could create problems for the animals who eat the food.

2. The inconvenience to the store associates. They will have to remember to sort the edible food materials and keep them separate from the inedible food/ organics for composting, and put the inorganics into the trash container.

3. Continuous training of new associates must be done in order to keep the sorting free from contamination.

4. Food safety concerns of cross-contamination must be addressed

5. Is there space for the extra containers that will be required?

Contamination

The high quality of the organics will be critical to the success of this program. This means that inorganics such as glass steel and aluminum cans, foil, plastic wrap and containers, styrofoam must not be placed in the recycling containers. These inorganic materials are considered contaminants. If the organics are contaminated, the recycler will refuse to take the load. You will then have to throw the contaminated material into the trash compactor.

Information

Contact:

Bernadette Thavarajah, Publix' Solid Waste Manager at Lakeland corporate offices, extension 3292, or

Mike Sosadeeter, Project Manager, at Resource Management Group, (RMG), tel: (941)358 7730

Thank you

The goal of recycling the organics is to divert as much of the organic wastes or discards to composting. This will reduce bad odors from the compactor, the compactor will be pulled less often, saving Publix money. (Your store currently pays \$119 for the haul, and \$63.77 per ton for disposal of waste in the trash compactor. The average load is about nine tons).

Thank you for doing your part.

Chapter 2: Recycling Organics in the Produce Department

Objective

To describe the recycling process for the Produce Department associates at the Store

Tools

You are provided with 3 types of containers;

1. the green recycling container for the farm animal (edible) organics
2. The yellow recycling container for the plant (compostable) materials
3. The regular trash cans for the inorganic and other trash that cannot go into the two recycling containers

You should also have posters describing the types of materials or products in each category.

Use a liner in each container so the organics and trash can be removed without contaminating the recycling containers and trash cans.

If you have questions, speak to your manager.

Process

1. Place a liner in each container. Have at least one of each type of container ready for your use.
 2. Place the animal and plant food recycling containers near the cut produce preparation area.
 3. If you are discarding produce that is edible, but for some reason cannot be sold, check with your manager. The manager will decide if you should pack it in a box for donation to the food bank, or place it in the green recycling container.
 4. Before recycling, remove all inorganics such as glass, plastics, trays, foil, rubber, chemicals, metal cans. Place all of these materials in the trash container. Do not put them in the green or yellow recycling containers.
-

Recycling organics in the Produce Department, Continued

Process (continued)

-
5. When discarding the produce or produce trimmings, think
IS THIS SOMETHING THAT CAN BE FED TO CATTLE?

If the answer is yes, place it in the green container

If the answer is no, place it in the yellow container

6. When the bag is full, tie it securely and take it to the area in the back room.
 7. Put a new liner in the container and start over.
-

Materials for the farm animal food

These materials go into the GREEN RECYCLING CONTAINER – for donation to the farms.

- Blemished or unsaleable produce that is not suitable for the food bank
 - Trimmings from produce; fruit
 - All vegetables except broccoli and onions (animals do not like them)
-

Materials for the plant food

These materials can be placed in the YELLOW RECYCLING CONTAINER – for composting into plant food:

- Trimmings that cannot be fed to farm animals
 - Broccoli and onions, and their trimmings
 - Any type of paper such as the newspaper inserts/ads, paper towels; office paper (shred confidential papers before putting it into the recycling container) (clean wax cardboard should be broken down and placed in a unitizer for shipping to the Recycle Center with the cardboard).
 - Wax cardboard boxes.
 - Floral discards such as flowers, plants, potting soil, boxes that the florals are packaged
 - Spoiled juices (pour the juices in and discard the container, unless it is a wax carton)
 - Other organic office trash such as coffee filters and grounds, tea leaves, etc., food residue, including meats and cheeses (remove plastics).
-

Chapter 3: Recycling Organics in the Meat and Seafood Departments

Objective

To describe the recycling process for the Meat and Seafood Department associates at the Store

Tools

You are provided with 2 types of containers;

- the yellow recycling container for the plant (compostable) materials
- the regular trash cans for the inorganic and other trash that cannot go into the two recycling containers

You should also have posters describing the types of materials or products in each category.

Use a liner in each container so the organics and trash can be removed without contaminating the recycling containers and trash cans.

If you have questions, speak to your manager.

Process

1. Place a liner in each container. Have at least one of each type of container ready for your use.
2. Place the plant food recycling containers near the preparation area.
3. If you are discarding meat or seafood that is edible, but for some reason cannot be sold, check with your manager. The manager will decide if you should pack it in a box for donation to the food bank, or place it in the yellow recycling container.
4. Before recycling, remove all inorganics such as glass, plastics, trays, foil, rubber, chemicals, metal cans. Place all of these materials in the trash container. Do not put them in the green or yellow recycling containers.

Recycling organics in the Meat and Seafood Departments, Continued

Process (continued)

5. Place the discarded meat, fat bone or seafood scraps in the yellow container
 6. When the bag is full, tie it securely and take it to the area in the back room.
 7. Put a new liner in the container and start over.
-

Materials for the farm animal food

There should be no GREEN RECYCLING CONTAINER at the Meat Department.

- Do not place any meat, meat scraps, fat bone, and seafood in the green container
-

Materials for the plant food

These materials can be placed in the YELLOW RECYCLING CONTAINER – for composting into plant food:

- Meat, meat scraps, fat, bone, and seafood (Remove the plastic and Styrofoam packaging. Paper packaging does not have to be removed.
 - Any type of paper such as the newspaper inserts/ads, paper towels; office paper (shred confidential papers before putting it into the recycling container)
 - Wax cardboard boxes. (clean wax cardboard should be broken down and placed in a unitizer for shipping to the Recycle Center with the cardboard).
 - Other organic office trash such as coffee filters and grounds, tea leaves, etc., food residue, including meats and cheeses (remove plastics).
-

Chapter 4: Recycling Organics in the Deli Department

Objective

Describe the process to recycle organic discards from the Deli Department

Tools

You are provided with 3 types of containers;

- the green recycling container for the farm animal (edible) organics
- The yellow recycling container for the plant (compostable) materials
- The regular trash cans for the inorganic and other trash that cannot go into the two recycling containers

You should also have posters describing the types of materials or products in each category.

Use a liner in each container so the organics and trash can be removed without contaminating the recycling containers and trash cans.

If you have questions, speak to your manager.

Process

1. Place a liner in each container. Have at least one of each type of container ready for your use.
2. Place the animal and plant food recycling containers near the deli prep area
3. If you are discarding a product that is edible, but for some reason cannot be sold, check with your manager. The manager will decide if you should pack it in a box for donation to the food bank, or place it in the green recycling container.
4. Before recycling, remove all inorganics such as glass, plastics, trays, foil, rubber, chemicals, metal cans. Place all of these materials in the trash container. Do not put them in the green or yellow recycling containers.
5. When discarding the deli items or produce trimmings, think
IS THIS SOMETHING THAT CAN BE FED TO CATTLE?
If the answer is yes, place it in the green container

If the answer is no, place it in the yellow container

Process for Recycling organics in the Deli, Continued

Process (continued)

6. When the bag is full, tie it securely and take it to the area in the back room.
 7. Put a new liner in the container and start over.
-

Materials for the farm animal food

These materials go into the GREEN RECYCLING CONTAINER – for donation to the farms.

- Blemished or un-saleable products that are not suitable for the food bank. Please do not put meats and cheeses in this container
 - Trimmings from produce; fruit
 - All vegetables except broccoli and onions (animals do not like them)
-

Materials for the plant food

These materials can be placed in the YELLOW RECYCLING CONTAINER – for composting into plant food:

- End pieces of deli meats and cheeses (remove the plastic coverings, and put the plastics in the trash container)
- Produce trimmings that cannot be fed to farm animals
- Dressings, potato salad, egg salad, etc (remove and discard plastic packaging)
- Sandwiches, food scraps and paper from the Deli Café (no Styrofoam cups, plates, plastic forks, spoons and knives, no straws –only paper and food)
- Any type of paper such as the newspaper inserts/ads, paper towels, office paper (shred confidential papers before putting it into the recycling container)
- Wax cardboard boxes. (clean wax cardboard should be broken down and placed in a unitizer for shipping to the Recycle Center with the cardboard).
- Spoiled juices (pour the juices in and discard the container, unless it is a wax carton)
- Other organic office trash such as coffee filters and grounds, tea leaves, etc., food residue, including meats and cheeses (remove plastics).
- Waste grease, rotisserie grease, cooking oil (after it has cooled)

Chapter 5: Recycling Organics in the Bakery Department

Objective

Describe the process for associates to recycle organic discards from the Bakery Department.

Tools

You are provided with 3 types of containers;

- the green recycling container for the farm animal (edible) organics
- The yellow recycling container for the plant (compostable) materials
- The regular trash cans for the inorganic and other trash that cannot go into the two recycling containers

You should also have posters describing the types of materials or products in each category.

Use a liner in each container so the organics and trash can be removed without contaminating the recycling containers and trash cans.

If you have questions, speak to your manager.

Process

1. Place a liner in each container. Have at least one of each type of container ready for your use.
2. Place the animal and plant food recycling containers near the bakery prep area
3. If you are discarding a product that is edible, but for some reason cannot be sold, check with your manager. The manager will decide if you should pack it in a box for donation to the food bank, or place it in the green recycling container. Donations to the food bank can be kept in their original package.

4. Before recycling, remove all inorganics such as glass, plastics, trays, foil, rubber, chemicals, metal cans. Place all of these materials in the trash container. Do not put them in the green or yellow recycling containers.

Recycling Organics in the Bakery Department, Continued

Process (continued)

-
5. When discarding the deli items or produce trimmings, think
IS THIS SOMETHING THAT CAN BE FED TO CATTLE?

If the answer is yes, place it in the green container

If the answer is no, place it in the yellow container

6. When the bag is full, tie it securely and take it to the area in the back room.
 7. Put a new liner in the container and start over.
-

Materials for the farm animal food

These materials go into the GREEN RECYCLING CONTAINER – for donation to the farms.

- Un-saleable, un-sweet bakery products that are out of date, or that is not suitable for the food bank (breads)
 - spoiled or un-usable bakery dough, batter, mixes
-

Materials for the plant food

These materials can be placed in the YELLOW RECYCLING CONTAINER – for composting into plant food:

- Sweet bakery products – cakes, muffin, cookies, breads, pastries (remove plastics, ties, foil before placing these items in the container)
- Un-usable dough, batter, mixes that cannot be put in the green, animal food recycling container
- Any type of paper such as the newspaper inserts/ads, paper towels, office paper (shred confidential papers before putting it into the recycling container)
- Wax cardboard boxes. (clean wax cardboard should be broken down and placed in a unitizer for shipping to the Recycle Center with the cardboard).

- Other organic office trash such as coffee filters and grounds, tea leaves, etc., food residue, including meats and cheeses (remove plastics).
-

Chapter 6: Recycling Organics in the Dairy Products Section

Objective

Describe the process for associates to recycle organic discards from the Dairy Products Section

Tools

You are provided with 3 types of containers;

- the green recycling container for the farm animal (edible) organics
- The yellow recycling container for the plant (compostable) materials
- The regular trash cans for the inorganic and other trash that cannot go into the two recycling containers

You should also have posters describing the types of materials or products in each category.

Use a liner in each container so the organics and trash can be removed without contaminating the recycling containers and trash cans.

If you have questions, speak to your manager.

Process

1. Place a liner in each container. Have at least one of each type of container ready for your use.
2. Place the animal and plant food recycling containers near the bakery prep area
3. If you are discarding a product that is edible, but for some reason cannot be sold, check with your manager. The manager will decide if you should

pack it in a box for donation to the food bank, or place it in the green recycling container. Donations to the food bank can be kept in their original package.

4. Before recycling, remove all inorganics such as glass, plastics, trays, foil, rubber bands, chemicals, metal cans. Place all of these materials in the

Recycling Organics in the Dairy Section, Continued

Process (continued)

trash container. Do not put them in the green or yellow recycling containers.

5. When discarding the dairy products, think

IS THIS SOMETHING THAT CAN BE FED TO CATTLE?

If the answer is yes, place it in the green container

If the answer is no, place it in the yellow container

6. When the bag is full, tie it securely and take it to the area in the back room.
 7. Put a new liner in the container and start over.
-

Materials for the farm animal food

These materials go into the GREEN RECYCLING CONTAINER – for donation to the farms.

- Un-saleable, out of date dairy products (remove plastics and foil before putting these items in the recycling container) – cheese, yogurt, ice cream, etc.
 - spoiled or out of date milk, juices etc,
 - do not place meat products (frozen or unfrozen) in the green container
-

Materials for the plant food

These materials can be placed in the YELLOW RECYCLING CONTAINER – for composting into plant food:

- All frozen dairy products
- Any type of paper such as the newspaper inserts/ads, paper towels, office paper (shred confidential papers before putting it into the recycling container)
- Contaminated wax cardboard boxes (clean wax cardboard should be broken down and placed in a unitizer for shipping to the Recycle Center with the cardboard).

- Other organic office trash such as coffee filters and grounds, tea leaves, etc., food residue, including meats and cheeses (remove plastics).
-

Chapter 7: Process for Recycling Organics from the Frozen Foods Section

Objective

Describe the process for associates to recycle organic discards from the Frozen Foods Section

Tools

You are provided with 3 types of containers;

- the green recycling container for the farm animal (edible) organics
- The yellow recycling container for the plant (compostable) materials
- The regular trash cans for the inorganic and other trash that cannot go into the two recycling containers

You should also have posters describing the types of materials or products in each category.

Use a liner in each container so the organics and trash can be removed without contaminating the recycling containers and trash cans.

If you have questions, speak to your manager.

Process

1. Place a liner in each container. Have at least one of each type of container ready for your use.
2. Place the animal and plant food recycling containers near the cases
3. If you are discarding a product that is edible, but for some reason cannot be sold, check with your manager. The manager will decide if you should pack it in a box for donation to the food bank, or place it in the green recycling container. Donations to the food bank can be kept in their original package.

Recycling Organics in the Frozen Foods Section, Continued

Process (continued)

4. Before recycling, remove all inorganics such as glass, plastics, trays, foil, rubber bands, chemicals, metal cans. Place all of these materials in the trash container. Do not put them in the green or yellow recycling containers.
5. When discarding the frozen food, think
IS THIS SOMETHING THAT CAN BE FED TO CATTLE?
If the answer is yes, place it in the green container
If the answer is no, place it in the yellow container
6. When the bag is full, tie it securely and take it to the area in the back room.
7. Put a new liner in the container and start over.

Materials for the farm animal food

These materials go into the GREEN RECYCLING CONTAINER – for donation to the farms.

- Un-saleable, out of date dairy products (remove plastics and foil before putting these items in the recycling container) – cheese products, yogurt, ice cream, etc.
- Frozen produce items
- Any frozen breads
- spoiled or out of date juices etc,
- do not place meat products (frozen or unfrozen) in the green container

Materials for the plant food

These materials can be placed in the YELLOW RECYCLING CONTAINER – for composting into plant food:

- All frozen dairy products
 - All frozen dinners; vegetables, breads, sweet pastries (remove plastic and foil packaging; paper can be left.
 - Any type of paper such as the newspaper inserts/ads, paper towels, office paper (shred confidential papers before putting it into the recycling container)
 - Contaminated wax cardboard boxes (clean wax cardboard should be broken down and placed in a unitizer for shipping to the Recycle Center with the cardboard).
 - Other organic office trash such as coffee filters and grounds, tea leaves, etc., food residue, including meats and cheeses (remove plastics).
-

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Introduction

The purpose of this report is to outline the in-store food waste separation strategy as well as the proposed collection route. This proposal was developed in part by evaluating existing food waste compost operations (see attached Industry Case Studies and Food Waste Collection Systems Comparison Matrix) and consulting with Bernadette Thavarajah, Publix Supermarkets Solid Waste Manager.

In Store Food Waste Separation System

The proposed in store food separation system will require 6 65-gallon wheeled containers for each store (see attached Container Comparison Matrix and Cart Product Survey). There will be a container in each department: produce, meat and seafood, deli, bakery, dairy and frozen foods to collect the compostable materials. Each container will be outfitted with a biodegradable liner so that the organics can be removed without soiling the container. Containers will be taken, by Publix staff, to a central loading dock for pick-up. Employees will receive a training manual and in-store training by project manager and project partners to explain the separation process. On-going oversight of the food waste separation process will be performed to ensure minimal contamination of food waste. The ultimate selection and number of the recycling carts per store will be dependent on the schedule of pick-ups on the collection route, which has yet to be finalized.

Collection Route

The proposed collection route will initially consist of 4 stores: #217, #802, #734 and #384 (see attached Map). This collection route will be traveled 3 times each week. The proposed hauling strategy involves rolling the containers off the loading dock and on to a flat bed truck with sides. The full containers will be replaced by a set of empty containers while the full containers are transported to Central County Solid Waste Disposal Complex (landfill). Once at the landfill, the containers will be weighed at the Scale House and Control Booth before they are transported to the compost facility.

Resources

Bernadette Thavarajah
Publix Supermarkets Solid Waste Manager
(863)688-7407 x3292
bernadette.thavarajah@mail.publix.com

Food Waste Collection Systems Comparison

Project Name; Location	Waste Recovery Solutions; ME	SW dept.; Plano, TX	Brooks Contractors; Goldston, NC
Feedstock(s) Type	Produce, bakery & deli goods, thick dairy products, frozen meals (no meat or paper)	NA	Paper and cardboard, animal manure, produce and dairy
Quantity/route	5 tons	3 tons	10 tons
Quantity/site	1,290 lbs.	Highly variable	1 ton (800-1200 lbs/day is normal for Commercial sites)
Collections/week	1/site (either Monday or Friday)	6	2-3 (2 trucks have 2 routes each/week)
Route Length	No more than 30 mi. (1 way)	60-100 mi.	50 mi. (1 way)
Sites/route	7-8	22	15-20
Site Type	Commercial (Hannaford Bros.)	ICI	ICI
Container Type	Two-wheeled, flip top rolling carts lined with 'Biobag' biodegradable liners	Otto 'polycart'	Baker Waste toters; standard cans that came with vehicle
Container Size	95 g (switching to 64 gallon)	95 g	65 g totter: rent to sites for \$2/month; 6-8 cy standard cans: rent to sites for \$15/month
Vehicle Type	1) converted rear loader 2) flat bed (need twice as many containers) 3) rendering truck with tanks for water to rinse containers	Standard automated side-load Crane Carrier Chasis for recycling w/ tilt dump body; want vehicle that retains moisture	12 ton capacity liquid tight rear loader with 6 cy bucket;
Special Equipment	Water for rinsing; rack to hold waste plastic from packaging	NA	Meadows hydraulic specialty beds; water seal application; water tanks: to rinse and collect waste water; scale: in forks is probably best
Staff/vehicle	1	1	2 for 65 g; 1 for 6-8 cy

Food Waste Collection Systems Comparison

General Comments	Total diversion is a must in order to be cost effective; A third pick-up day, especially in the summer, would ideally be added (if economically sound) so that some stores can be collected from more than once a week to circumvent odor and liquid problems	Have companies use biodegradable plastic bags right from the start in order to retain moisture in collection containers	Collect produce without liners because containers will clean well and liners are expensive and difficult to get shipped as you need them; Canada liner supplier is good; have stores buy liners; have minimum quantity accepted from sites to ensure that trip is worth the while; Hire full time trainer to divert contamination (plastic, glass, metal styrofoam); use different color containers at generator for garbage and compostable materials to cut down on contamination
Contact Information	Ted Brown (207)725-5249 tedem@gwi.net	Robert Smouse (972)769-4199	Dane Brooks (919)837-5914

Container Comparison Matrix

Container Manufacturer	Consolidated Plastics Company	Otto Industries	Roto Industries	Toter, Inc.
Model	Rubbermaid, Square Brute, Big Wheel	Polycart	Hauler 60 U	1) 64 Nestable 2) 64 Universal
Capacity	50 gallon	68 gallon	60 gallon	64 gallon
Color	Yellow, green, gray and blue	Blue, Green and black	Green, gray, blue, black and brown	Green, blue, gray, brown
Additional Features		Locking device		
Estimated cost/container	\$124.45	NA	NA	\$79.95
Bulk Order Discount	25% off orders of 12 or more	NA	NA	NA
Source of Information	(800)362-1000	David Wright (800)227-5885	(800)634-ROTO	(800)424-0422

Hold It

To assist haulers and municipalities with selecting the right residential container, *Waste Age* compiled a list of some manufacturers' latest products.

- Ameri-Kart Corp., Goddard, Kan., introduces the Versa-Kart in 35-, 60- and 90-gallon capacities constructed from linear, medium-density polyethylene. The cart is compatible with all fully and semi-automated systems, according to the company.

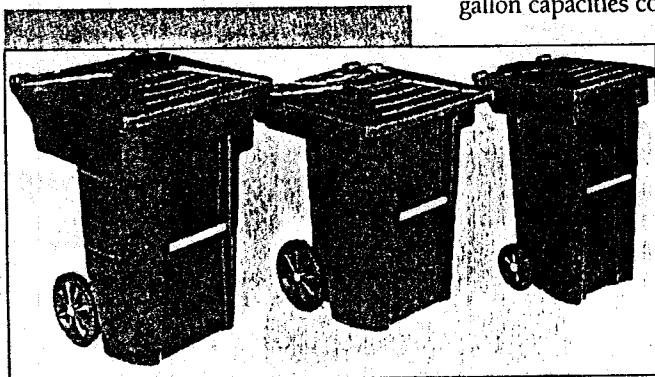


Photo courtesy of Ameri-Kart Corp., Goddard, Kan.

Bonar Plastics Inc., Tigard, Ore., offers the Two-Can automated recycling and collection system, which is a one-pass system designed to pick up two commodities.

- Cascade Engineering Container Group, Grand Rapids, Mich., offers carts and recycling bins made from high-density, injection-molded plastic. The company's 35-, 64- and 96-gallon roll-out carts are designed for multiple uses, including refuse, recyclables, yard waste and the co-collection of refuse and commingled or separated recyclables. Curbside recycling bins are available in 5-, 14-, 18- and 21-gallon sizes.

- El Monte Plastics, El Monte, Calif., manufactures carts from 35 gallons to 450 gallons in either linear low-density polyethylene or xlink thermoset polyethylene, depending on the climate of the community. El Monte carts fit all automated systems and most semi-automated systems, according to the company.

- Otto Industries Inc., Charlotte, N.C., manufactures a line of semi- and fully automated carts and lifters for residential collection. These injection-molded plastic carts are compatible with a variety of lifter systems and can be used with dual-collection systems. Otto also offers a line of rotary actuator- and cylinder-operated lift systems.

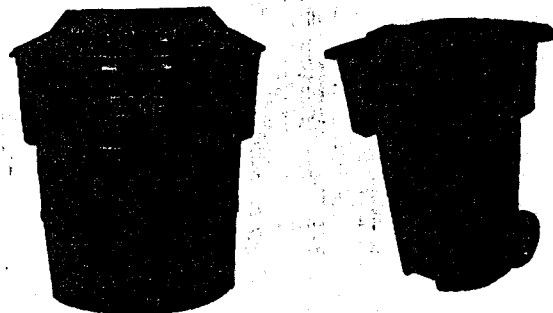


Photo courtesy of El Monte Plastics, El Monte, Calif.

Perkins Manufacturing, Chicago, offers the TuckAway cart lifter for semi-automated carts, as well as rear and side loader containers. TuckAway has a rotary design, lifts at a 50 degree angle and attaches closely to the vehicle, according to the company. Lift capacity is 250 pounds to 300 pounds. The lifter also has an 8- to 10-second cart cycle.

- Plastic Omnium Zarn, Reidsville, N.C., manufactures the CityCart line, which includes 35-, 65- and 95-gallon containers of high-density polyethylene (HDPE). The carts, which have an ultraviolet (UV) inhibitor coating, are available in several color combinations.

By Melanie A. Lasoff

Residential carts

come in all sizes

for all jobs.

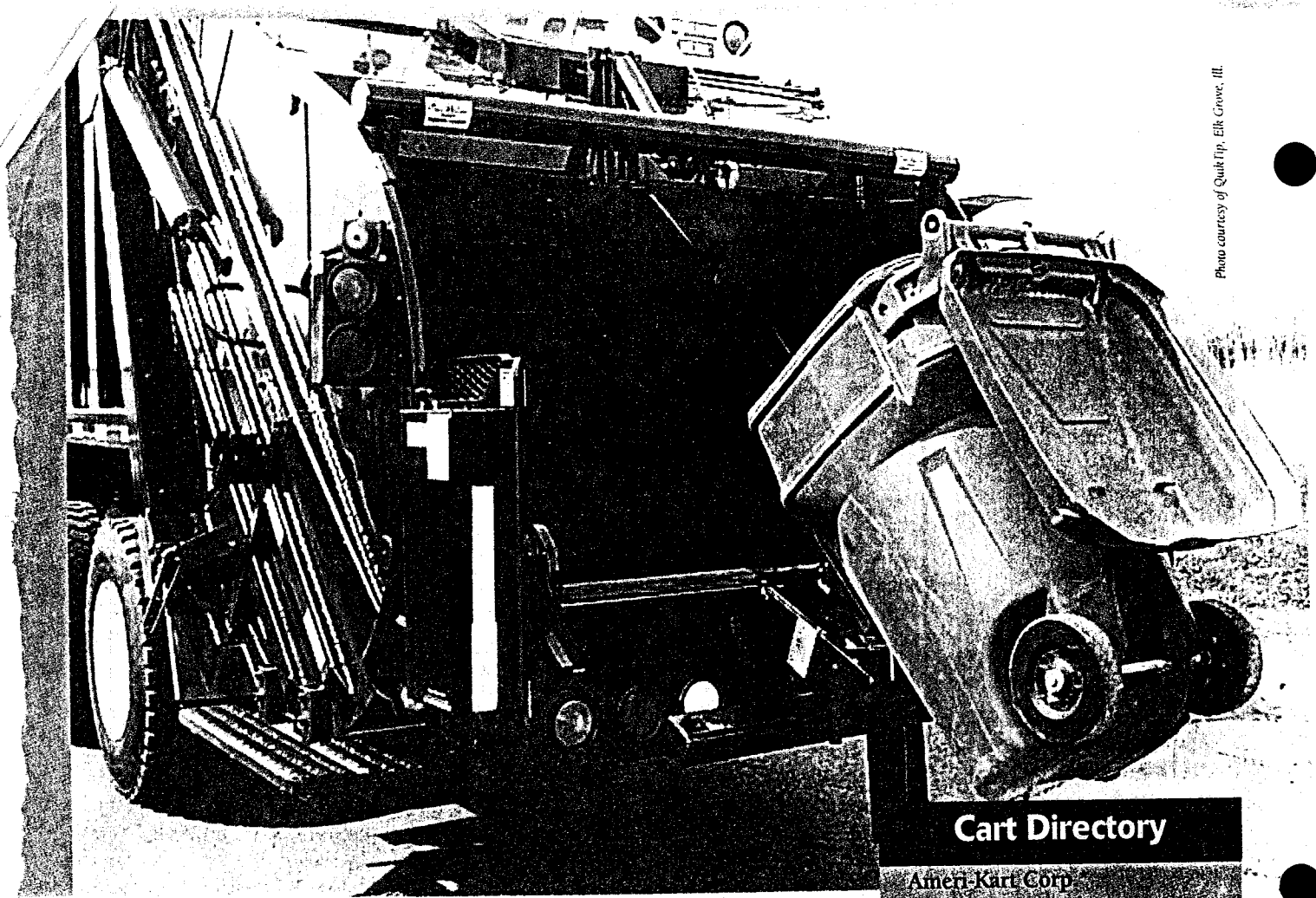


Photo courtesy of QuikTip, Elk Grove, Ill.

Cart Directory

QuikTip, Elk Grove, Ill., manufactures a lift system that can be installed on rear loaders to lift carts and 1- to 10-yard containers without cables, chains or driver intervention, according to the company.

- Rehrig Pacific Co., Los Angeles, offers a line of injection-molded plastic roll-out carts and stackable recycle bins for curbside programs. Carts come in 20-, 35-, 65- and 95-gallon sizes, and are designed for semi- and fully automated lifters. Rehrig also offers green waste carts with venting and a false bottom to promote odor dissemination, as well as carts with locks.

- Roto Industries Inc., Anaheim, Calif., manufactures the Hauler Cart series in sizes from 35 gallons to 300 gallons for semi- and fully automated collection systems. The company also offers plastic lids for front and rear loaded containers, plastic bin liners and plastic bottoms.

Rotonics Manufacturing Inc., Gardena, Calif., offers a complete line of bin lids, refuse containers and medical waste containers in sizes including 300 gallons and 450 gallons.

- Schaeffer Systems International Inc., Charlotte, N.C., manufactures a line of 35-, 65- and 95-gallon containers for refuse and recycling.

- Toter Inc., Statesville, N.C., features fully and semi-automated carts in sizes from 32 gallons to 105 gallons in a variety of colors. The company's EVR Series includes molded handles, sealed stop bar journals, multiple bottom wear chimes and a reinforced top rim. The EVR Co-Collection Cart, which is evenly divided and contains double lids hinged in the middle, allows for material separation.

UltraCart Inc., Harborcreek, Pa., manufactures carts with a front pull handle and front drag guards, which allows customers and workers to handle the carts from the front and the rear. UltraCart's products also feature a double-wall, domed top lid and latch system to open on both semi- and fully automated lifters. Features include a two-for-one replacement program and 16-gauge top and bottom lift bars. **WA**

Melanie A. Lasoff is a Waste Age associate editor.

Ameri-Kart Corp.

Circle 67 on reply card

Bonar Plastics Inc.

Circle 68 on reply card

Cascade Engineering

Circle 69 on reply card

El Monte Plastics

Circle 70 on reply card

Otto Industries

Circle 71 on reply card

Perkins Manufacturing

Circle 72 on reply card

Plastic Omnium Zarn

Circle 73 on reply card

QuikTip

Circle 74 on reply card

Rehrig Pacific Co.

Circle 75 on reply card

Roto Industries Inc.

Circle 76 on reply card

Rotonics Manufacturing Inc.

Circle 77 on reply card

Schaeffer Systems Int'l.

Circle 78 on reply card

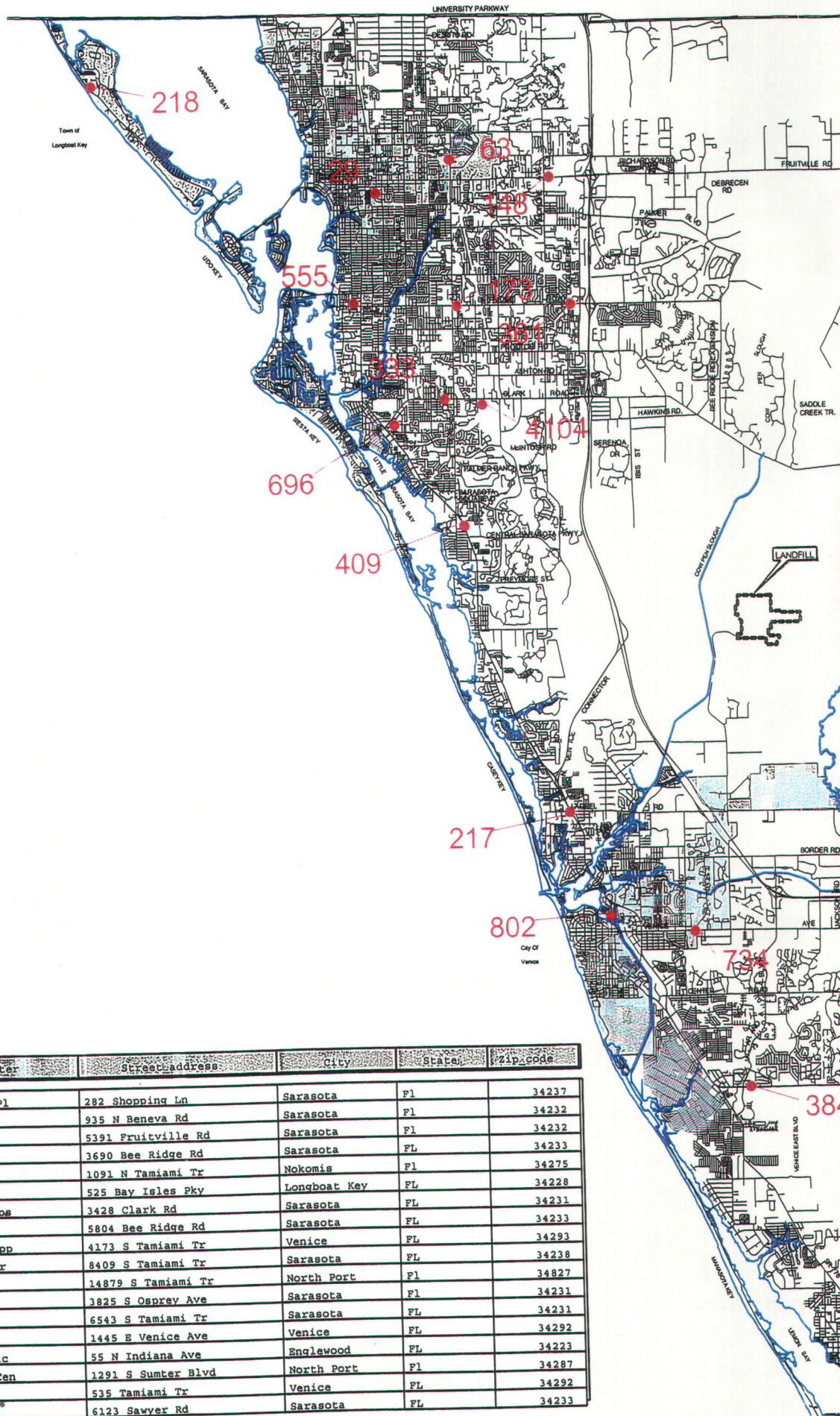
Toter Inc.

Circle 79 on reply card

UltraCart Inc.

Circle 80 on reply card

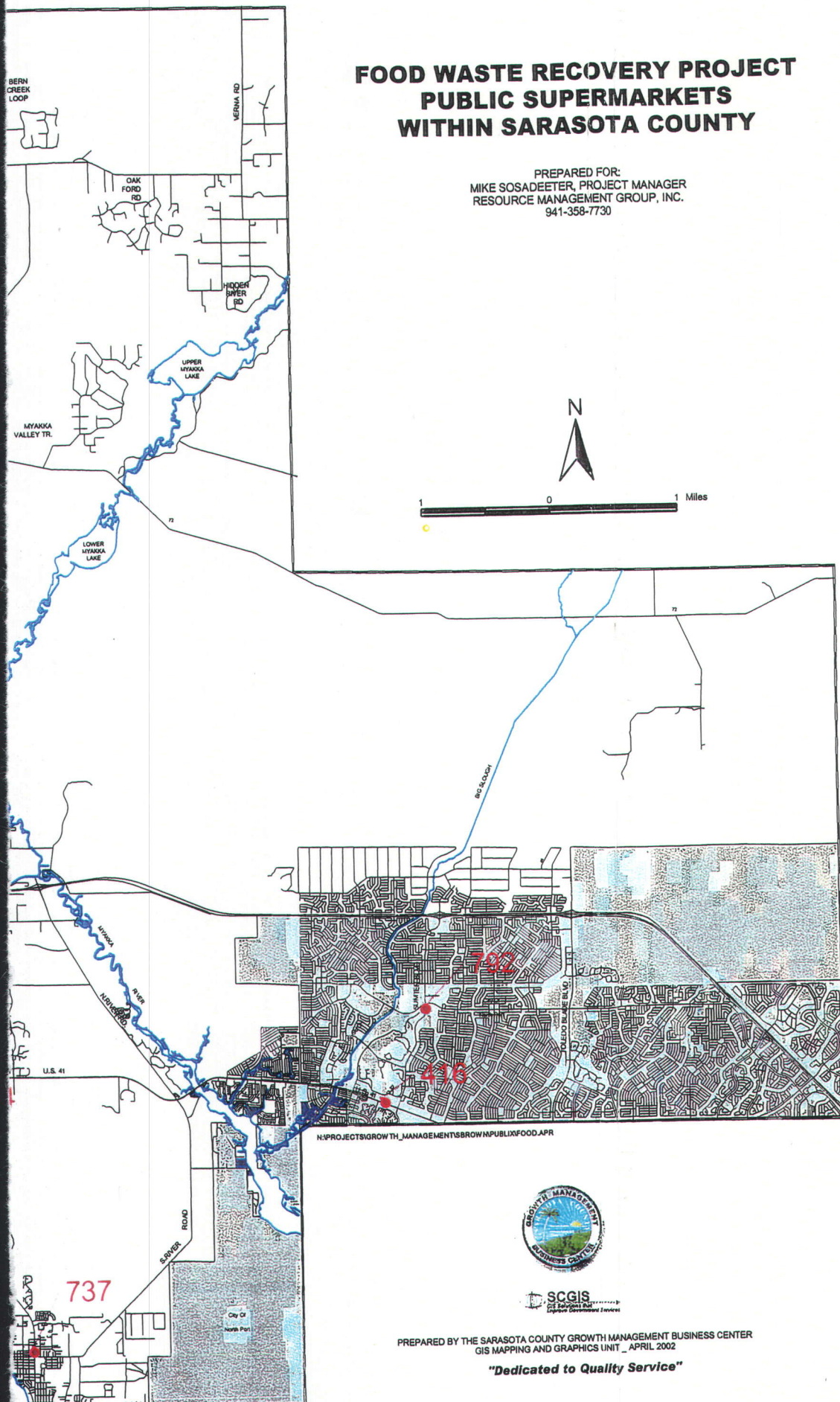
WASTE Member



Store #	Shopping Center	Street Address	City	State	Zip Code
29	Ringling Shopping Pl	282 Shopping Ln	Sarasota	FL	34237
63	Sarasota Commons	935 N Beneva Rd	Sarasota	FL	34232
148	Sarasota Crossing	5391 Fruitville Rd	Sarasota	FL	34232
173	Village Plaza SC	3690 Bee Ridge Rd	Sarasota	FL	34233
217	Nokomis Village SC	1091 N Tamiami Tr	Nokomis	FL	34275
218	Town Plaza	525 Bay Isles Pky	Longboat Key	FL	34228
333	Beneva Village Shops	3428 Clark Rd	Sarasota	FL	34231
361	Centergate Village	5804 Bee Ridge Rd	Sarasota	FL	34233
384	Venice Village Shopp	4173 S Tamiami Tr	Venice	FL	34293
409	The Plaza at Palmer	8409 S Tamiami Tr	Sarasota	FL	34238
416	Shoppes of N Port	14879 S Tamiami Tr	North Port	FL	34827
555	Paradise Plaza SC	3825 S Osprey Ave	Sarasota	FL	34231
696	Sarasota Pavilion	6543 S Tamiami Tr	Sarasota	FL	34231
734	Venice Commons	1445 E Venice Ave	Venice	FL	34292
737	Olde Village Public	55 N Indiana Ave	Englewood	FL	34223
792	Heron Creek Town Cen	1291 S Sumter Blvd	North Port	FL	34287
802	Venice SC	535 Tamiami Tr	Venice	FL	34292
4104	Grocery Warehouse	6123 Sawyer Rd	Sarasota	FL	34233

FOOD WASTE RECOVERY PROJECT PUBLIC SUPERMARKETS WITHIN SARASOTA COUNTY

PREPARED FOR:
MIKE SOSADEETER, PROJECT MANAGER
RESOURCE MANAGEMENT GROUP, INC.
941-358-7730



N:\PROJECTS\GROWTH_MANAGEMENT\BROWNS\PUBLIC\FOOD.APR



PREPARED BY THE SARASOTA COUNTY GROWTH MANAGEMENT BUSINESS CENTER
GIS MAPPING AND GRAPHICS UNIT - APRIL 2002

"Dedicated to Quality Service"



Jeb Bush
Governor

Department of Environmental Protection

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

David B. Struhs
Secretary

SARASOTA COUNTY INNOVATIVE RECYCLING GRANT

FOR STATE ASSISTANCE UNDER SECTION 403.7095(9), FLORIDA STATUTES
CSFA# 37.050

PART I - GRANT INFORMATION

1. Grant Number: IGI-14
2. Date of Award Decision: February 26, 2001
3. Grant Title: Food Recovery & Recycling
4. Grant Period: Date of Execution - Until May 30, 2003
5. Grant Amount: \$536,820
6. Grantee: SARASOTA COUNTY

Address: 1660 Ringling Blvd., 4th Floor
Sarasota, FL 34236
Payment Remittance Address (if different from above):
7. Federal Employer Identification Number: 59-6000848
8. Authorized Representative
Name: David R. Mills
Title: Chair, Board of County Commissioners
Phone: (941) 951-5344
9. Project Manager:
Name: Jodi John
Title: Manager, Resource Conservation
Phone: (941) 364-4663
E-mail: jjohn@co.sarasota.fl.us
10. Issuing Office: Florida Department of Environmental Protection
Bureau of Solid and Hazardous Waste
2600 Blair Stone Road MS 4570
Tallahassee, Florida 32399-2400

PART II - GRANT CONDITIONS***PLEASE READ THE GRANT CONDITIONS CAREFULLY AS SOME ITEMS HAVE CHANGED***

1. The Department does hereby enter into an Innovative Recycling Grant Agreement with **SARASOTA COUNTY (GRANTEE)** for purposes in accordance with Attachment D, Scope of Services; Attachment E, Grant Proposal, and Attachment F, Certification by Engineer or Other Qualified Professional attached hereto and made a part hereof.
2. The method of payment shall be on a reimbursement basis only.
3. The term of this agreement shall begin on the date it is fully executed by both parties and extend until May 30, 2003. The date each reporting period ends and the due date to submit period reports and payment requests is listed below:

<u>Reporting Periods</u>	<u>End Date</u>	<u>Reporting & Invoice Due Date</u>
Work Period 1	August 31, 2001	September 17, 2001
Work Period 2	November 30, 2001	December 17, 2001
Work Period 3	February 28, 2002	March 15, 2002
Work Period 4	May 31, 2002	June 17, 2002
Work Period 5	August 30, 2002	September 15, 2002
Work Period 6	November 30, 2002	December 16, 2002
Work Period 7	February 28, 2003	March 17, 2003
Work Period 8	May 31, 2003	June 16, 2003

FINAL REPORT DUE June 30, 2003

Any changes to the project Timeline or reporting periods must be approved in advance by the DEP project manager.

4. Reimbursement Requests must be signed by the designated authorized representative or the delegate assigned by resolution. This should be the same person who signed the grant agreement. If there is a change in the authorized representative during the grant term, the Department must be notified of the new representative by resolution or minutes of a commission meeting.
5. The Grantee shall submit an original and two copies of Attachment A in conjunction with the progress report to the DEP Project Manager as required herein. All requests for reimbursement shall be submitted in detail sufficient for proper pre-audit and post-audit review thereof. Five percent (5%) of each request, up to a maximum of five percent (5%) of the total Grant amount shall be withheld until the final report has been received and accepted by the Department.
 - a) Reimbursement Requests must include a summary sheet and copies of all invoices being submitted for reimbursement. The summary shall list each paid invoice, the date it was paid and the payment check number. It will provide a description of the services or items purchased stating why they are essential to the project.

- b) Property numbers will be assigned to any equipment purchase(s) over \$1000 (ref. paragraph 17) and provided in the reimbursement request. Include a properly completed Property Reporting Form (Attachment C) and attach copies of invoices or receipts to document the purchases to the form.
 - c) Consultant invoices shall include the number of hours, rate, and a detail of how time billed was essential to the project. The summary shall also state a total dollar amount of the invoices being submitted for reimbursement minus the DEP's 5% withholding amount.
 - d) Any changes to the Scope of Services budget (attachment D) must be requested in advance of expenditure through submission of a change order request. The DEP Project manager must approve any budget changes.
6. The Department's Project Manager is: **Laurie Tenace, (850) 488-1865**
The Grantee's Project Manager is: **Jodi John, (941) 364-4663**
All matters shall be directed to the Project Managers for appropriate action or disposition.
7. The progress reports submitted in conjunction with the reimbursement requests shall clearly state the activities undertaken during the reporting period, activities anticipated for the next reporting period, problems encountered and problem resolutions, a financial summary of the project (including matching and in-kind services), and any schedule updates. In addition to the progress reports required above and any deliverables specified in the Scope of Services (attachment D), a final report shall be submitted to the Department no later than **June 30, 2003**, 30 days from the date the grant ends, **May 30, 2003**.
8. The Final report should be presented in a technical or scientific manner. It should be able to stand on its own so individuals with first time knowledge of the project might understand it. The final report shall be submitted in hardcopy and MS Word or PDF electronic format and include but not be limited to the following information:
- a) An introduction briefly describing this project and the contents of the final report. It should also include but not be limited to the following:
 - 1. The background of how this project came about.
 - 2. The objectives or goals of the project.
 - 3. What made this project innovative?
 - 4. The proposed audience and date for the formal presentation about the project at an appropriate state or national workshop. Are any published articles in recognized trade journal or professional journals planned?
 - b) The implementation of the project including, but not limited to the following:
 - 1. What equipment and/or services were purchased and how it was utilized.
 - 2. How the project demonstrated and/or implemented a cooperative recycling effort with other counties in the region.
 - 3. A description of the various elements or components and a project timeline.
 - 4. Problems encountered during the project and how they were resolved or addressed.
 - c) The project results including, but not limited to, the following:

1. How the objectives or goals were or were not met for this project.
2. How this project demonstrated or utilized advanced technologies or processes which are not in common use on a statewide basis in jurisdictions of similar size or demographics.
3. How this project led to greater quantities of recovered materials and/or created a product that is more recyclable and/or marketable.
4. The transferability of the technology or processes realized from this project and how it was or will be applicable to other communities, businesses or individuals.
5. A detailed analysis and discussion of how this project resulted in substantial improvements in recycling program cost effectiveness and efficiency as measured against statewide average costs for the same or similar programs. Include the following:
 - a. Total dollar figures of the various elements or components of the project, including administration, equipment, operations, advertising, education and any other expenses incurred during the project.
 - b. Project expenditures categorized for both the public versus private sectors and the sources of project funding comparing the county (including in-kind services) versus the innovative grant.
 - c. Tipping fees avoided as a result of waste diversion/reduction.
 - d. A cost/benefit ratio for the project comparing the cost of project versus the benefits that were achieved. Include any assumptions made in deriving this information. Discussion should include the following:
 1. Avoided material tonnages and space (in cubic yards) at area landfills.
 2. Possible impacts made conserving natural resources.
 3. Cost per capita and per ton of specific material(s) recovered or recycled as part of this project.
 - e. How the project has collected and recycled nontraditional materials, and enhanced their marketability and availability to end markets.
9. The Grantee shall maintain books, records and documents directly pertinent to performance under this Agreement in accordance with generally accepted accounting principles consistently applied. The Department, the State, or their authorized representatives shall have access to such records for audit purposes during the term of this Agreement and for three years following Agreement completion. In the event any work is subcontracted, the Grantee shall similarly require each subcontractor to maintain and allow access to such records for audit purposes.
10. In addition to the provisions contained in paragraph 9 above, the Grantee shall comply with the applicable provisions contained in Attachment B, Special Audit Requirements. A revised copy of Attachment B, Exhibit-1, must be provided to the Grantee with each amendment that authorizes a funding increase or decrease. The revised Exhibit-1 shall summarize the funding sources supporting the Agreement for purposes of assisting the Grantee in complying with the requirements of Attachment B. If the Grantee fails to receive a revised copy of Attachment B, Exhibit-1, the Grantee shall notify the
11. Department's Contracts Administrator at 850/922-5942 to request a copy of the updated information.

The Department has the right to terminate the grant award and demand refund of grant funds for non-compliance with the terms of the grant agreement.

12. The State of Florida's performance and obligation to pay under this grant agreement is contingent upon receipt of funds presently anticipated from the Florida Department of Revenue.
13. Travel expenses are included in the amount of this grant and no additional travel expenses will be authorized. Any requests for reimbursement of travel expenses must be submitted in accordance with Section 112.061, Florida Statutes.
14. The Department reserves the right to unilaterally cancel this agreement for refusal by the Grantee to allow public access to all documents, papers, letters, or other material subject to the provisions of Chapter 119, Florida Statutes, and made or received by the Grantee in conjunction with this grant.
15. The Grantee, and any sub-grantee, is prohibited from using grant funds for the purpose of lobbying the Legislature or a State Agency.
16. The Grantee recognizes that the State of Florida, by virtue of its sovereignty, is not required to pay any taxes on the services or goods purchased under the terms of this agreement.
17. Upon satisfactory completion of this grant agreement, the Grantee may retain ownership of the equipment purchased under this agreement. The equipment may be leased or loaned to a private business if necessary for the project. A "release of lien" for any structures built or purchased with grant funds must be provided to the DEP with the final report. Any site containing state purchased equipment must provide records disclosure/access to state auditors.
18. Any equipment purchased for more than \$1000 must be recorded on Attachment C, which must be submitted to the Department with your final report. For a period of three years after completion of the grant agreement, the Grantee shall maintain ownership of such equipment, shall list such equipment purchase(s) on its property inventory, and shall assure that such equipment is used exclusively in some recycling capacity in this state. Within that three-year period, the Grantee may sell the equipment for fair market value provided that the proceeds of such a sale must be returned to the DEP.
19. This grant agreement does not supersede any other agency requirements that may be applicable to your project. The appropriate DEP District Office, as well as local government, must be contacted to determine whether a permit or license is required.
20. The Grantee, as an independent grantee and not an agent, representative, or employee of the Department, agrees to carry adequate liability and other appropriate forms of insurance. The Department shall have no liability except as specifically provided in this agreement.
21. The Grantee must comply with the applicable requirements of Section 287.057, F.S., if acquiring professional services. The DEP Project Manager must approve any Contractor, not identified in the Scope of Services that is hired to carry out project work. Project work cannot be contracted on a contingency basis.

OFFER AND ACCEPTANCE

The State of Florida, acting by and through the Department of Environmental Protection, hereby offers assistance to **SARASOTA COUNTY** for allowable costs up to and not exceeding **\$536,820**.

The State of Florida by the Department of Environmental Protection:

John M. Ruddell
John M. Ruddell, Director
Division of Waste Management

4/27/01
Date

In accepting this award and any payments made pursuant thereto, (1) the undersigned represents that he is duly authorized to act on behalf of the recipient county, and (2) the recipient agrees to the grant conditions.

BY AND ON BEHALF OF SARASOTA COUNTY:

Signature of Authorized Representative

Date

Please Return to:

Suzanne Boroff
FL DEP, Division of Waste Management
Waste Reduction Section, Rm. 358C,
2600 Blair Stone Rd. MS 4570
Tallahassee, FL 32399-2400

List of attachments/exhibits included as part of this agreement:

Attachment A	Payment Request Form
Attachment B	Special Audit Requirements
Attachment C	Property Reporting Form for DEP Innovative Grant
Attachment D	Scope of Services (-- pages)
Attachment E	Proposal for Innovative Recycling Grant Project (-- pages)
Attachment F	Certification By Engineer or Other Qualified Professional

ATTACHMENT A

PAYMENT REQUEST SUMMARY FORM

GRANTEE: SARASOTA COUNTY

GRANTEE'S GRANT MANAGER:

Jodi John

DEP AGREEMENT NO.: IG1-14

PAYMENT REQUEST NO.: _____

DATE OF REQUEST: _____

PERFORMANCE PERIOD

COVERED: _____

AMOUNT REQUESTED THIS
PERIOD: _____

TOTAL MATCHING

FUNDS REQUIRED: _____

GRANT EXPENDITURES SUMMARY SECTION

[Effective Date of Grant through End-of-Grant Period]

CATEGORY OF EXPENDITURE	AMOUNT OF THIS REQUEST	TOTAL CUMULATIVE PAYMENTS	MATCHING FUNDS
Salaries	\$	\$	\$
Fringe Benefits	\$	\$	\$
Travel (if authorized)	\$	\$	\$
Subcontracting:			
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
	\$	\$	\$
Equipment Purchases*	\$	\$	\$
Supplies/Other Expenses	\$	\$	\$
TOTAL INVOICES SUBMITTED	\$	\$	\$
Less 5%	\$		
Total Reimbursement Requested	\$		
Less Total Cumulative Payments of:	\$		
TOTAL REMAINING IN GRANT	\$		

*Single purchases over \$1,000. See Attachment C

GRANTEE CERTIFICATION

The undersigned certifies that the amount being requested for reimbursement above were for items that were charged to and utilized only for the above cited grant activities.

Grantee's Grant Manager's Signature	Grantee's Fiscal Agent
Print Name Jodi John	Print Name
Telephone Number (941) 364-4663	Telephone Number

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ATTACHMENT B

SPECIAL AUDIT REQUIREMENTS

The administration of funds awarded by the Department of Environmental Protection (which may be referred to as the "Department", "DEP", "FDEP" or "Grantor", or other name in the contract/agreement) to the recipient (which may be referred to as the "Contractor", "Grantee" or other name in the contract/agreement) may be subject to audits and/or monitoring by the Department of Environmental Protection, as described in this section.

MONITORING

In addition to reviews of audits conducted in accordance with OMB Circular A-133, as revised (see "AUDITS" below), monitoring procedures may include, but not be limited to, on-site visits by Department staff, limited scope audits as defined by OMB Circular A-133, as revised, and/or other procedures. By entering into this agreement, the recipient agrees to comply and cooperate with any monitoring procedures/processes deemed appropriate by the Department of Environmental Protection. In the event the Department of Environmental Protection determines that a limited scope audit of the recipient is appropriate, the recipient agrees to comply with any additional instructions provided by the Department to the recipient regarding such audit. The recipient further agrees to comply and cooperate with any inspections, reviews, investigations, or audits deemed necessary by the Comptroller or Auditor General.

AUDITS**PART I: FEDERALLY FUNDED**

This part is applicable if the recipient is a State or local government or a non-profit organization as defined in OMB Circular A-133, as revised.

1. In the event that the recipient expends \$300,000 or more in Federal awards in its fiscal year, the recipient must have a single or program-specific audit conducted in accordance with the provisions of OMB Circular A-133, as revised. EXHIBIT 1 to this agreement indicates Federal funds awarded through the Department of Environmental Protection by this agreement. In determining the Federal awards expended in its fiscal year, the recipient shall consider all sources of Federal awards, including Federal funds received from the Department of Environmental Protection. The determination of amounts of Federal awards expended should be in accordance with the guidelines established by OMB Circular A-133, as revised. An audit of the recipient conducted by the Auditor General in accordance with the provisions OMB Circular A-133, as revised, will meet the requirements of this part.
2. In connection with the audit requirements addressed in Part I, paragraph 1., the recipient shall fulfill the requirements relative to auditee responsibilities as provided in Subpart C of OMB Circular A-133, as revised.
3. If the recipient expends less than \$300,000 in Federal awards in its fiscal year, an audit conducted in accordance with the provisions of OMB Circular A-133, as revised, is not required. In the event that the recipient expends less than \$300,000 in Federal awards in its fiscal year and elects to have an audit conducted in accordance with the provisions of OMB Circular A-133, as revised, the cost of the audit must be paid from non-Federal funds (i.e., the cost of such an audit must be paid from recipient funds obtained from other than Federal entities).

4. The recipient may access information regarding the Catalog of Federal Domestic Assistance (CFDA) via the internet at <http://aspe.os.dhhs.gov/cfda>.

PART II: STATE FUNDED

This part is applicable if the recipient is a nonstate entity as defined by Section 215.97(2)(l), Florida Statutes.

1. In the event that the recipient expends a total amount of State awards (i.e., State financial assistance provided to the recipient to carry out a State project) equal to or in excess of \$300,000 in any fiscal year of such recipient, the recipient must have a State single or project-specific audit for such fiscal year in accordance with Section 215.97, Florida Statutes; applicable rules of the Executive Office of the Governor and the Comptroller, and Chapter 10.600, Rules of the Auditor General. EXHIBIT 1 to this agreement indicates State funds awarded through the Department of Environmental Protection by this agreement. In determining the State awards expended in its fiscal year, the recipient shall consider all sources of State awards, including State funds received from the Department of Environmental Protection, except that State awards received by a nonstate entity for Federal program matching requirements shall be excluded from consideration.
2. In connection with the audit requirements addressed in Part II, paragraph 1, the recipient shall ensure that the audit complies with the requirements of Section 215.97(7), Florida Statutes. This includes submission of a reporting package as defined by Section 215.97(2)(d), Florida Statutes, and Chapter 10.600, Rules of the Auditor General.
3. If the recipient expends less than \$300,000 in State awards in its fiscal year, an audit conducted in accordance with the provisions of Section 215.97, Florida Statutes, is not required. In the event that the recipient expends less than \$300,000 in State awards in its fiscal year and elects to have an audit conducted in accordance with the provisions of Section 215.97, Florida Statutes, the cost of the audit must be paid from non-State funds (i.e., the cost of such an audit must be paid from recipient funds obtained from other than State entities).
4. For information regarding the Florida Single Audit Act, including the Florida Catalog of State Financial Assistance (CFSA), a recipient should access the website for the Governor's Office located at <http://sun6.dms.state.fl.us/fsaa/> for assistance. In addition to the above website, the following websites may be accessed for information: Legislature's Website <http://www.leg.state.fl.us/>, Governor's Website <http://www.flgov.com/>, Department of Banking and Finance's Website <http://www.dbf.state.fl.us/aadir/FSAAIndex.html>, and the Auditor General's Website <http://sun6.dms.state.fl.us/audgen>.

PART III: OTHER AUDIT REQUIREMENTS

(NOTE: Pursuant to Section 215.97(7)(m), Florida Statutes, State agencies may conduct or arrange for audits of State awards that are in addition to audits conducted in accordance with Section 215.97, Florida Statutes. In such an event, the State agency must arrange for funding the full cost of such additional audits. This part would be used to specify any additional audit requirements imposed by the State agency that are solely a matter of that State agency's policy (i.e., the audit is not required by Federal or State laws and is not in conflict with other Federal or State audit requirements).)

PART IV: REPORT SUBMISSION

1. Copies of audit reports for audits conducted in accordance with OMB Circular A-133, as revised, and required by PART I of this agreement shall be submitted, when required by Section 320 (d), OMB Circular A-133, as revised, by or on behalf of the recipient directly to each of the following:

- A. The Department of Environmental Protection at each of the following addresses:

Laurie Tenace, Project Manager
Florida Department of Environmental Protection
Bureau of Solid and Hazardous Waste
2600 Blair Stone Road MS 4570
Tallahassee, Florida 32399-2400

Audit Director
Florida Department of Environmental Protection
Office of Inspector General
2600 Blair Stone Road, MS40
Tallahassee, Florida 32399-2400

- B. The Federal Audit Clearinghouse designated in OMB Circular A-133, as revised (the number of copies required by Sections .320 (d)(1) and (2), OMB Circular A-133, as revised, should be submitted to the Federal Audit Clearinghouse), at the following address:

Federal Audit Clearinghouse
Bureau of the Census
1201 East 10th Street
Jeffersonville, IN 47132

- C. Other Federal agencies and pass-through entities in accordance with Sections .320 (e) and (f), OMB Circular A-133, as revised.

2. Pursuant to Section .320(f), OMB Circular A-133, as revised, the recipient shall submit a copy of the reporting package described in Section .320(c), OMB Circular A-133, as revised, and any management letters issued by the auditor, to the Department of Environmental Protection at each of the following addresses:

Laurie Tenace, Project Manager
Florida Department of Environmental Protection
Bureau of Solid and Hazardous Waste
2600 Blair Stone Road MS 4570
Tallahassee, Florida 32399-2400

Audit Director
Florida Department of Environmental Protection
Office of Inspector General
2600 Blair Stone Road, MS40
Tallahassee, Florida 32399-2400

3. Copies of reporting packages required by PART II of this agreement shall be submitted by or on behalf of the recipient directly to each of the following:

- A. The Department of Environmental Protection at each of the following addresses:

Laurie Tenace, Project Manager
Florida Department of Environmental Protection
Bureau of Solid and Hazardous Waste
2600 Blair Stone Road MS 4570
Tallahassee, Florida 32399-2400

Audit Director
Florida Department of Environmental Protection
Office of Inspector General
2600 Blair Stone Road, MS40
Tallahassee, Florida 32399-2400

B. The Auditor General's Office at the following address:

State of Florida Auditor General
Room 574, Claude Pepper Building
111 West Madison Street
Tallahassee, Florida 32302-1450

4. Copies of reports or management letters required by PART III of this agreement shall be submitted by or on behalf of the recipient directly to the Department of Environmental Protection at each of the following addresses:

Laurie Tenace, Project Manager
Florida Department of Environmental Protection
Bureau of Solid and Hazardous Waste
2600 Blair Stone Road MS 4570
Tallahassee, Florida 32399-2400

Audit Director
Florida Department of Environmental Protection
Office of Inspector General
2600 Blair Stone Road, MS40
Tallahassee, Florida 32399-2400

5. Any reports, management letters, or other information required to be submitted to the Department of Environmental Protection pursuant to this agreement shall be submitted timely in accordance with OMB Circular A-133, Florida Statutes, and Chapter 10.600, Rules of the Auditor General, as applicable.
6. Recipients, when submitting audit reports to the Department of Environmental Protection for audits done in accordance with OMB Circular A-133, Florida Statutes, and Chapter 10.600, Rules of the Auditor General, should indicate the date that the audit report was delivered to the recipient in correspondence accompanying the audit report.

PART V: RECORD RETENTION

The recipient shall retain sufficient records demonstrating its compliance with the terms of this agreement for a period of 3 (*specify appropriate number of years, should be at least three years*) years from the date the audit report is issued, and shall allow the Department of Environmental Protection or its designee, access to such records upon request. The recipient shall ensure that audit working papers are made available to the Department of Environmental Protection or its designee, upon request for a period of 3 (*specify appropriate number of years, should be at least three years and be equivalent to the number of years identified above*) years from the date the audit report is issued, unless extended in writing by the Department of Environmental Protection.

ATTACHMENT B

EXHIBIT -1

FUNDS AWARDED TO THE RECIPIENT PURSUANT TO THIS AGREEMENT CONSIST OF THE FOLLOWING:

Federal Funds Awarded to the Recipient Pursuant to this Agreement Consist of the Following:					
Federal Program Number	Federal Agency	CFDA Number	CFDA Title	Funding Amount	State Appropriation Category

State Funds Awarded to the Recipient Pursuant to this Agreement Consist of the Following Matching Funds for Federal Programs:					
Federal Program Number	Federal Agency	CFDA	CFDA Title	Funding Amount	State Appropriation Category

State Funds Awarded to the Recipient Pursuant to this Agreement Consist of the Following Funds Subject of Section 215.97, F.S.:						
State Program Number	Funding Source	State Fiscal Year	Catalog of State Financial Assistant Number	CSFA Title Or Funding Source Description	Funding Amount	State Appropriation Category
Total Award					Specify Total Amount	

For each program identified above, the recipient shall comply with the program requirements described in the Federal Catalog of Domestic Assistance (CFDA) <http://aspe.os.dhhs.gov/cfda> and/or the Florida Catalog of State Financial Assistance (CFSA) <http://sun6.dms.state.fl.us/fsaa/>. The services/purposes for which the funds are to be used are included in the Contract scope of services/work. Any match required by the recipient is clearly indicated in the Contract.

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ATTACHMENT C

PROPERTY REPORTING FORM FOR DEP IG1-14 (For Property With Grantee Assigned Property Control Numbers)

GRANTEE: List non-expendable equipment/personal property* costing \$1,000 or more purchased under the above Agreement. Also list all upgrades* under this Agreement, costing \$1,000 or more, of property previously purchased under a DEP Agreement (identify the property upgraded and the applicable DEP Agreement on a separate sheet). Complete the serial number, cost, location/address and property control number columns of this form. The Grantee shall establish a unique identifier for tracking all personal property purchased under this agreement and shall report the inventory of said property, on an annual basis, to the Department's Grant Manager, by DEP Agreement number, no later than January 31st for each year this agreement is in effect.

DESCRIPTION	SERIAL NO./COST	LOCATION/ADDRESS	GRANT/ASSIGNED PROPERTY CONTROL NUMBER

Not including software. ** Attach copy of invoice, bill of sale, or other documentation to support purchase.

GRANTEE: SARASOTA COUNTY	Grantee's Grant Manager: Jodi John	Date:
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BELOW FOR DEPARTMENT USE ONLY

DEPARTMENT USE ONLY: Maintain all documents with a copy of the invoice supporting the acquisition item identified above in your Agreement file. If the Agreement is assigned to a grant manager, presenters must submit a copy of the invoice to the grant manager for the processing of the grant. Grantee's invoice for payment.

DEPARTMENT USE ONLY: [Signature Line]

DEP FINANCE AND ACCOUNTING: No processing required by Finance & Accounting as the Grantee is responsible for retaining ownership of the equipment/property upon satisfactory completion of the agreement.

DEP PROPERTY MANAGEMENT: No processing required by the Property Management section as the Grantee will retain ownership of the equipment/property upon satisfactory completion of the Agreement.

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IG1-14 Attachment D

Sarasota County - Food Recovery and Recycling Year 4 - Innovative Recycling Grant Scope of Service

This Scope of Service documents the anticipated activities the project team will conduct and deliverables to be produced to implement the Food Recovery and Recycling project proposal submitted to FDEP under the Year 4 Innovative Recycling Grant program. The scope has been developed in a table format, so that the project timeline clearly aligns with deliverables and anticipated costs/expenditures. The columns of the table are explained below.

Column 1 identifies the project Task, which will be listed on requests for reimbursement and accounting for in-kind contributions.

Column 2 identifies Activities anticipated for completing the task.

Column 3 identifies Deliverables anticipated for completing the task.

Column 4 identifies the anticipated total cost for the task

Column 5 identifies the anticipated In-Kind contribution through local matching funds and/or services.

Column 6 identifies the maximum reimbursement the project will request from FDEP for the task.

Column 7 identifies the project timeline based on the anticipated work period in which activities will occur. Each work-period represents three-months, and commences upon issuance of signed contract between FDEP and the County.

Tasks	Activities	Deliverables	Cost	In Kind	Request	Timeline – Work Period in which activities will occur							
						1	2	3	4	5	6	7	8
Food for People program													
Refrigerated Collection Truck	Specify and procure refrigerated truck for use in the program. Fuel and conduct routine maintenance of truck.	A refrigerated truck placed into service for perishable food recovery.	\$ 75,000	\$ 10,000	\$ 65,000	x	x	x	x	x	x	x	x
Outreach	Coordinate and meet with managers of food banks, grocery stores, and other potential generators and recipients of edible perishable foods, and facilitate implementation of a perishable foods recovery program. Prepare educational materials.	Copies of educational materials, list of stores contacted, meetings held, and programs implemented.	9,500	6,000	3,500	x	x	x	x	x	x	x	x
Driver	Driver will operate refrigerated truck to collect food for people.	Collection and distribution of perishable foods.	70,000	70,000	-	x	x	x	x	x	x	x	x

IG1-14 Attachment D

Sarasota County - Food Recovery and Recycling
Year 4 - Innovative Recycling Grant Scope of Service

Tasks	Activities	Deliverables	Cost	In Kind	Request	Timeline - Work Period in which activities will occur							
						1	2	3	4	5	6	7	8
Food for Animals program	Refrigerated Collection Truck (co-collected w/Food for People)	Develop and evaluate a system of co-collecting food for animals with food for people. Evaluate feasibility of diversion while complying with health and safety standards to protect against cross contamination.											
		Coordinate with farms and other potential recipients of food for animals as well as regulating agencies. Facilitate implementation of a perishable foods recovery program. Prepare educational materials and meet with managers of farms to develop market for diverted materials.											
	Outreach to Farms	Documentation of system(s) utilized to co-collect food for animals with food for people. If proven feasible, prepare a guidance document explaining how this program could be transferred to other locales.											
		Documentation of activities, evaluation of opportunities for diverting food for animals, and a diversion program, if feasible, with documentation of food quantities diverted. Copies of educational materials, list of farms contacted, meetings held, and programs implemented.	6,500	2,500	4,000								
	Outreach to Stores	Documentation of activities, evaluation of opportunities for diverting food for animals, and a diversion program, if feasible, with documentation of food quantities diverted. Copies of educational materials, list of stores contacted, meetings held, and programs implemented.	10,500	6,000	4,500								
Food for Plants (composting) program	Facility design and Permitting	Compost facility design and facility Operating Permit.	51,100	9,500	41,600								
	Composting Pad (fill material)	Fill or other material procured.	12,500		12,500								
	Composting Pad (transporting fill)	Transportation of fill or other material from source location to composting site.	12,500	2,500	10,000								

IG1-14 Attachment D

Sarasota County - Food Recovery and Recycling
Year 4 - Innovative Recycling Grant Scope of Service

Tasks	Activities	Deliverables	Cost	In Kind	Request	Timeline - Work Period in which activities will occur							
						1	2	3	4	5	6	7	8
Composting Pad (site preparation)	Loader and other equipment operation to prepare site for composting operation, including forming of composting pad as well as storm-water control system.	Pad prepared.	15,000	5,000	10,000				X				
Composting Site Misc. Improvements	This activity may include digging a well, bringing electric to the site, repairing donated equipment broken during other activities, erecting fencing, or other appropriate uses approved (in advance) by FDEP.	Documentation per activity.	5,000	2,500	2,500				X	X	X	X	X
Composting Equipment (lease)	Research and analyze composting equipment for use with composting operation. Lease and evaluate equipment during the project period.	Report on equipment considered, and performance of equipment leased.	110,000	80,000	30,000					X	X	X	X
Operator Training	Attend and/or conduct compost facility operators training.	Certificates of course completion for trainees.	14,200	9,100	5,100					X	X	X	X
Design collection route	Market food discards generators to recruit participants for collection, including mailings phone calls and meetings.	A collection route that diverts approximately one truck (estimated 10 ton) per day of material.	12,480	-	12,480			X	X	X	X	X	X
Collection and Tip Fees	Collect food discards.	Documentation of activities and diversion.	187,200	93,600	93,600					X	X	X	X
Collection container rental	Rent collection containers.	Containers rented.	23,400	11,700	11,700					X	X	X	X
Education/training of generators	Prepare educational materials and meet with managers of grocery stores and restaurants to implement diversion program(s).	Copies of educational materials, list of stores and restaurants contacted, meetings held, and programs implemented.	18,100	7,700	10,400				X	X	X	X	X
Operator Compensation	Operator will manage food discards delivered to the composting facility.	Documentation of activities.	15,600	-	15,600						X	X	X
In-Vessel System	Research and analyze in-vessel composting equipment. Develop comparison of on-site in-vessel management of food discards, compared with central facility approach. Lease and evaluate equipment during the project period.	Report on equipment considered, and performance of equipment leased.	30,000	-	30,000			X	X	X	X	X	X
Ground Urban Plant Debris	This material will be procured for use as carbon source to balance food discards in the composting process and recipe design.	Composting recipes.	93,600	93,600	-						X	X	X
Sampling and analysis	Conduct sampling and analysis of compost.	Compost samples collected and analyzed.	6,400	1,400	5,000							X	X

IG1-14 Attachment D

Sarasota County - Food Recovery and Recycling Year 4 - Innovative Recycling Grant Scope of Service

Tasks	Activities	Deliverables	Cost	In Kind	Request	Timeline - Work Period in which activities will occur							
						1	2	3	4	5	6	7	8
Marketing Product Screening	Marketing	Documentation of activities.	8,600	7,600	1,000							x	x
	Screen compost material to increase it's market potential and remove contaminants.	Screened compost. Documentation of contaminants that are screened out.	500	500	-							x	x
	Valuation of land used for the pilot project.	Documentation of activities.	30,000	30,000	-				x	x	x	x	x
Lease Land													
Food for Plants (Vermi-composting) prog. Design, and Permitting													
	Design the food discards vermi-composting facility, meet with appropriate regulators, local industry experts, and other interested parties, including FORCE; prepare permit application(s); negotiate with regulating agencies for issuance of permits.	Vermi-compost facility design and facility Operating Permit	16,500	5,300	11,200	x	x	x	x				
Operator Training	Attend and/or conduct vermi-compost facility operators training.	Certificates of course completion for trainees.	10,300	5,200	5,100				x	x			x
	Research and analyze vermi-composting equipment for use with operation. Equipment to be considered, include: concrete floor worm bed, pole-barn structure for worm shelter, castings harvesting equipment, screens, food shredders, tractor, converted feed-mixer for blending. Lease and evaluate equipment during the project period.	Report on equipment considered, and performance of equipment leased.	110,500	6,500	104,000				x	x	x	x	x
Operator Compensation	Operator will manage food discards delivered to the composting facility.	Documentation of activities.	15,600	-	15,600								
	Used as bedding in worm bins, mixed with food discards.	Documentation of activities.	3,000	3,000	-								
Marketing Product Worms	Marketing	Documentation of activities.	8,500	8,500	-								
	Purchase appropriate species of worm.	Worms procured and introduced to the system.	15,000	-	15,000								
General Tasks													

IG1-14 Attachment D

Sarasota County - Food Recovery and Recycling
Year 4 - Innovative Recycling Grant Scope of Service

Tasks	Activities	Deliverables	Cost	In Kind	Request	Timeline - Work Period in which activities will occur							
						1	2	3	4	5	6	7	8
Reporting, Dissemination of Information, Administration	Prepare reports as requested by FDEP, add information and resource pages to Florida's Online Composting Center (compostinfo.com) to disseminate information on the project. Work with Recycle Florida Today - FORA division to disseminate information to the Florida organics recycling industry. Author articles on the project and seek publication in state and national forums. Seek to present at annual conferences within the recycling industry.	Reports, updated web-site, articles, and responses to calls for speakers.	24,440	11,000	13,440	x	x	x	x	x	x	x	x
Insurance	Purchase insurance for operations protection.	Documentation of Insurance.	4,000	-	4,000								
Total			1,025,520	488,700	536,820								



- 1) Applicant County: Sarasota County, Florida
- 2) Primary contact person: Jodi John
- 3) Complete Address: Resource Conservation
Environmental Services
Sarasota County Government
1660 Ringling Blvd.
Sarasota, FL 34236
- 4) Telephone (including SunCom number): 941-364-4663
- 5) E-mail address: jjohn@co.sarasota.fl.us
- 6) Grant Request Amount: \$536,820
- 7) Project Timeframe (months): 24 months
- 8) Project Abstract:

Sarasota County Government seeks funding to develop Florida's first integrated food discard management program using an intrinsic value hierarchy. Significant quantities mean significant opportunities. FDEP estimates 1.3 million tons of food waste was collected in Florida in 1998.

The program will collect food discards generated by supermarkets, restaurants, and institutions (e.g., schools, prisons) and distribute it within the community based on the food's highest and best value.

1. **Food for People:** food that is of highest quality will be collected by a local food bank.
2. **Food for Animals:** food that is of good quality, but not suitable for human consumption will be collected by the food bank in special containers and aggregated for pick up by local farmers.
3. **Food for Plants:** food that is not suitable as food will be collected and processed through composting and vermi-composting into valuable soil amendments.

Each of these program components will function independently, yet complement one another, and form a food discards management pyramid. This powerful diversion strategy, which is unique in Florida, will capture the greatest value in food discards from an environmental, social, and cost-effective standpoint. In addition to food, this project will recover: food soiled paper, yard waste, unmarketable paper (e.g., paper materials recovery facility (MRF) residue), waxed cardboard, and other components of the MSW stream, qualifying this project as addressing "targeted materials."

Innovative Technologies and Processes

Food discards account for 5% to 10% of the overall municipal solid waste stream (exclusive of industrial discards) and offers a huge opportunity for recovery of value from materials otherwise destined for disposal as waste.

Not in common use in Florida.

- **Integrated Hierarchy.** Not one Florida county has implemented a sustainable, integrated food discards management hierarchy.
- **Source Separation.** There are no permitted source-separated food discards composting programs utilizing post-consumer materials currently operating in Florida. Only Sumter county composts any appreciable quantity of food discards, and there the food is mixed with MSW. The product, a mixed-municipal-solid-waste compost, has limited end-market applications.
- **Vermi-composting** is not in common use in Florida on a commercial scale and, up until now, has not been used as a technique for increasing the value of compost. In addition, the vermi-composting system will be constructed of recycled and/or reused materials (minimum 25%).
- **Innovative Carbon Sources.** We will develop procedures for incorporating innovative carbon sources (food-soiled paper, wax cardboard, unmarketable paper) for compost bulking while maintaining quality controls. While attempts have been made to incorporate these challenging materials, this project will combine evaluation of recipe formation with processing method to arrive at sustainable programs that will last beyond the grant period.

Novel application of an existing technology or process.

- **Hierarchy of Diversion.** Hierarchical use of food discards, source reduction (food for people), food reuse (as animal feed); food recycling (including onsite in-vessel composting and vermi-composting). While each of these individual components have been used throughout the ages to manage food discards, our holistic, integrated approach is a novel one.
- **Co-Collection Efficiency.** Some near-expiration foods that are appropriate for animal feed can be co-collected with food for people, while maintaining compliance with FDA and supermarket guidelines for food safety. This novel approach will save farmers time and increase the supply of fresh food for animals.
- **Permit.** The project will seek a solid waste permit to accept and compost food discards and develop guidance for others seeking permits to compost source-separated organic MSW. The permit process is used to protect human health and the environment. The Project Team will work closely with FDEP to share information about successes and challenges in the permit process, and will develop proposals for streamlining this process to stimulate investment in food discards composting, should FDEP choose to do so.

Overcoming obstacles to recycling/waste reduction in new or innovative ways.

- **Compost Markets (Value).** Compost is a historically low priced commodity in Florida. Because of this, many operators minimize investment in composting and sell inferior, typically un-finished materials. These poor products compound market disinterest in compost. We over come this obstacle by creating a compost that is more beneficial to end-users' horticultural needs.

- ✓ This project utilizes food with urban plant debris, to create a finished product with more nutritional value than yard trash compost.
- ✓ Vermi-composting will be used to “finish” the composting process. Worms have a way of improving the value of compost for plants, and vermi-compost and worm castings command a premium price.
- **Overcoming Collection Challenges.** Two of the major obstacles to food discards management is the limitation on collection infrastructure and failure to integrate collection strategies.
 - ✓ The project also implements an innovative collection system for collecting compostable food discards, focusing on transportation efficiencies.
 - ✓ The project will evaluate composting food discards at the generator’s site (its origin), and transporting partially-composted materials. It is anticipated this will reduce odors, volume, and weight of materials that need to be transported.
- **Programmatic Obstacles.** The Project Team will seek guidance from the Florida Organics Recycling Center of Excellence (FORCE) and other existing resources to build off existing knowledge and to avoid making mistakes demonstrated by previous organics recycling projects. Areas of innovation include demonstration of new composting recipes using food discards and urban plant debris, implementation of original management strategies, and use of non-traditional carbon sources. Innovative demonstrations will include:
 - ✓ Recipes. Source separated food composting has been limited by lack of knowledge about recipe formation. Recipes are the proportional combination of several materials to make a mixture of materials that has the chemical and physical characteristics to promote optimal decomposition by aerobic organisms and to avoid malodorous emissions. The project will develop recipes that incorporate unique materials (e.g. wax cardboard, which has only been co-composted with food waste on a limited basis in Florida). Furthermore, all recipes will be shared through the project’s web site, and in presentations at industry events.
 - ✓ Proper Daily Management The management of food discards through composting and vermi-composting has been attempted many times before. Odor suppression, which will be address by all proposed systems, is the key obstacle to expanded composting. To avoid odor generation, the project will demonstrate specialized aeration equipment (such as innovative turners and a modified passive/active aerated static pile), mobile small-scale in-vessel composting systems, and vermi-composting.
- **Harvesting Worm Castings** is a challenge because you do not want to harvest your worms with your castings, and you do not want to disturb your worms while they are actively working the material. To overcome this challenge, we will lease a specialized castings extractor that allows worm castings to be removed from the system without harvesting worms. It is hoped this will increase operational efficiency. The process also results in increased aeration of the worm beds.
- **Odor Suppression.** Odor has been the primary cause of composting operation failure. The Project Team will build on the successes of the Massachusetts and Vermont food discards composting projects, which have been lauded by the Environmental Protection Agency as model projects that are market based, low technology, and cost-effective.

- ***Quality Assurance.*** The Project Team will overcome concerns about compost quality by testing finished product for quality, including nutrient analysis, compost maturity, problem metals, and pathogens. The Florida Organic Growers Association (FOG) is interested in participating in the project to help clarify if the project can produce compost from municipally generated organic discards that meets the stringent requirements of this environmentally oriented group.

Both the overall approach and system components apply novel approaches and new technologies to overcome obstacles to effectively manage food discards. The project will provide the most comprehensive and integrated food discard management system ever implemented in Florida.

Environmental and Economic Benefits and Cost effectiveness.

Environmental benefits

Because the project is built on a food management hierarchy, the embodied energy of the food is captured on all levels, and materials can be used in their highest and best use. Embodied energy represents all the environmental and economic inputs required to bring a product into being.

Methodology.

- **Source Reduction.** People do not eat “recycled” food, thus this project is source reduction at its core. Each item that can be diverted to use as food-for-people has the greatest environmental impact, because this food has already been produced to the point of readiness for human consumption. Thus all the production, transportation, and distribution impacts are already embodied in the item. In a holistic sense, providing food for people has a great environmental return, as well, because providing food for people responds to a basic human condition, and fulfills the need for fresh nourishment. The *Food for Animals* program also provides source-reduction.
- **Green House/Global Warming Gas Reductions.** Using EPA guidance, the Project will be among the first in the nation to quantify diversion in terms of preventing/offsetting the production of global warming gasses. The composting component will reduce greenhouse gas production by approximately 800 metric ton carbon equivalents (MTCE) annually, based on the designed capacity of 50-60 tons per week of food discards.
- **Energy Innovation (Pollution Prevention).** The Project Team plans to utilize solar power generation options for operating the in-vessel system. This would enable the mobile in-vessel system to be operated without electrical hook-ups or noise generation. Further, it allows the system to operate without generating greenhouse gas emissions or pollution.

Toxicity/Hazards.

Composting food discards aerobically can result in many environmental toxicity benefits by reducing the chemical reactions that occur as food discards break down in landfills and other waste treatment systems. Composting results in **reductions in:**

- **Methane generation.** Methane is a flammable gas that must be managed when generated.
- **Leachate generation.** Leachate generated in landfills must be treated and disposed of properly.
- **Odors and Leachate** in solid waste compactors and dumpsters, where health concerns can arise.
- **Vermin/vectors** at waste management facilities, e.g., landfills, due to reduced food attractants.

Economic Benefits

- **Jobs.** Composting facilities employ four times more people on a per-ton basis than landfills (WasteCap Wisconsin). The Sarasota project will create two to three new permanent full-time jobs, will be replicable, and will demonstrate economic feasibility of commercial food discard composting and vermi-composting.
- **Decreased Generator Costs.** The project aims to reduce generator costs by \$20 - \$40 per ton (depending on internal costs to perform source separation).

- **Commercialization of Source-Separated Organics Management.** The project plans a market-based approach to assure on-going success. This includes a tip fee for the compost operator, disposal savings for the generator, and compensation to the hauler. An anticipated tip fee of \$20/ton is \$44/ton below County landfill tip fees. In addition, the proposed facility location is within seven miles of approximately 60% of the County's population.
- **Low Cost Animal Feed.** Two of 16 Publix Stores currently source separate material for farmers. The project will analyze why these arrangements are effective and permitted, and build on this success to encourage other stores (both Publix and other supermarket chains) to support this end-use. The Project Team is mindful of the changing regulations in this component, and has limited the scope and extent of dependence on this sector to utilize food discards.
- ✓ **Food Pelletization.** The concept of pelletization and other value-added preparation will be considered. However, the Project Team is aware that, most currently operating food-to-feed pelletization programs require a minimum of 80 to 150 tons per day to be economically feasible, and multi-million dollar infrastructure development. Such a facility is beyond the scope of this proposal. Currently, the Team is aware of only one jurisdiction considering this technology: Reedy Creek, which is home to Disney World and related Theme Parks. While there is much to learn from Reedy Creek's experiences, the Project Team believes that the collection infrastructure issues facing medium sized counties require further innovation to be cost effective.
- **Building Community Value:** The project will serve the community by partnering with and incubating community entrepreneurs in the manufacture and sale of worms, worm castings, and compost as a value-added soil amendments. Whereas bulk yard waste compost has a retail value of \$0 plus shipping to \$15.00, delivered, per cubic yard, worm castings are sold for up to \$ 2.00 per lb. in small quantities or by bulk at approximately \$35.00 to \$70.00 per cubic yard.

Cost-effectiveness

- **Food Value.** Diversion of approximately 600,000 lb. of perishable food for people, holds a value of approximately \$1,008,000.00 (per All Faiths Food Bank average grocery food values), and will provide approximately 350,000 to 400,000 meals to area residents in need.
- **Feed Value.** Diversion of approximately 10,000 lb. of perishable food for animals will result in approximately 100 lb. of meat donated to area food banks. Thus the market value of this component alone effectively provides a two-to-three-fold return on investment.
- **Cost Avoidance.** Composting and Vermi-composting will result in annual cost avoidance of approximately \$114,400.00. Thus the payback for this component of the hierarchy is 3.0 years at the initially anticipated rate of diversion, not including compost sales.
- **Compost Market.** Quality compost will be produced which we anticipate will have a market value of \$20 to \$40 per ton (\$8 to \$20 per cubic yard), or about \$50,000.00 to \$100,000.00 per year. This profit level is sufficient to attract the private sector to continue the project after the grant period.
- **Co-Collection Efficiencies.** Current systems require farmers to make "milk-run" collections at multiple locations. By aggregating fresh food for animals, participant farmers will be able to reduce transportation costs.
- **Worms,** Vermi-compost has a retail value of \$100+/-ton in some areas of the country. However, these prices have not been paid in Florida. Part of the challenge is developing these

compost markets. We are sharing information with the Florida Organic Growers Association (FOG) and will be field testing compost products on FOG member farms in the area. We also plan to send compost samples to The Organic Materials Review Institute (OMRI) to have the project's product certified for use in organic agriculture. These activities are anticipated to increase the value and cost effectiveness of the project.

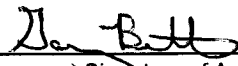
- **Onsite Composting.** We will compare the cost of a small-scale in-vessel system used at the generator's site to the total cost for centralized processing. We anticipate both savings to the generator and environmental benefits through this model. Current research indicates that the majority of odor is produced during the first two weeks of composting. Therefore, on-site composting could have a significant impact on odor reduction. Additional potential benefits include: reduction in the weight and volume of materials that need to be managed, increased stability of materials that must be handled, and more cost-effective transportation of residue.
- **Coordination with FORCE.** The project will coordinate with FORCE, to maximize efficiency of project, streamline program implementation, add to the existing body of knowledge on composting, and replicate trials, as appropriate, to demonstrate commercialization of University scale research.
- **Innovative low-tech solutions.** Not all communities will be able to afford large scale in-vessel composting systems. Therefore, this project focuses on low technology solutions to odor suppression and management. We will evaluate the combination of a low capital investment strategy with a low labor strategy by focusing on recipe mixtures that include structure to promote airflow.
- **Sustainability.** Because Sarasota County is popular as a resort and retirement destination, there are numerous restaurants in the County. Six schools, the county courthouse, jail, and hospital are all located within several miles of the site. Overall, it is safe to say that there is a greater supply available to the program of commercial and institutional food residuals than the design capacity. Therefore, the program shall be sustainable beyond the project year, and all partners are committed to continuing the project if proven economically viable.

DEP Form #	62-701.900(10)
Ap. for Per. to Construct/Operate a Solid Waste Manag. Fac. for Prod. of Compost	
Form Title	Waste Manag. Fac. for Prod. of Compost
Effective Date	12-23-96
DEP Application No.	(Filled in by DEP)

Certification by Applicant and Engineer or Public Officer

A. Applicant

The undersigned applicant or authorized representative of Sarasota County is aware that statements made in this form and attached information are an application for a Food Waste Composting Permit from the Florida Department of Environmental Protection and certifies that the information in this application is true, correct and complete to the best of his knowledge and belief. Further, the undersigned agrees to comply with the provisions of Chapter 403, Florida Statutes, and all rules and regulations of the Department. It is understood that the Permit is not transferable, and, the Department will be notified prior to the sale or legal transfer of the permitted facility.



 Signature of Applicant or Agent
Gary Bennett, Solid Waste Operations

 Name and Title

Date: 6/10/02

Attach letter of authorization if agent is not a governmental official, owner, or corporate officer.

B. Professional Engineer Registered in Florida or Public Officer as Required in Section 403.707 and 403.7075, Florida Statutes

This is to certify that the engineering features of this solid waste management facility have been designed/examined by me and found to conform to engineering principals applicable to such facilities. In my professional judgment, this facility, when properly maintained and operated, will comply with all applicable statutes of the State of Florida and rules of the Department. It is agreed that the undersigned will provide the applicant with a set of instructions of proper maintenance and operation of the facility.

PA Wingle, PE

 Signature
Paul A. Wingle Proj. Mng.

 Name and Title (Please type)
 Florida Registration No. 1235 6/10/02

 (Please affix seal)

4000 Knights Trail Rd.

 Mailing Address
Nokomis, FL 34275

 City, State, Zip Code
 Telephone No. 914/ 486-2600 x 103

 Date: 6/10/02

Construction Cost Estimate: \$171,550

Permit Number: _____

Issue Date: _____

Review Date: _____

Expiration Date: _____