

SOLID WASTE COMPOSTING IN NEW YORK

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ABSTRACT

Since October of 1989, Omni Technical Services, Inc., an environmental services firm, has been developing a major solid waste management project to be located on the East End of Long Island. The project involves the preprocessing and active composting of municipal solid waste.

In October of 1991, Omni received a 6 NYCRR Part 360 Permit to Construct a 500 TPD Intensive Recycling/Composting Facility from the New York State Department of Environmental Conservation. This permit is the first of its kind for the composting of mixed solid waste.

Waste procurement and project financing is anticipated to be completed in the winter of 1992 with construction to commence in Spring of 1992.

This paper details activities undertaken from project inception to permit receipt.

PROJECT DEVELOPMENT — BACKGROUND

New York residents generate in excess of 19 million tons of waste per year. Waste management in New York State is accomplished in the following modes: landfilling (61%), incineration (5%) (without energy recovery), resource recovery (16%) and out-of-state disposal (18%). On Long Island, where a total population of 2.6 million represents 14% of the State's population, solid waste is handled by landfilling 35%, incineration 44%, and out-of-state disposal 21%.

On Long Island, public drinking water supplies are provided by underground aquifers. Protection of these

aquifers has resulted in regulatory actions that have directly affected how solid waste is managed on Long Island.

The project developed addresses the specific solid waste management of the five (5) East End Towns of Riverhead, Shelter Island, Southold, East Hampton, and Southampton. These communities all rely on landfilling for waste disposal with four (4) of the Towns directly affected by the Long Island Landfill Law (LILL).

In 1983, the New York State Legislature passed what is known as the Long Island Landfill Law (LILL). This law required the closure of existing landfills that did not meet NYSDEC design standards and were situated over deep-flow recharge zones by December, 1990.

The law further stipulated that new landfills meeting these stringent criteria could only be constructed in shallow recharge zones. These landfills would only be allowed to accept by-products of waste-to-energy, incineration, or composting facilities. Bypass waste from the above facilities would also be acceptable.

The LILL directly affects the landfills owned and operated by the Towns of Riverhead, Shelter Island, East Hampton, and Southold. The Town of Southampton landfill meets the design criteria and is located outside of the deep flow recharge area. However, the Town at this time does not have a solid waste processing facility on line. Direct burial of raw waste is not permitted within the context of the LILL.

With the East End of Long Island facing an impending solid waste crisis, and the Towns facing regulatory deadlines, the siting of a solid waste management in this area became feasible.

In 1988, New York State enacted the Solid Waste Management Act which established a hierarchy for managing solid waste. The hierarchy is as follows:

(a) First, reduce the amount of wastes being generated.

(b) Second, to reuse, recycle, or compost waste that cannot feasibly be prevented.

(c) Third, to recover energy from wastes that cannot be economically and technically reused or recycled.

(d) Fourth, to landfill wastes that cannot be reused, recycled or processed in waste-to-energy facilities.

The proposed East End Intensive Recycling/Composting Facility is compatible with this hierarchy. The facility combines recovery of recyclables and composting of the organic fraction. Only nonprocessibles and reject items will be landfilled.

In addition to this hierarchy, the State also has developed recycling and recovery goals that by 1995 are proposed to be in excess of 50% of the wastestream. Curbside collection of source separated recyclables alone will not achieve this goal.

With this situation present, Omni began in earnest to develop the project. Initial efforts focused on locating a facility site.

SITE SELECTION

As is true with most solid waste processing or disposal projects, the success of the project is often connected directly with site location. With the proposed project involving 500 ton/day, site selection took on a significant importance. Initially screening of sites encompassed six (6) months.

The five (5) East End Towns are located in eastern Suffolk County (Fig. 1). The area includes both the North and South Forks of the Island as well as the Town of Riverhead which rests just west of the two forks, and reaches both the North and South shores of Long Island.

The Town of Riverhead was chosen due to its strategic geographic location, good access roads, and large open areas. A meeting was held with Town officials to ascertain the interest in the Town "hosting" a large solid waste processing facility. After the initial meeting, the Town embraced the project. Advantages for the Town included long term waste management services, employment opportunities for residents, and an increase in the tax base.

Omni evaluated a total of eighteen (18) sites within the Town. Site investigations included surveys of wildlife and fauna conducted by specialized sub-consultants. Sites with distinct environmental traits

such as wetlands, pot holes, thick woods, or surface waters were removed from consideration.

A Phase I and Phase II environmental audit was conducted on several key parcels to provide additional information for site selection.

The site selected is fifty-one (51) acre site with an Industrial B designation, the least restrictive classification within the Town. The site is a formerly farmed flat parcel with no distinguishing environmental characteristics.

The site borders on 5000 acres of government owned land and is surrounded by undeveloped agricultural land. The site selected was also approved by Town officials as an acceptable location.

REGULATORY INTERFACE

Once the site was selected, Omni proceeded to meet with state and local regulatory agencies. Informal meetings provided a productive format in which technical and environmental concerns were discussed openly and set the groundwork for the formal permit application process.

New York State is recognized nationally as having one of the most comprehensive set of regulations for the design, construction, and operation of solid waste facilities. As the proposed facility is the first one of its type in the state, the application had to conform with the requirements of 6 NYCRR Part 360 regulations.

SPECIAL PERMIT

With the site selected and the regulatory agencies apprised of the proposal project, Omni submitted a Special Permit application to the Town of Riverhead. The Special Permit is required due to the fact that solid waste composting is not an activity listed within the Town Codes.

Filing of the Special Permit application started the State Environmental Quality Review Act (SEQRA) proceedings. The SEQRA process is a mandatory process that allows for the thorough review of all major projects by both agencies and the public. The SEQRA process must be completed successfully in order for a project to obtain a 6 NYCRR Part 360 permit.

As the facility is the first of its type and of significant size (500 TPD), a considerable amount of comments were generated by both interested agencies and the general public. Interested agencies included; New York State Department of Environmental Conservation, Suffolk County Department of Health Services, The Department of the Navy, Grumman Aerospace, Fed-

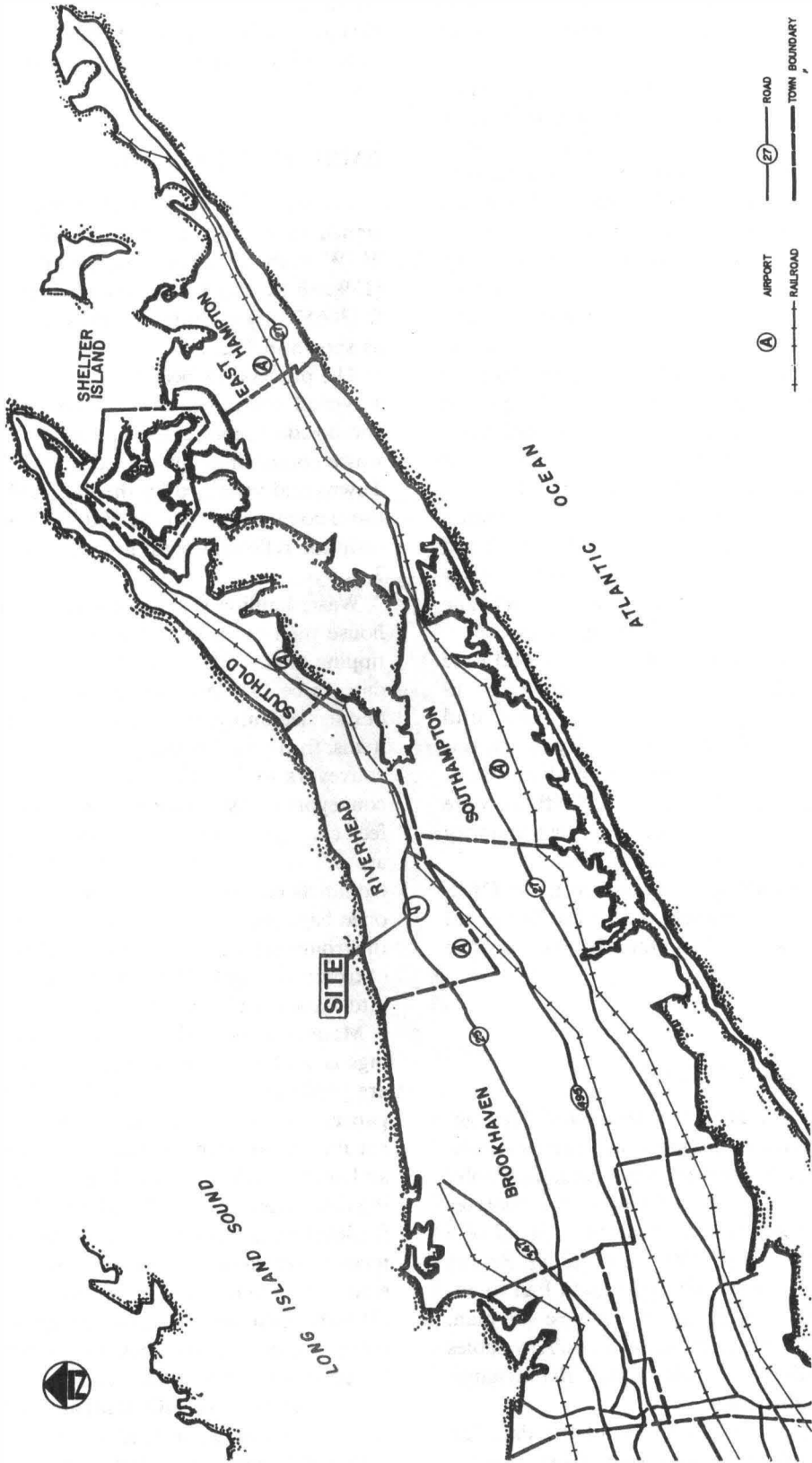


FIG. 1 SUFFOLK COUNTY MAP

eral Aviation Administration, and the North Fork Environmental Council to name a few. The Town of Riverhead and many of its citizens submitted written comments.

The Town acting as Lead Agency, incorporated all the comments and held a public scoping hearing to address the comments to the Special Permit application. The Town required the development of a comprehensive Draft Environmental Impact Statement (DEIS) to address issues such as noise, odor, ground-water contamination, traffic, vectors, employee safety, site archeology, water usage, and economic viability.

The development of the DEIS required the engagement of specialized subconsultants for the evaluation of traffic, noise, site archeology, site fauna and flora. Of particular interest was the noise study which required a noise analysis of existing recycling facilities and evaluation of current noise levels in and around the proposed project site. The archeology evaluation included detailed on-site excavations (over 300 test pits) to search for Native Indian artifacts. A major Indian find had been made by the same consulting firm less than sixty days earlier at a site less than two (2) miles away. The site proved to have no archeological significance.

During development of the DEIS, Omni held over two dozen (24) meetings with local civil, environmental, and regulatory groups. Presentations were fruitful in providing information on future facility operations as well as addressing local environmental concerns. Two public hearings were also held. Local citizens were encouraged to actively participate. The vast majority of speakers spoke in support of the project.

After review by an independent engineer, the DEIS and FEIS documents were approved by the Town and a Special Permit was issued to Omni by the Town in May of 1991.

6 NYCRR PART 360 PERMIT

As stated earlier, the NYS Department of Environmental Conservation has a comprehensive set of regulations for the design, construction, and operation of solid waste facilities. As the proposed facility incorporates recycling prior to composting, Subparts 5 and 12 of 6 NYCRR Part 360 apply. The Engineering Report which accompanied the permit application had to address in detail many project aspects such as: site plan, process design, building design, site utilities, recyclables and compost marketing, staffing and maintenance plans, and residue disposal.

In order to meet the requirements of the Part 360 recyclables, a significant engineering effort was re-

quired. Sub-consultants were engaged for architectural, structural, electrical, HVAC, and specialized systems design. The Engineering Report including process design took six (6) months to complete.

FACILITY DESCRIPTION

The Intensive Recycling/Composting Facility is designed for average capacity of 500 TPD (446 mtd) of MSW with an annual throughput of 156,000 tons (139,286 t). The facility incorporates over 330,000 sq ft (30657 m²) of buildings situated on the 51-acre site as shown in Fig. 2.

The process has been designed to handle MSW with a typical composition noted on Table 1. This waste composition represents a summary of five (5) different waste compositions provided by the five (5) East End Towns and weighted by the expected contributions of those communities to the 500 TPD input. Process description reflects process flow diagram as shown in Fig. 3.

Waste hauling vehicles are first weighed at the scale house then proceed to the enclosed tipping hall. The tipping area is 30,000 ft² (2787 m²) and can accommodate three (3) days storage of waste. After removal of oversize bulky, nonprocessible, and large recyclable items, front end loaders push the MSW on to steel pan conveyors to feed the two (2) processing lines. These conveyors transfer waste to the main sorting trommel feed conveyors. Waste enters the sorting trommels that are 9.8 ft (3000 mm) × 39.3 ft (12,000 mm). The trommels are equipped with internal cutting blades to open bags and have 3.9 in. (100 mm) openings 50% of the trommel length and 7.9 in. (200 mm) openings 50% of trommel length. The trommels split the wastestream into three (3) distinct size fractions.

Material passing through the 3.9 in. (100 mm) openings is considered compostables. Compostables which are predominantly organics fines, food wastes, soiled papers, and vegetative materials pass under a belt magnet for ferrous removal and are transferred to mixing and homogenizing drums. The mixing and homogenizing drums are 32.8 ft (10,000 mm) in length with a 9.8 ft (3000 mm) diameter. The drums serve as units for mixing and moisture addition. The rear of the units is equipped with a screening section comprised of 2.9 in. (75 mm) openings. Material passing through the screen becomes compost feedstock. Oversize material is transferred to a reject load out area.

Material > 3.9 in. (100 mm) and < 7.9 in. (200 mm) is considered an under. Unders are predominantly comprised of bottles, cans, plastics, and some paper items.

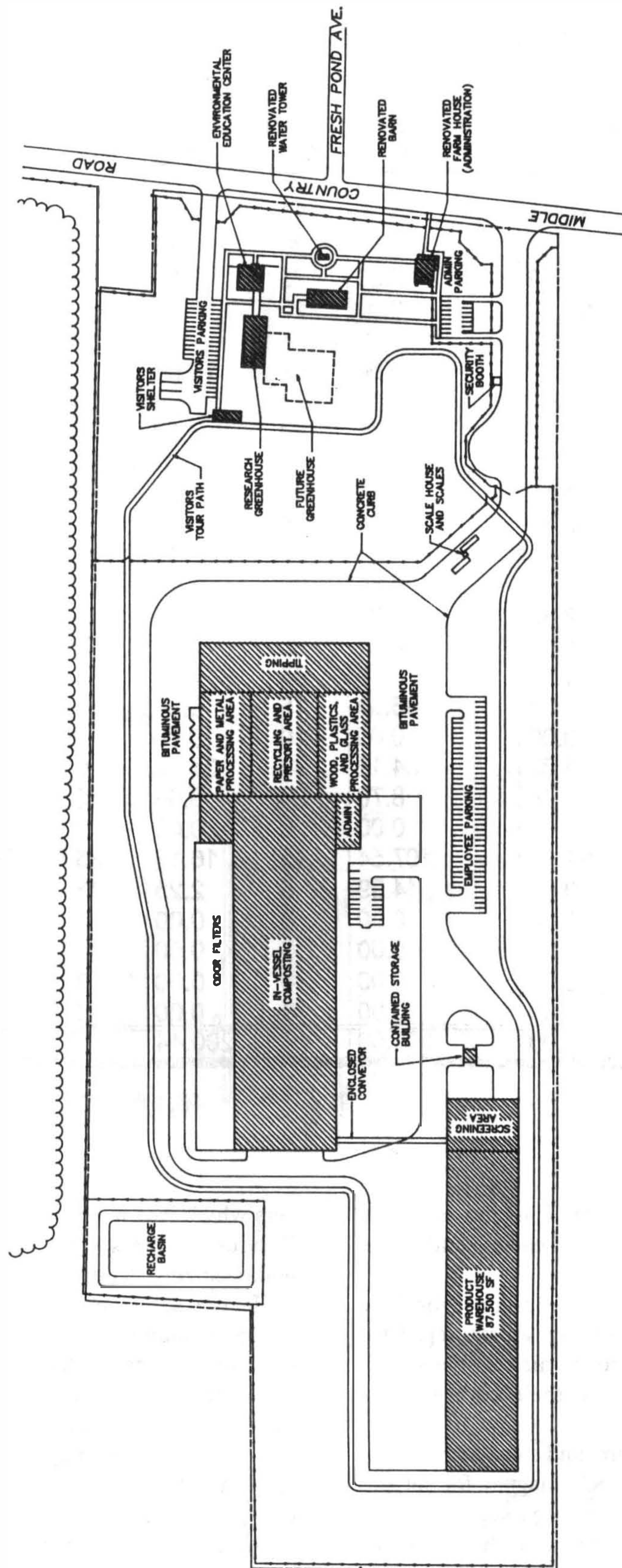


FIG. 2 SITE PLAN

TABLE 1 REFERENCE WASTE SUMMARY
(Facility Name: East End Long Island; Capacity: 500 TPD)

Component	Percent Composition	Daily Quantity TPD	Inerts		Organics		Moisture	
			%	TPD	%	TPD	%	TPD
Paper								
Corrugated	10.16	50.78	30	15.23	65	33.01	5	2.54
Newspaper	6.15	30.77	20	6.15	75	23.08	5	1.54
Magazines	2.46	12.29	25	3.07	70	8.60	5	0.61
Other Paper	12.00	60.00	15	9.00	75	45.00	10	6.00
Glass								
Flint	4.01	20.04	98	19.64	0	0.00	2	0.40
Amber	0.62	3.10	98	3.04	0	0.00	2	0.06
Green	1.54	7.71	98	7.56	0	0.00	2	0.15
Aluminum	1.36	6.80	98	6.66	0	0.00	2	0.14
Ferrous	5.82	29.11	98	28.53	0	0.00	2	0.58
Non Ferrous	0.19	0.94	98	0.92	0	0.00	2	0.02
Plastics								
HDPE	1.36	6.80	98	6.66	0	0.00	2	0.14
PET	2.80	13.98	98	13.70	0	0.00	2	0.28
Film	1.66	8.31	95	7.89	0	0.00	5	0.42
Mixed	1.74	8.68	98	8.51	0	0.00	2	0.17
Wood	9.07	45.34	15	6.80	70	31.74	15	6.80
Fines	0.00	0.00	0	0.00	0	0.00	0	0.00
Rubber/Leather	6.82	34.12	93	31.73	0	0.00	7	2.39
Textiles	1.74	8.70	80	6.96	10	0.87	10	0.87
Bulky Waste	0.00	0.00	0	0.00	0	0.00	0	0.00
Yard	21.51	107.54	15	16.13	25	26.89	60	64.52
Food	9.00	44.99	5	2.25	35	15.75	60	26.99
Misc. Organics	0.00	0.00	0	0.00	0	0.00	0	0.00
Sludge	0.00	0.00	0	0.00	0	0.00	0	0.00
Hazardous Waste	0.00	0.00	0	0.00	0	0.00	0	0.00
Misc.	0.00	0.00	0	0.00	0	0.00	0	0.00
Total	100.00	500.00		200.44		184.93		114.63

Percentage of Total Weight

40.1 %

37.0 %

22.9 %

Unders are passed through an air classifier to obtain three (3) additional splits: lights, heavies, and ultra-lights.

A separate dedicated steel pan feed conveyor from the tip floor is utilized for feeding source separated commingled bottles and cans to the air classifiers. This allows communities to continue their curbside programs.

Lights are plastics, aluminum, and some ferrous containers. Lights pass under a belt magnet for ferrous removal prior to entering an enclosed sorting station for removal of plastics (by resin) and aluminum (by eddy current). Plastics and aluminum are fed into hop-

pers which feed a densifier prior to transfer to market. Residue on the sorting belt goes to the mixing and homogenizing drums.

Heavies are comprised predominantly of glass and ferrous containers. Heavies pass under a belt magnet prior to entering an enclosed sort station for removal of plastics (if any) and glass (by color). Residue on belt goes to the mixing and homogenizing drums.

Ultra-lights are comprised predominantly of papers and film plastics. Ultra-lights are transferred by blower to a gravity box to settle out. They are discharged on to the compostables conveyor feeding the mixing and homogenizing drums.

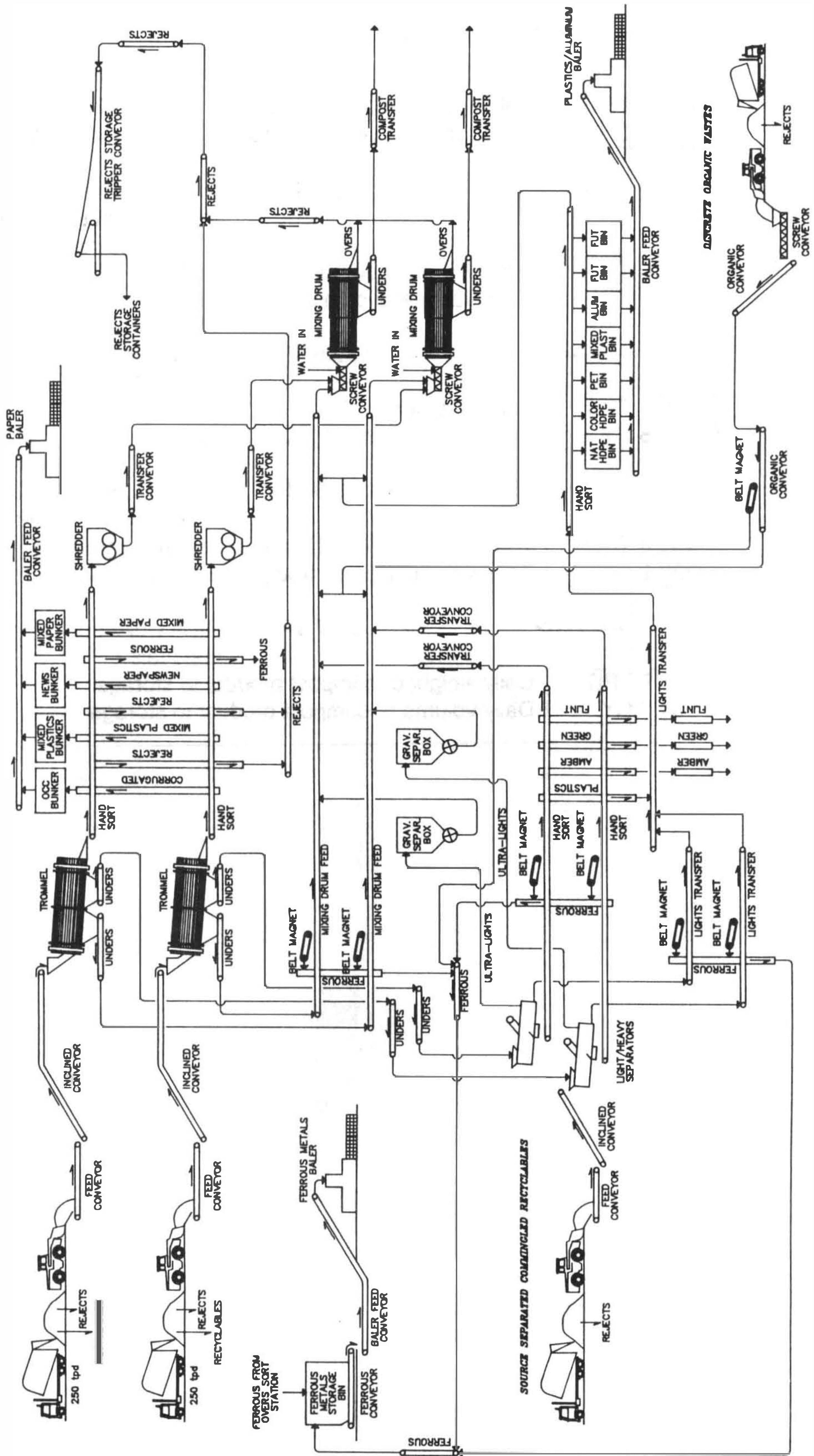
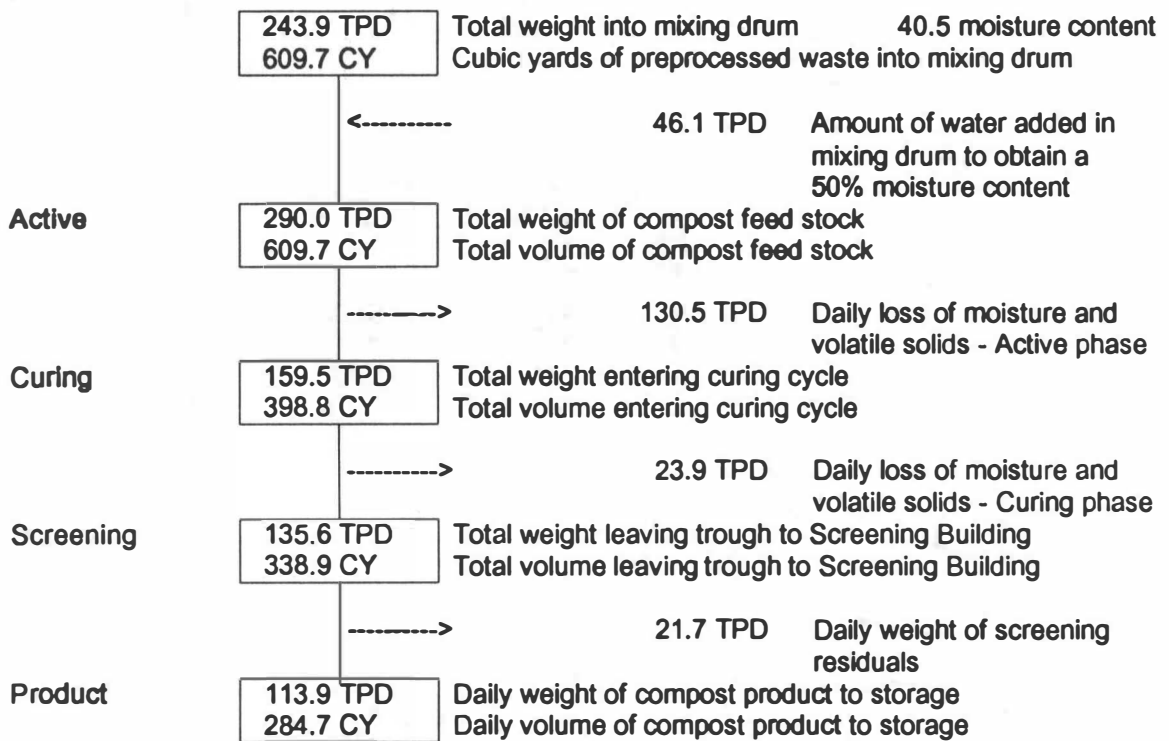


FIG. 3 PREPROCESSING PROCESS FLOW DIAGRAM

TABLE 2 COMPOST MASS BALANCE
 (Facility Name: East End Long Island; Capacity: 500 TPD)



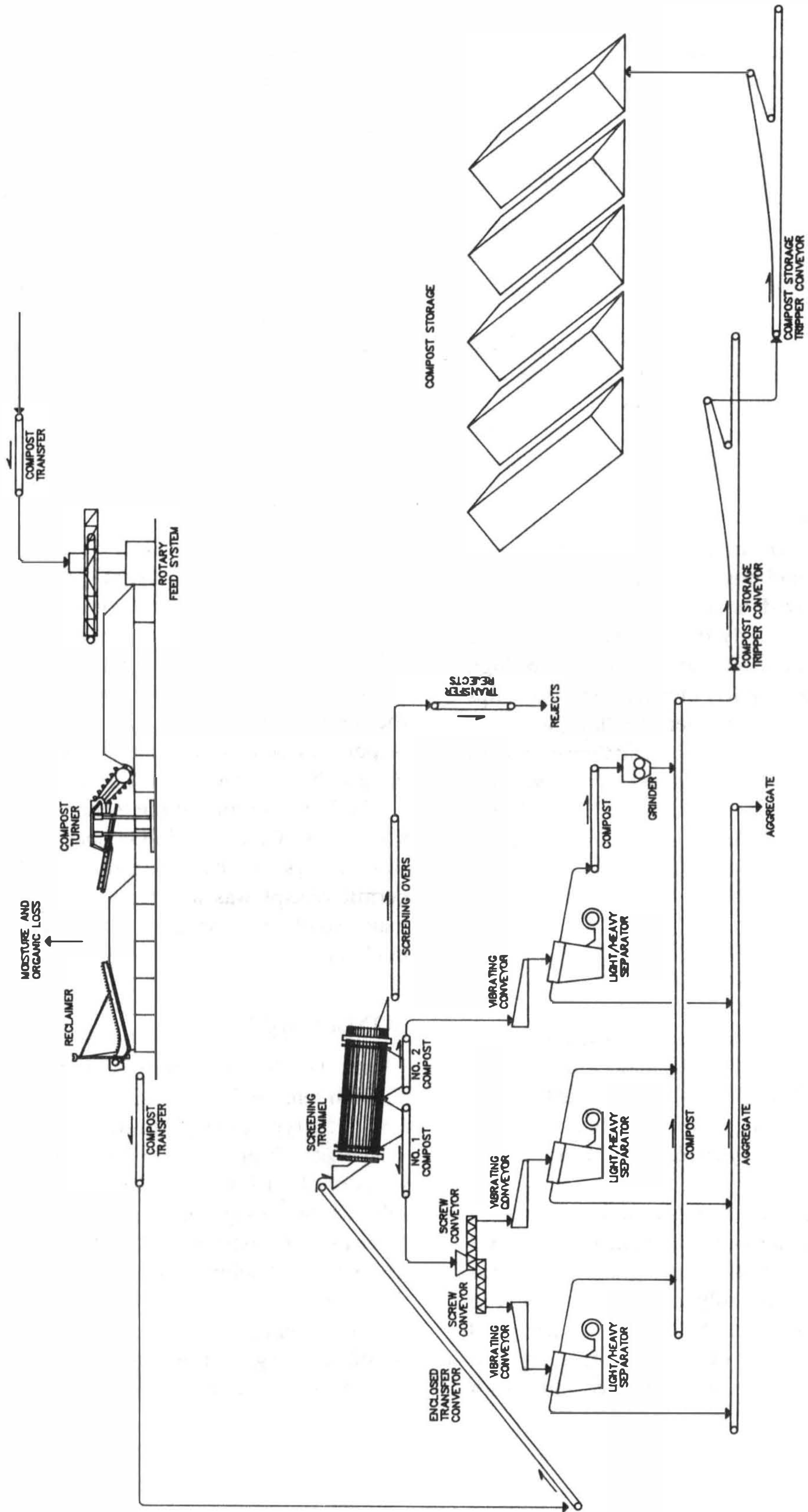


FIG. 4 COMPOSTING PROCESS FLOW DIAGRAM

Overs are the materials exiting the main sorting trommels as a greater than 7.9 in. (200 mm) items. This material enters an enclosed sorting station for removal of corrugated, plastic films, and clean paper (news and office). Metal detectors are present for identifying materials such as car parts. Residue on the belt is coarse shredded by a knife mill and is transferred to the mixing and homogenizing drums.

The preprocessing area also has two additional processing systems. One is for clean wood removed at the tip floor and the other for the receipt of discrete organic wastes.

Wood is loaded into a steel pan conveyor which feeds a slow speed screw shredder. A belt magnet is located over the discharge conveyor for removal of ferrous materials. The chips are loaded into containers. Woodchips can be either marketed or utilized as a bulky agent for the discrete organic wastes.

Discrete organic wastes can include residues from restaurants, supermarkets, agricultural or fishery operations. The wastes would not require extensive preprocessing and are received at a separate tipping area. These wastes are fed directly into the two (2) mixing and homogenizing drums. Should the waste be of high nitrogen content or particularly moist, clean woodchips would be utilized as an amendment (bulking agent).

The preprocessing section of the facility encompasses 70,000 sq ft (6503 m²) and is estimated to remove 30% of incoming material as a recyclable and (20%) as a reject or nonprocessable item. The remainder is transferred to the in-vessel composting system.

COMPOSTING

The composting system is an agitated trough technology developed by KOCH of Germany. This system is comprised of two (2) aerated troughs over 600 ft (183 m) in length and 75 ft (23 m) in width. The troughs are fed by radial stacking conveyors. See Fig. 4 for process flow through composting.

Two digging, turning, and transfer units operate on a rail system that straddles each trough. An overhead gantry arrangement allows the turning unit to traverse the entire trough both vertically and horizontally. The compost is moved from the loading end to the discharge end over a seventy (70) day cycle by the turning unit. The unit's movements are totally automated and permit

operators to maintain a constant pile height throughout the trough.

At the end of the seventy (70) day cycle, an extraction device removes the compost and transfers it to the secondary screening system.

Screening includes trommel, vibrating conveyors, and air classification tables, for removal of inerts such as glass and ceramics. Trommel oversize is greater than 1 in. (25 mm) and is suitable for incineration or landfill. Heavy inerts removed from the air tables is suitable for landfill cover or an aggregate substitute.

Compost product after screening is conveyed to a covered storage area which has capacity for more than three (3) months of product storage.

Table 2 reflects a projected mass balance through the in-vessel composting system.

PERMIT REVIEW

The New York State Department of Environmental Conservation (DEC) received the Engineering Report and supporting documents including drawings and equipment specifications in December of 1990. Technical comments were developed by the DEC reviewers (recycling and composting departments) and required the development of an addendum to the Engineering Report. Subsequent comments resulted in some minor design changes and two (2) additional addenda.

The DEC completed the technical review and issued a Permit to Construct in October of 1991. Due to the completeness of the application, total review time to permit receipt was less than nine (9) months. For a major solid waste project, this can be considered relatively fast.

CONCLUSION

Omni Technical Services Inc., has developed a 500 TPD Intensive Recycling/Composting Facility, the first of its type to be permitted in New York State.

The permitting process encompassed over two (2) years of effort initiated with a concept for a regional solid waste management solution and concluding with a Permit to Construct a 500 TPD Intensive Recycling/Composting Facility. The first such permit issued in the State of New York.

The proposed facility can play an important role in complementing existing solid waste management facilities on Long Island.