Discussion Paper 3.2: Systems Options

SWEAP discussion paper 3.2, *Long Term Planning Analysis of Solid Waste Management Systems Options*, presents 5 potential waste management systems for the study area of Metropolitan Toronto and the Regions of York and Durham.

The systems presented refer only to what happens to your garbage after you throw it away. A large part of any waste management strategy will be reduction and reuse. These are critical means of decreasing the amount of garbage that needs to be managed.

Each system presented in 3.2 is a combination of some or all of the following 6 waste management options: Composting • Landfill • Incineration (EFW) • Private Disposal • Recycling • Refuse Derived Fuel

Composting is a process that converts organic wastes (materials originating from animals and plants, like vegetables, excreta, etc.) into a material that can be used as a soil conditioner and low strength fertilizer. There are three forms of composting. Backyard composting handles kitchen and yard wastes of individual householders. A broader range of wastes can be handled by centralized composting. These include leaf and yard wastes, sewage sludge, separated organic material (e.g., food wastes), wet wastes (mixed, wet garbage), and a mixture of sewage sludge and paper waste ("co-composting sewage sludge"). Vermiculture is composting with the use of special worms that help to break down the organic material. Composting requires that the compost attain a high temperature for the conversion to take place. Vermiculture composting does not have the same temperature requirements for successful composting.

Landfilling involves depositing waste in sites of land chosen for this purpose. The choice of a landfill site takes into consideration social, cultural, economic and environmental factors. Landfills are designed to collect leachate (the liquid which "leaches" out of rotting garbage) so that it does not seap into ground water sources. Lining the base of a landfill also safeguards against leachate contamination of ground water. Landfills can take clean-fill or inert wastes which do not produce leachate, or more conventional mixture of wastes which do. The assumption of all 5 scenarios is that some residual wastes will require landfilling.

Incineration is the burning of solid waste and can occur with or without energy recovery. That is, the burning of garbage can produce electricity, steam, etc., depending on the technological design of the incinerator. Many incineration facilities are designed to produce energy from waste (EFW), while others are not. The product of incineration is ash which reenters the waste stream and requires disposal, usually in landfill.

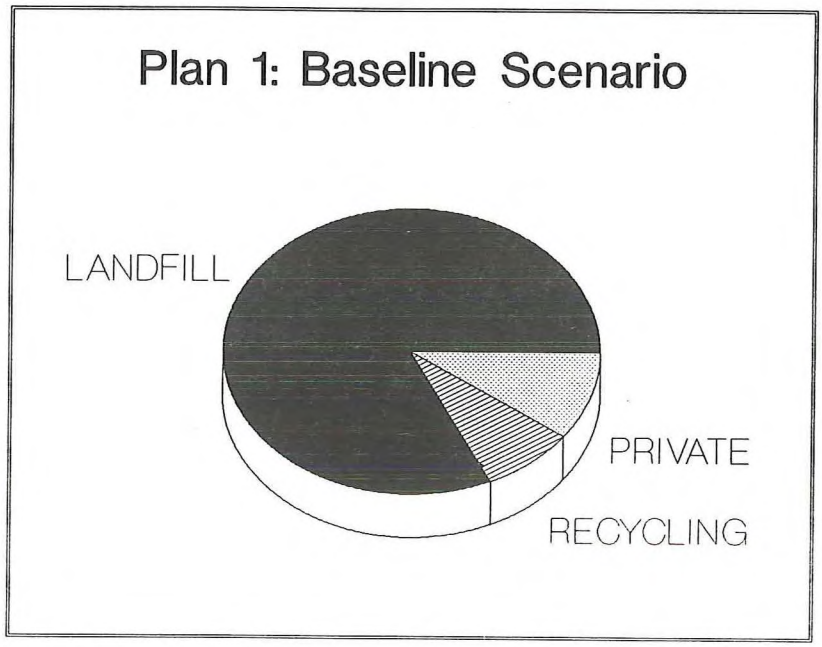
In the discussion of systems options, **Private Disposal** refers to wastes disposed of using a variety of options. Private disposal differs from other options only because wastes go through a centralized disposal system, such as that provided by municipalities. Options used to dispose of these wastes include all of those presented in this discussion.

Recycling involves the collection of specific waste materials for use in the manufacture of new products. The Blue Box program is currently in place to collect tin, newspaper glass and PET plastics. This program requires that these items be separated from other wastes and set out for separate pick-up. Clean paper, plastics, textiles and wood can be included in the future. Industrial recycling is also included in the options.

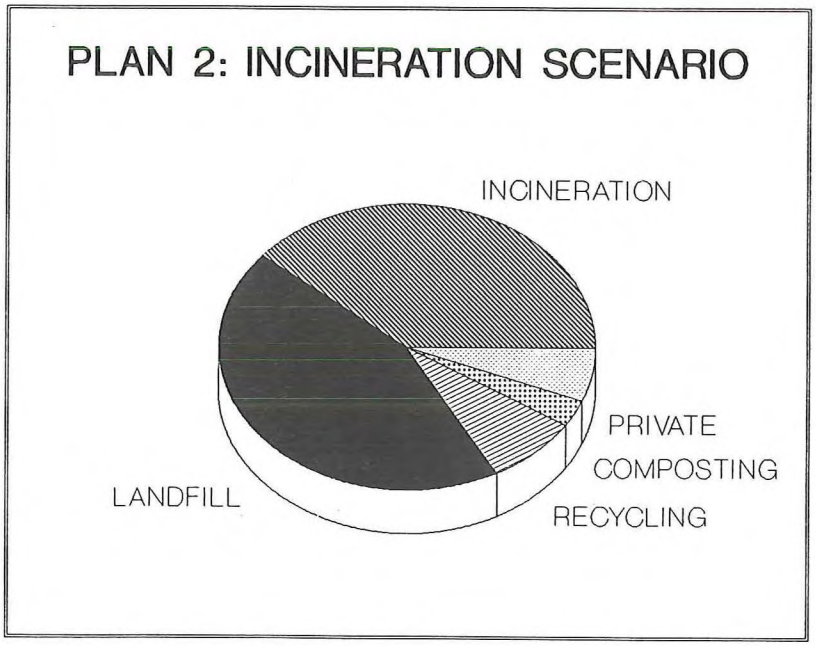
Refuse Derived Fuel (RDF) is the production of fuel from mixed solid wastes often used in cement kilns. There are three steps which are taken in the production of RDF. First large items such as appliances and tires are removed. Mechanical sheers, shredders or hammers then reduce the waste size. Broken glass, grit and other crushed non-burnable items are then removed by sifting with screens, magnets and other methods. The product of this is either left in fluff form or processed into fuel pellets. The use of RDF has the potential to reduce the the need for fuels derived from non-renewable natural resources. Production of RDF could result in the substantial residues of material that have to be disposed of by some other means such as landfill. ▶ ▶

The Five Waste Management Systems Options

The following plans differ by options included and the emphasis placed on each. Each pie chart illustrates the breakdown of options in each plan.



The baseline plan is the one to which the other opions are compared. It begins with extended Blue Box recycling and landfills the remaining unsegregated waste.



The Incineration Plan also begins with extended Blue Box recycling. The remaining unsegregated mixed waste is first processed to recover some materials, (including those that can be composted) and is then incinerated with the remaining ash landfilled. ▶ ▶

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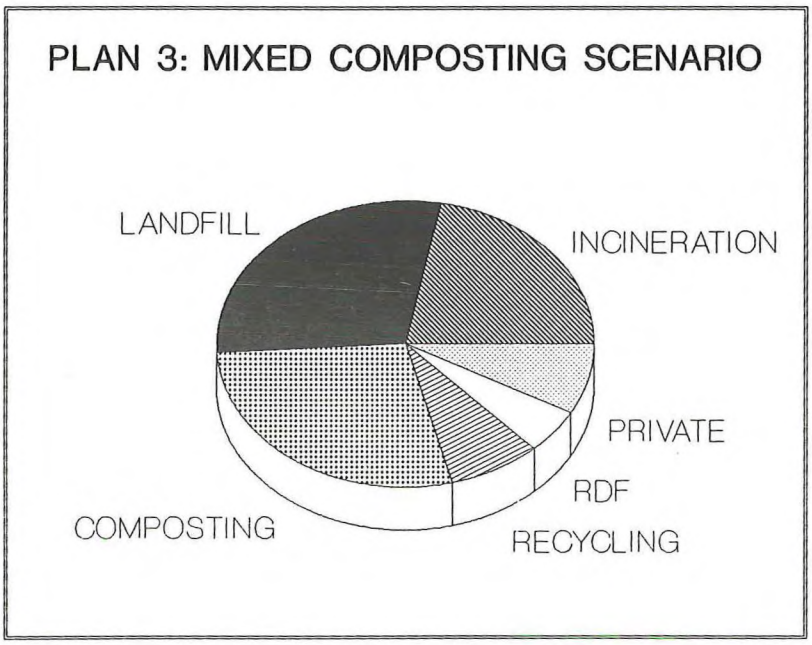
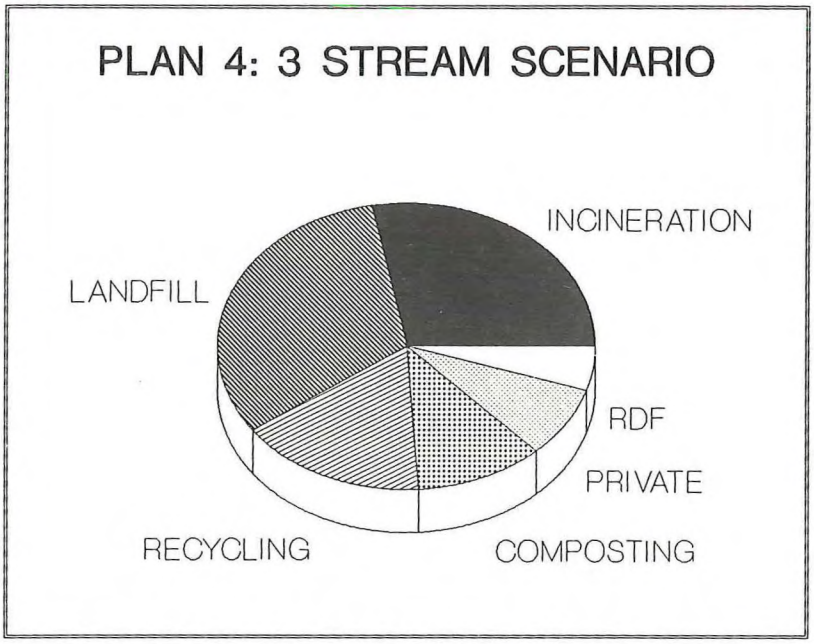


The Mixed Waste Composting Plan also begins with extended Blue Box recycling. After removal of some materials (e.g., metals) from the mixed waste, the remainder is composted. Residuals from Blue Box and composting operations could be subjected to further materials recovery, co-composted with sewage sludge, incinerated or landfilled. Incinerator ash will be landfilled.



The Three Stream Plan requires segregation at source into three streams: recyclables (i.e., extended Blue Box), compostables (i.e., kitchen scraps and yard wastes), and everything else. Materials can be recovered at a central location from the "everything else" category with the remainder incinerated, composted or landfilled. ▶ ▶

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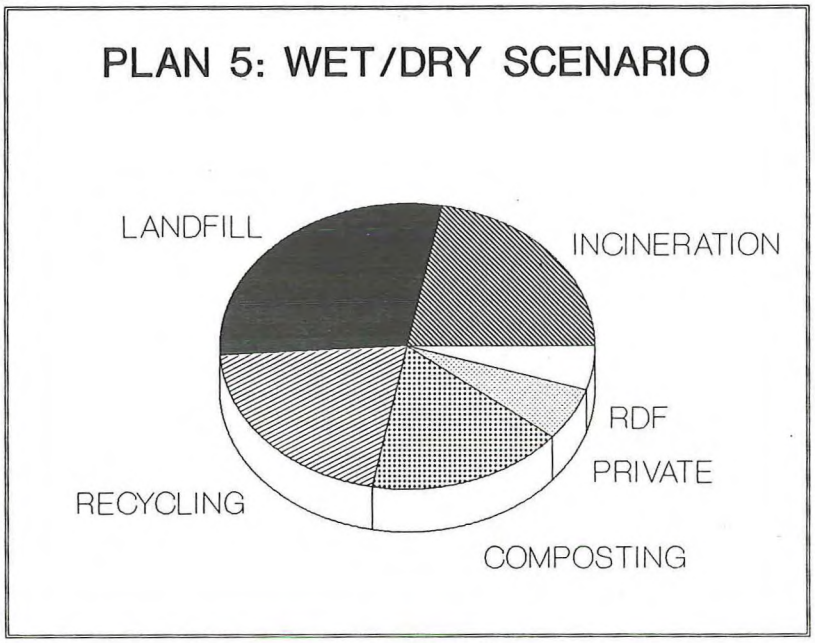

The Wet/Dry Plan requires segregation at source into wet-soiled and dry-unsoiled. Most of the wet wastes can be composted. Materials can be recovered from the dry wastes with the remainder incinerated, co-composted with sewage sludge, and/or landfilled.

The following chart shows the criteria used to evaluate each of these plans, ranking each in reference to the others.

	SYSTEMS PLANS				
	1	2	3	4	5
EVALUATION CRITERIA					
Environmental Impact	H*	H	L	M	L
Priority 3 Rs	L	L	L	H	H*
Flexible to changes in waste generation & composition	H*	L	-	H	M
Capacity of system	L	L	-	-	-
Opportunities for innovative technology	L	M	M	H	H
Costs	L*	M	H*	H	H

L* = Lowest, L = Low, M = Medium, H = High, H* = Highest