

CHAPTER 14

SOLID WASTE



Photograph courtesy Satee Boodoo



*Photograph courtesy
Town and Country Planning Division*



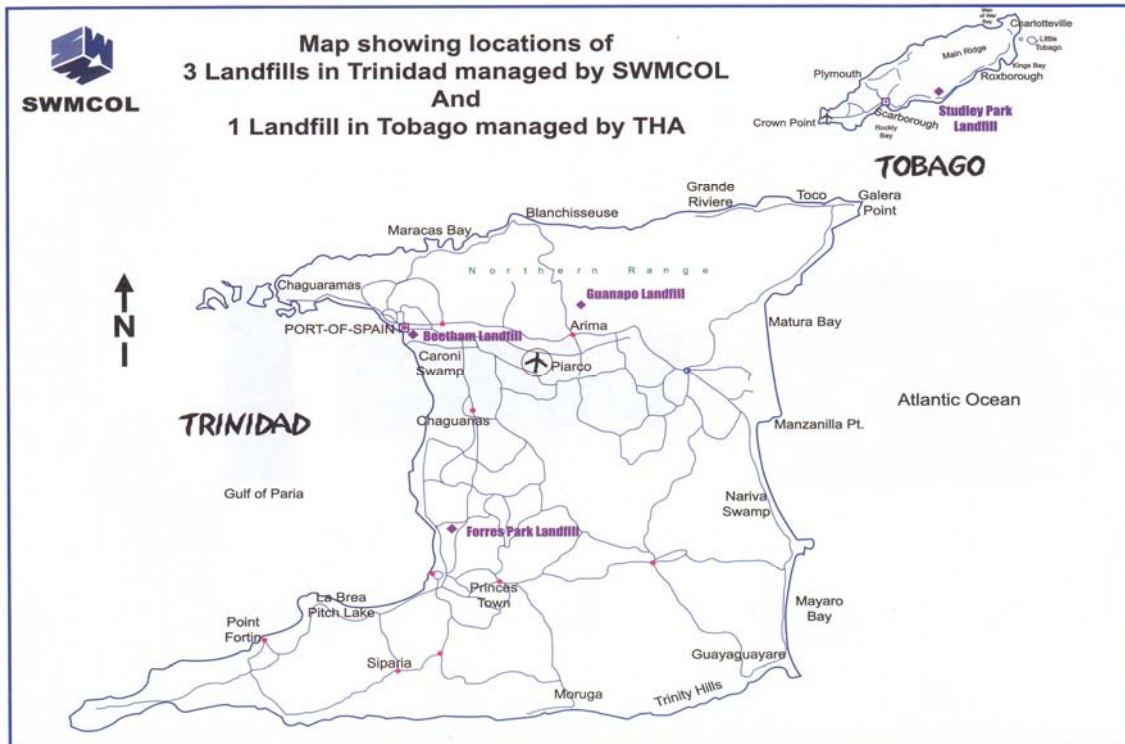
*Photograph courtesy
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14 SOLID WASTE MANAGEMENT

Introduction

Solid Waste Management, by definition, is the administration, collection, transportation and treatment of all solid waste. The ultimate goal of solid waste management is to continuously lower the amount of waste that is generated per capita. In 1983, the Trinidad and Tobago Solid Waste Management Company Limited (SWMCOL) was mandated with the responsibility of managing the three major waste disposal sites in the country (Refer to appendix 14.1). In Trinidad and Tobago residential/ municipal waste collection is done by private companies who are sub-contracted to the various Regional Municipalities. Presently, there are five (5) operational sites on the twin-island Republic; Beetham, Guanapo and Forres Park which are managed by SWMCOL, Guapo Landfill which is operated by Earth Limited and Studley Park, Tobago which falls under the auspices of the Tobago House of Assembly (THA) (see Figure 14.1). Please note however that all data in this chapter is relevant to Trinidad specifically as no data has been submitted for Tobago operations.

MAP 14.1: LOCATIONS OF THREE (3) LANDFILLS IN TRINIDAD MANAGED BY SWMCOL AND ONE (1) LANDFILL IN TOBAGO



Source: SWMCOL

14.1 Landfills in Trinidad Managed by SWMCOL

14.1.1 Beetham

The Beetham site covers an area of 0.61 km² (61 hectares) and is the largest landfill in Trinidad and Tobago. Established some thirty (30) years ago disposal practices at the site were unsatisfactory. In 1983 SWMCOL was mandated with the responsibility of managing the three (3) disposal sites, thus the sites were operated as controlled landfills. The Beetham accepts an average of 875 tonnes/ 875,000kg of waste per day and serves the catchment area from Chagaramas to Curepe and areas to the south of Chaguanas. In addition to landfilling of solid waste, the site also accommodates a bottle recovery facility (informal) and a faecal waste stabilization pond system. The landfill is poorly located on the outskirts of the capital city, and poses an ecological threat as it is located in a wetland environment. This landfill has officially reached its maximum storage capacity and is presently scheduled for closure.

14.1.2 Forres Park

The Forres Park landfill is the second largest site in Trinidad and Tobago. It has an area of over 0.08 km² (8 hectares) and accepts an average of 420 tonnes/420 000kg of waste per day. It serves the catchment area from Chaguanas to Mayaro, inclusive of many of the areas in the south-western peninsula. At Forres Park the cover material is excavated at the site and hauled to the tip, an activity that is best suited to the dry season. The site was constructed with a leachate collection system, which is still in operation but requires extensive maintenance. It is the only engineered landfill in Trinidad & Tobago.

14.1.3. Guanapo

This is the smallest of the three (3) landfills managed by SWMCOL. It has an area of approximately 0.07 km² (7 hectares) and accepts an average of 253 tonnes/ 253 000kg of waste per day. It serves the catchment area from St. Augustine to Toco and Southwards to areas of Mayaro. The Guanapo Landfill has the potential to have a direct impact (negative) on the underlying aquifer and all surface water downstream of the site. In addition, there are many private residences closely surrounding the site. Cover material is excavated from the hills north of the site and used to cover incoming waste. This site has exceeded its life span and should be closed and integrated as part of a reconstituted National Integrated Waste Management System (NIWMS).

14.2 WASTE DISPOSAL

Waste Disposal by Type and Site

In Trinidad and Tobago, the average person generates approximately 4lbs or 2.20kg of waste every day¹. From 2005 estimate figures, the Beetham, Forres Park and Guanapo landfill receive 875, 420 and 253 tonnes of waste respectively each day. This accounts for approximately one thousand, five hundred and forty eight (1,548) tonnes or 1,548,000kg of waste per day from all 3 landfills. (Figures are computed by subtracting the tier weight from the maximum gross weight of the truck. The result is then multiplied by the number of vehicles entering the particular site. The International Coastal Cleanup (ICC) programme for the year 2004, targeted 5 miles of beach, and eight (8) coastal locations for a period of five weeks, from September 18 to October 17 during which the following coastlines were cleaned: Chagville (west coast), Guayaguayare (south coast), Matelot (north coast), Salybia (east coast), Las Cuevas and Tyrico (north coast) and Great Courland and offshore (Tobago). In total, two thousand eight hundred and forty-four kilograms (2,844 kg) of waste was collected. In comparison with 2003, for 11.3 miles of beach, four thousand five hundred and eighty-two kilograms (4,582 kg) of waste was collected. Apart from this, large quantities of waste are also improperly disposed of, and as a result, pollute our streets, drains, rivers, beaches and other environs.

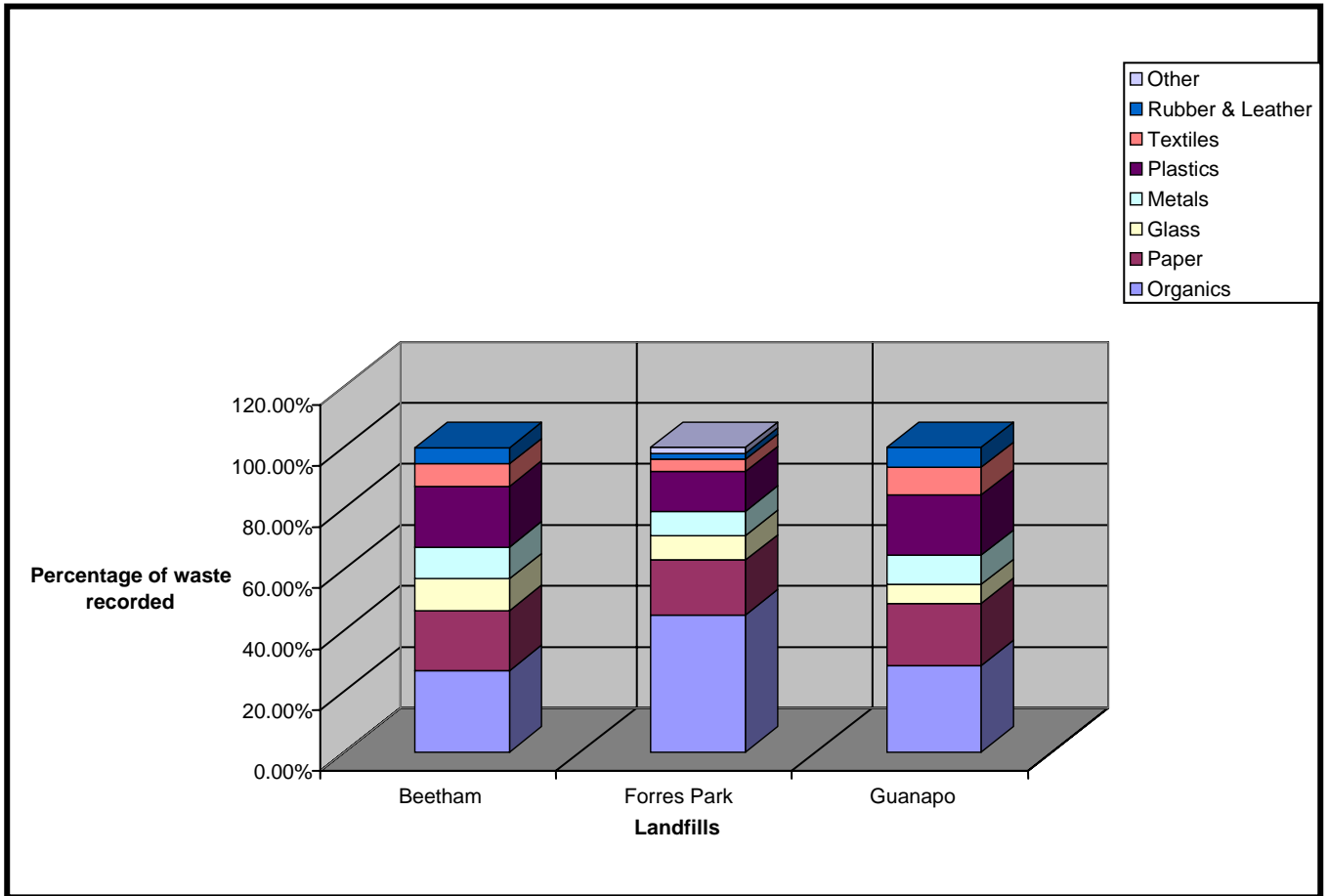
TABLE 14.1: WASTE DISPOSAL BY TYPE AND SITES, 1995

Type of Waste	Beetham	Forres Park	Guanapo
Organics	26.7%	45%	28.4%
Paper	19.7%	18%	20.3%
Glass	10.5%	8%	6.3%
Metals	10.4%	8%	9.5%
Plastics	19.9%	13%	19.6%
Textiles	7.3%	4%	9.2%
Rubber & Leather	5.3%	2%	6.6%
Other	0.2%	2%	0.1%

Source: SWMCOL

¹ Report on the Regional Evaluation of Municipal Solid Waste Management Services in Latin America and the Caribbean

FIGURE 14.1: WASTE DISPOSAL BY TYPE AND SITE, 1995



Source: SWMCOL

TABLE 14.2: SITE DATA, 1995 - 2004

BEETHAM LANDFILL SITE	YEARS									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total Annual No. of Vehicles	76,653	79,422	91,774	89,753	95,039	105,692	104,901	127,192	138,706	154,661
Monthly Average No. of Vehicles	6,388	6,19	7,648	7,479	7,920	8,808	8,742	10,599	11,559	12,888
Daily Average No. of Vehicles	210	217	251	246	260	289	287	348	380	423
Total Estimated Annual Tonnes	143,101	133,722	177,434	176,949	172,263	195,967	200,527	238,540	269,440	283,456
Monthly Average Tonnes	11,925	11,144	14,786	14,746	14,355	16,331	16,711	19,878	22,453	23,621
Daily Average Tonnes	392	365	486	485	472	535	549	654	738	774
FORRES PARK LANDFILL SITE	YEARS									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total Annual No. of Vehicles	40,736	45,022	44,393	54,331	63,599	96,836	54,924	52,618	67,885	76,485
Monthly Average No. of Vehicles	3,395	3,752	3,699	4,528	5,300	8,070	4,577	4,385	5,657	6,374
Daily Average No. of Vehicles	112	123	122	149	174	265	150	144	186	210
Total Estimated Annual Tonnes	70,747	77,869	79,378	98,285	113,858	178,957	104,809	103,051	131,449	149,600
Monthly Average Tonnes	5,896	6,489	6,615	8,190	9,488	14,913	8,734	8,588	10,954	12,467
Daily Average Tonnes	194	213	217	269	312	489	287	282	360	410
GUANAPO LANDFILL SITE	YEARS									
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total Annual No. of Vehicles	20,840	28,095	21,909	27,790	28,487	29,136	39,960	43,886	45,818	51,954
Monthly Average No. of Vehicles	1,737	2,341	1,826	2,316	2,374	2,428	3,330	3,657	3,818	4,330
Daily Average No. of Vehicles	57	77	60	76	78	80	109	120	126	142
Total Estimated Annual Tonnes	33,322	47,838	39,069	47,984	49,863	48,818	73,448	83,393	85,307	97,034
Monthly Average Tonnes	2,777	3,987	3,256	3,999	4,155	4,068	6,121	6,949	7,109	8,086
Daily Average Tonnes	91	131	107	131	137	133	201	228	234	266

Source: SWMCOL

14.3 Biomedical Waste

Pathological wastes from hospitals, clinics and veterinary clinics present a special problem². The Biomedical Waste Management Study (February 2000) was carried out by SWMCOL for PAHO/WHO, to assess the waste management systems in the numerous health care facilities throughout the country. The report highlighted the medical institutions existing locally, and their waste disposal techniques. The Ministry of Health Government of the Republic of Trinidad and Tobago in collaboration with Pan American health Organization, World Health Organization Trinidad and Tobago together produced the Code of Practice for Bio-medical Waste Management in Trinidad and Tobago, 2005. This is a standard policy document with training, supervision and operating procedures to guide the collection, treatment and disposal of Bio-Medical Waste and its management.

14.4 Recycling Initiatives

14.4.1 Paper

The Paper Recovery Operation which is located in El Socorro was formally commissioned in May 1991. In this operation, paper is collected from clients, sorted into various grades, 'baled' and sold to a local contractor who then ships it abroad for sale as feedstock in paper mills. Since its commissioning, recovery of paper has increased 41% over the first three years, with an average of 130 tons per month exported. In 2001, 2002, 2003 and 2004; 64.5%, 11.5%, 14.1% and 9.9% of the total tonnage of paper produced was recycled respectively. From Figure 14.2, the discrepancy is as a result of:

SWMCOL's ability to collect the following types of paper for recycling:

- White Ledger
- Computer Paper
- Coloured Ledger
- Mixed
- Non-windowed white envelopes
- Map, Drawn and Bond Paper

² T&T SWMCOL. 'Results of Survey of Infectious Medical Waste in Trinidad and Tobago'. Oct-Dec 1999

SWMCOL currently does not collect the following types of paper for recycling as there are no present markets:

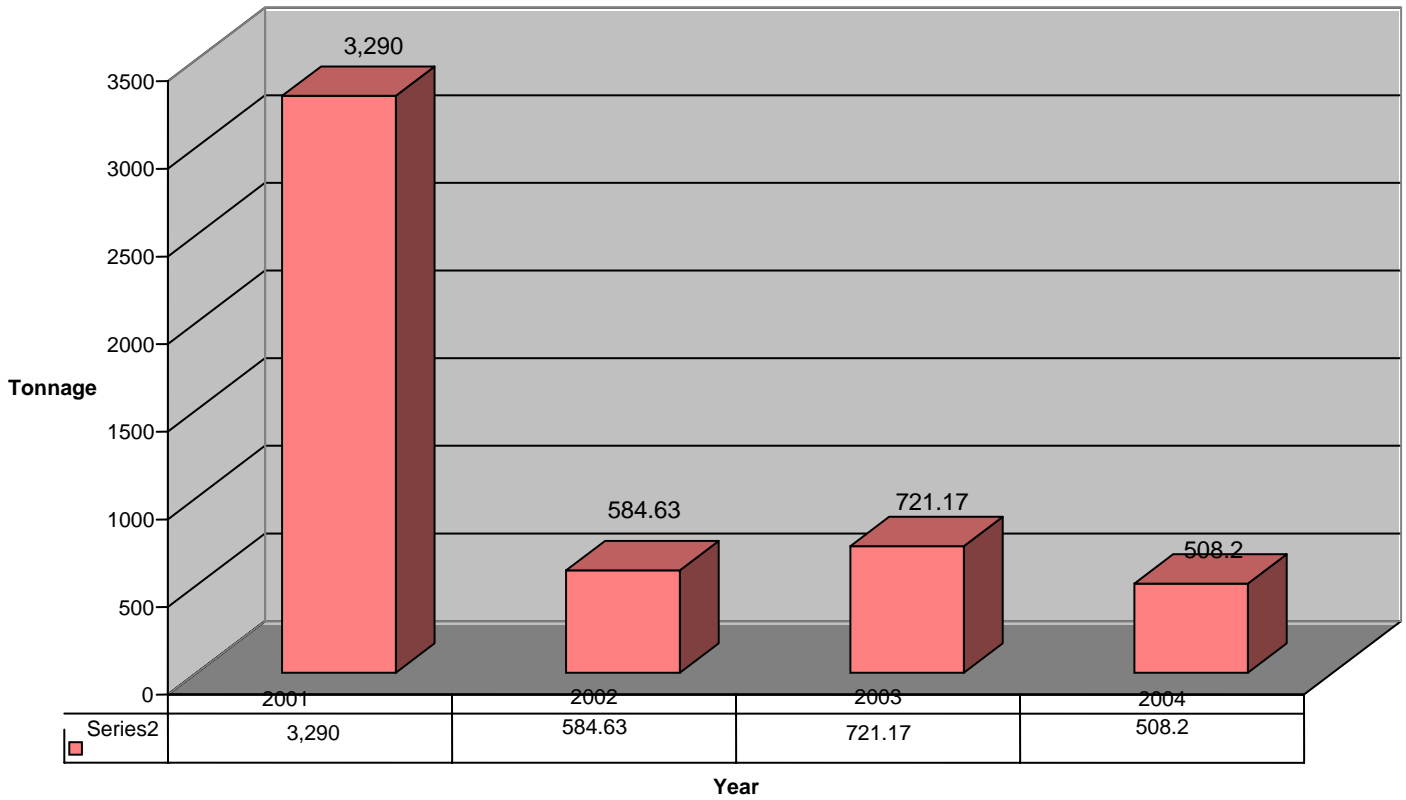
- Thermal Fax Paper
- Carbon Paper
- Newspaper
- Tissues
- Milk, Juice, Lunch boxes (boxes with a thin film of wax)
- Candy Wrappers
- Grey Board paper

White Ledger and computer paper represent the higher grades of recyclable paper, followed by coloured ledger and mixed paper. This would also explain the large figure for the year 2001 as paper is recycled according to the market demand. This can be seen and identified in Figure 14.2. The most revenue was obtained during that year.

SWMCOL also offers collection and shredding services to clients, from which most of the paper is collected

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FIGURE 14.2: PAPER PRODUCTION, 2001-2004



Source: SWMCOL

14.2.2 Plastics

SWMCOL is not at present providing collection services for plastics. This is mainly done by the Commercial Plastics Recycling (CPR) Company in Penal, Trinidad. Five hundred million (500,000,000) empty Polyethylene Terephthalate (PET) plastic bottles at an average of 31.78g each is landfilled in Trinidad annually. In 2005, within the first nine (9) months six hundred thousand pounds (600,000 lbs) of PET, High Density Polyethylene (HDPE) and Polycarbonate (PC) scrap plastic bottles were recycled (i.e. baled and reground).

TABLE 14.3: WASTE GENERATION RATES FOR MEDICAL FACILITIES

Type/No. of facilities by quantity of waste generated (kgs/mth)

WASTE TYPE	H/8	PNH/4	LAB/11	FH/11	HC/57	MD/47	VET/4	DNT/16	HM/8	A&P/2	Total
1	663	37	151	30	10	...	...	...	...	...	891
2	51	...	190	117	129	186	5	50	10	5	743
3	405	...	76	50	10	...	...	...	...	...	541
4	229	105	59	17	142	...	...	...	...	...	552
5	234	23	136	...	18	8	...	4	...	...	423
6	221	72	98	114	1,040	429	125	86	33	17	2,235
7	189	...	10	55	485	375	38	...	...	...	1,152
8	250	25	188	9	1,711	825	130	70	30	...	3,238
9	10	...	...	...	84	...	...	...	...	...	94
10	486	126	126	45	2,050	952	90	65	57	4	4,001
Total	2,737	388	1,034	437	5,679	2,775	388	275	130	26	13,869
Annual Total/t	32.8	4.7	12.4	5.2	68.1	33.3	4.7	3.3	1.6	0.3	166.4
Gen. Rate per Facility	342	97	94	40	100	59	97	17	16	13	875

Source: SWMCOL

Key: Medical Waste Generators

H- Hospitals

PNH- Private Nursing Homes

HC- Health Centres

VET- Veterinary Clinics

HM- Geriatric Homes, etc

LAB- Laboratories

FH- Funeral Homes

MD- Medical Practitioners

DNT- Dentists

A&P- Acupuncturists & Pharmacies

Key: Medical waste Types

1- Cultures and stock of infectious agents

3- Culture dishes and other utensils

5- Sample containers

7- Pathological waste

9- Dialysis unit waste

2- Vials containing body fluid

4- Stool Specimens

6- Sharps

8- Dressing and bandages

10- Disposable protective clothing

14.5 Public Awareness

In 2003 the mandate of SWMCOL was expanded from that of management of the landfills to include the Preservation and Upgrade of the environment. These programmes attempt to limit the types of associated waste entering the landfills and also act as methods of a collective effort in gathering and disposal of waste by the use of a quality waste management system. To this end SWMCOL has increased the number of programmes which it manages:

1. **CEPEP-** The Community- based Environmental Protection and Enhancement Programme was founded on three guiding objectives:
 - Clean, enhance and beautify the physical environment
 - Provide employment opportunity to those persons left out of the distribution system- unskilled and semi skilled persons and;
 - To create a cadre of new entrepreneurs in Trinidad and Tobago.

2. **CEII-** The Community Environmental Improvement Initiative. This programme is aimed at educating the national community on the need to conserve the environment and inculcating the right attitudes and behavioural patterns towards the environment. This initiative is designed to improve the quality of life of the nation's citizens through community involvement, the education of the populace, and heightened awareness on the need to conserve and protect the physical environment of Trinidad and Tobago.

3. **DART-** Dead Animal Removal Team was set up in 2002 primarily to oversee the effective removal and disposal of small animal carcasses from the country's roads. In the years 2002, 2003, 2004 and January to September 2005 total figures of twenty-six (26), one thousand and five (1,005), two thousand and sixteen (2,016) and one thousand, three hundred and forty-eight (1,348) animals, inclusive of cats, dogs and others were collected respectively.

4. **DERT**- Disaster Emergency Response Team. This programme was developed in response to Hurricane Ivan's impact on Grenada. The Government of the Republic of Trinidad and Tobago (GORTT) mobilised several units of CEPEP to assist in the disaster relief both physically and psychologically.

5. **"I LOVE MY BEACH PROGRAMME"**- In response to the crime of dumping and littering on the nations beaches, SWMCOL created and established this programme in November 2003. The project was introduced with the objective of removing marine debris from our coastline and thereby preserving the environment.



Solid waste on the Coastline in South Trinidad

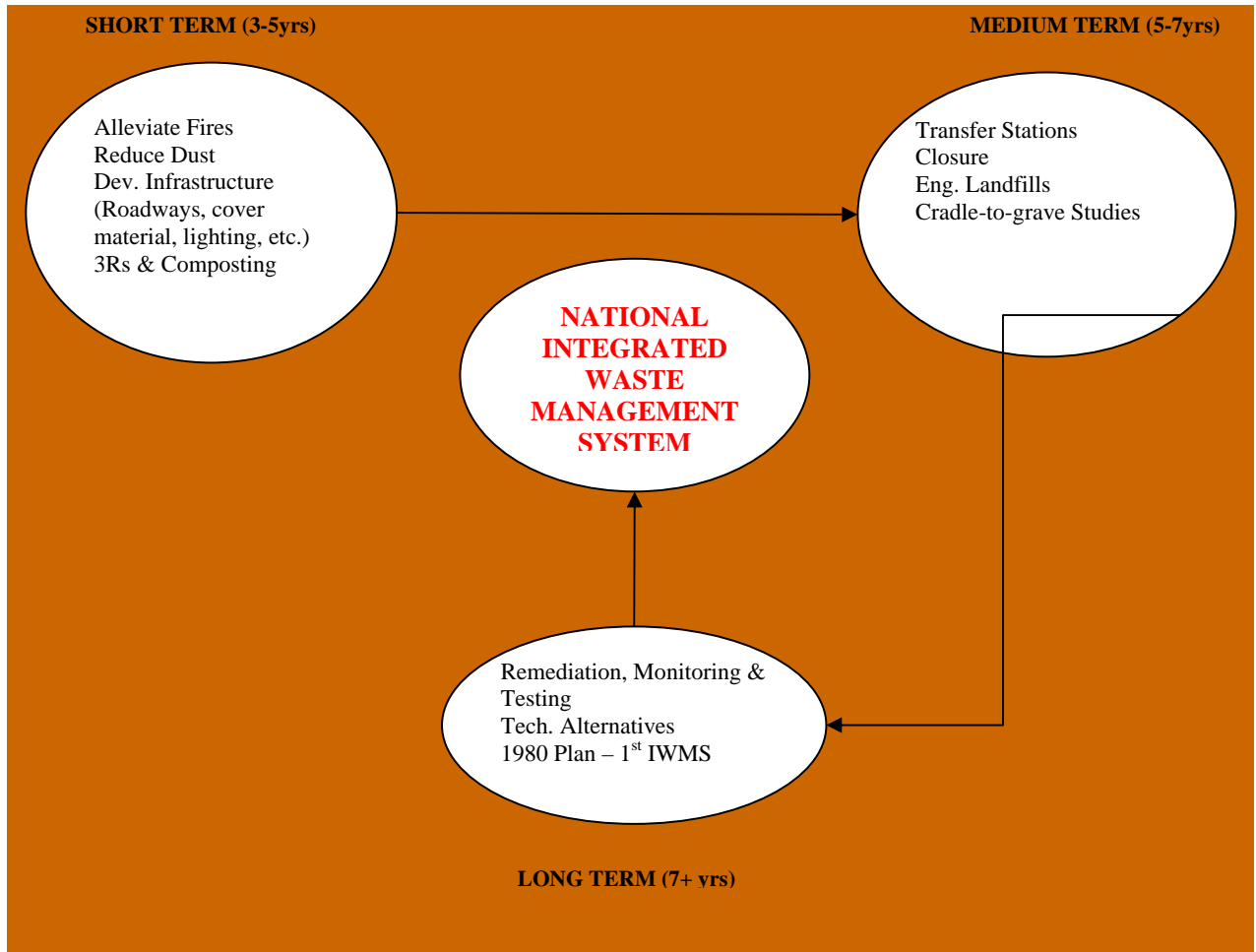
The following are the categories of waste types SWMCOL can collect: Liquid Waste (pure sewage only); Special Waste which is buried at the landfill under a special disposal (e.g. Wastewater from food production facilities). Hazardous Waste is currently not accepted the landfill. However, once treated at a facility and rendered inert the treated hazardous waste would be accepted at the landfill for final disposal. The company also collects Waste- Paper for recycling and supplies Portable Toilets.

14.6 National Integrated Waste Management System

The Trinidad and Tobago waste experience, as outlined in this chapter and the existing approach to waste management is a major cause for concern. As a small island developing state with a fragile, ecosystem and competing land uses, the problems associated with improper waste management are magnified one hundred fold. It is in this regard that SWMCOL has argued for the inception of a National Integrated Waste Management System (NIWMS) which involves a combination of initiatives that provide a systems approach to dealing with the waste generated by a society.

The NIWMS would incorporate all the component parts to establish a waste system that moves all waste from generation source to final disposal. The objective of implementing an NIWMS is to provide proper administration for both contractual and municipal collection crews with the provision of details on types of vehicles to be used, the collection routes and times, the contract period for contracted collectors, the establishment of transfer stations and the method of final disposal.

FIGURE 14.3: FLOWCHART SUMMARIZING INTEGRATED WASTE MANAGEMENT PLAN (IWMP)



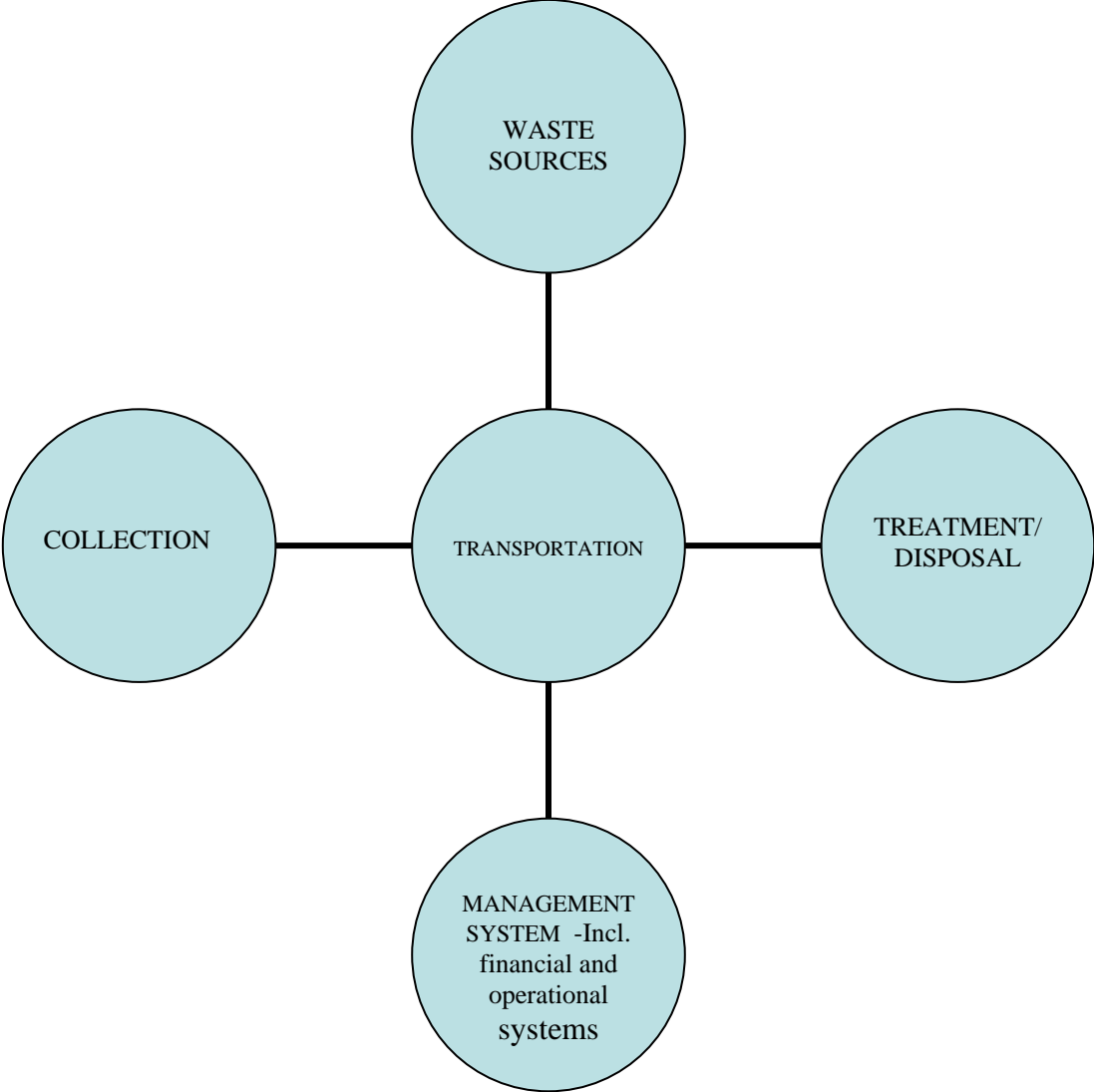
Source: SWMCOL

Figure 14.3 depicts the path that can be taken for successful implementation. Solutions are numerous and a multi-pronged approach is necessary. Solutions have been classified into short, medium and long term requirements, but ultimately, converting to an IWMS would fall in the ideal situation. This is important, especially to ensure proper waste management in light of the limited land resource common to SIDS, the ever-shrinking global village and the increases in consumerism.

All solutions are en route to the eventual long term establishment of a National Integrated Waste Management System. The 1980 study proposed an IWMS, which can be the basis for a revised NIWMS. SWMCOL hopes to implement the results of this update.

Figure 14.4

Elements of the Integrated Waste Management System



Source: SWMCOL