A COMPREHENSIVE SOLID WASTE MANAGEMENT PLAN FOR NEW YORK CITY and FINAL GENERIC ENVIRONMENTAL IMPACT STATEMENT

August 1992

This Comprehensive Solid Waste Management Plan and Final Generic Environmental Impact Statement (FGEIS) was prepared by the New York City Department of Sanitation with technical assistance from the following consultants:

The Tellus Institute; CalRecovery, Inc.; E & A Environmental Consultants, Inc.; Konheim & Ketcham; TAMS Consultants, Inc.; SCS Engineers; Eng-Wong, Taub & Associates; HydroQual, Inc.; Analysis & Computing, Inc.; Freudenthal & Elkowitz; Michael Gochfeld, MD, Ph.D; Hawkins, Delafield & Wood; Waste-Tech.

The Department of Sanitation is the lead agency for the environmental review process. The lead agency contact is:

Andrew S. Lynn
Assistant Commissioner
Solid Waste Management Plan Implementation
Department of Sanitation
125 Worth Street, Room 727
New York, N.Y. 10013

Phone: (212)-788-3885 Fax: (212)-385-2560

A full set of the 15 volumes of supporting appendices referred to throughout this document is available at each of the public depository locations listed on the following pages.

Public Depositories for Documents Pertaining to New York City's Comprehensive Solid Waste Management Plan and Generic Environmental Impact Statement

LOCATION	PHONE NUMBER	<u>HOURS</u>
BRONX:		
Bronx Reference Center 2556 Bainbridge Avenue Bronx, NY 10458 Attn: Lucida Arus	212-220-6576	M - 1pm-8pm T - 10am-6pm W - 1pm-8pm Th - 10am-6pm F - CLOSED S - 10am-5pm Su - CLOSED
Bronx Borough President's Office 851 Grand Concourse, Room 301 Bronx, NY 10451 Attn: Mirah Becker	212-590-6124	M - F: 9am-5pm
BROOKLYN:		
Brooklyn Public Library Grand Army Plaza Brooklyn, NY 11238 Attn: Walter Wolff	718-780-7759	M - CLOSED T - 9am-8pm W - 9am-8pm Th - 9am-8pm F - 10am-6pm S - 10am-6pm Su - CLOSED
Brooklyn Borough Hall Office of the Borough President 209 Joralemon Street Brooklyn, NY 11201 Attn: Ben Esner	718-802-3850	M - F: 9am-5pm
MANHATTAN:		
NY Public Library 455 5th Avenue, 6th Floor New York, NY 10016 Attn: John Paul Michaud	212-340-0911	M - 9am-9pm T - 11am-7pm W - 9am-9pm Th - 11am-7pm F - 10am-6pm S - 10am-6pm Su - CLOSED

Public Depositories (continued)

LOCATION	PHONE	HOURS
Municipal Reference & Research Center 31 Chambers St., Rm. 111 New York, NY 10007 ATTN: Stephanie Makler	212-788-8590	M - F: 9-4:30pm
QUEENS:		
Queens Public Library 89-11 Merrick Boulevard Jamaica, NY 11432 Attn: Constance Cook	718-990-0700	M - 10am-9pm T - 10am-9pm W - 10am-9pm Th- 10am-9pm F - 10am-9pm S - 10am-5:30pm Su- CLOSED
Queens Borough Hall Office of the Borough President 120-55 Queens Blvd., Rm. 219 Kew Gardens, NY 11424 Attn: Jerry LaMura	718-520-3300	M - F: 9am-5pm
STATEN ISLAND:		
St. George Library Center 5 Central Avenue Staten Island, NY 10301 Attn: Elizabeth Mullan	718-442-8560	M - 1pm-8pm T - 10am-6pm W - 10am-6pm Th - 1pm-8pm F - 1pm-6pm S - 10am-5pm Su - CLOSED
Staten Island Borough Hall Office of the Borough President 120 Borough Hall, Rm. 100 Staten Island, NY 10301 Attn: Nicholas Dmytryszn	718-390-5180	M - F: 9am-5pm

FORWARD

This Final Generic Environmental Impact Statement (FGEIS) documents a public planning, analysis and review process for the City's solid waste management needs. A Draft Generic Environmental Impact Statement (DGEIS) was issued on March 31, 1992. The formal public review and comment period pursuant to New York City's Environmental Quality Review (CEQR) procedures and the New York State Environmental Quality Review Act (SEQRA) began on April 9, 1992 when a Notice of Completion and Notice of Hearings was issued. The DGEIS was the subject of hearings in each of the five boroughs on May 14, 18, 19, 20 and 21, 1992. The record remained open for further written comments until June 1, 1992.

The comments received during this comment period from the New York State Department of Environmental Conservation (DEC) and other involved agencies; from the New York City Council and other elected officials; from the Citywide Recycling Advisory Board and borough Solid Waste Advisory Boards; from Community Boards and other organizations; and from the general public are addressed in this FGEIS. These comments and responses to them are contained in Chapter 21. In addition, some of the text in this document and in its supporting appendices has been changed to reflect these comments.

Most of the revisions made in the approval process for this FGEIS and Plan are indicated with vertical lines in the margin, bold type, and strike-out lines through deleted original text, except in the case of Chapter 19 which was revised in its entirety.

TABLE OF CONTENTS

PART	I:	CURRENT	WASTE-DISPOSAL	SYSTEMS	AND	THE	EXISTING
		ENVIRONM	MENT				

1.	New York C	City's Solid-Waste Management Problem	
		The Problem How the Problem Developed The Growth of New York City The Evolution of New York City's	1-1 1-3 1-3
		Waste Stream	1-4
	1.3	How Wastes Have Been Disposed of Up to the Present	1-5
	1.3.1	taran da antara da antara da taran da antara da an	1-5 1-6 1-7
	1.3.3 1.3.4		1-8
	1.3.5 1.3.6		1-9 1-9
	1.3.7	Sewage Sludge Disposal	1-10 1-10
	1.3.8 1.3.9	Dredge Spoils	1-11
	1.3.10	_	1-12 1-12
	1.4	Previous Planning Efforts	1-13 1-13
	1.4.1 1.4.2	Plans for Municipal Solid Waste Plans for Sludge	1-15
	1.4.3 1.4.4		1–16 1–16
	1.4.5	. <u></u>	1-16 1-16
	1.4.6 1.5	Structure and Content of this Comprehensive	
		Solid-Waste-Management Planning Effort	1-17
2.	The Exist:	ing Environment and Projected Changes	
	2.1	The Planning Unit Statistical Profile of New York City,	2–1
	2.2	Current and Projected Population & Projected Population Change	2-2 2-3
	2.3.1	Waste-Stream Analyses Municipal Solid Waste	2-7 2-7
	2.3.2 2.3.3	Construction and Demolition Waste Regulated Medical Wastes	2-10 2-10
	2.3.4 2.3.5	Sludge Harbor Debris	2-12 2-13
	2.3.6	Dredge Spoils Air Resources, Current and Projected	2-15 2-16
	2.5	Water Resources, Current and Projected	2-18
	2.6	Transportation Systems, Current & Projected	2–18

3. The Existing Solid-Waste-Management System

3.1	Prevention Programs	3–1
3.1.1	Prevention Programs for MSW	3-1
3.1.2	Prevention Programs for Sludge	
	and Wastewater	3-2
3.2	Collection, Transfer, & Transport Systems	3-4
3.2.1	MSW (Non-Source-Separated) Collected	
0.2.	by the Sanitation Department	3-4
3.2.2	MSW Collected by Private Carters	3-5
3.2.3	Municipal Transfer Stations for MSW	3-6
3.2.4		3-6
	Private Transfer Stations	3-0
3.2.5	Disposal of Private Transfer Station	2 40
2 2 4	Materials	3–10
3.2.6	Collection, Transfer, and Transport of	
	Non-MSW Waste	3-10
3.3	Recycling Programs and Facilities for MSW	3-11
3.3.1	Sanitation Department Recycling	3–11
3.3.2	Private-Carter Recycling	3-17
3.4	Composting Programs and Facilities	3-18
3.4.1	Composting Programs and Facilities for MSW	3-18
3.4.2	Composting Programs and Facilities	
	for Sludge	3-18
3.5	Incinerators	3-19
3.5.1	Municipal Incinerators	3-19
3.5.2		J-19
3.3.2		2 20
2 5 2	Incinerators	3-20
3.5.3	Medical Incinerators	3-20
3.6	Landfills	3-21
3.6.1	Within New York City	3-21
_ 3.6.2	•	3-26
3.7	Sludge	3-28
3.8	Medical Waste	3-28
	Harbor Debris	3-30
3.10	Dredge Spoils	3-30
3.10.1	Ocean Disposal	3-31
3.10.2	Upland Disposal	3-31
3.11	Construction and Demolition Waste	3-32
3.12	Regulatory Framework	3-32
		0 0-
Existing	Proposals for System Changes & Improvements	
Diff During .	reposars for system changes a improvements	
4.1	Prevention Programs	4-1
4.1.1		4-1
4.1.2	Currently Proposed Prevention Pilot Programs	4-1
4.1.2	Currently Proposed Prevention Legislation	4 4
4 2	and Executive Directives	4-1
4.2	Proposed Recycling Programs and Facilities	
4	for MSW and Non-Regulated Medical Waste	4-2
4.2.1	Planned Recycling Programs for Sanitation-	
	Collected Waste	4-2

4.

	4.2.2 4.3 4.4 4.4.1 4.4.2 4.5 4.6 4.7	Pilot Programs Compost Programs and Facilities Proposed for MSW Incinerators/Waste-to-Energy/Thermal- Processing Facilities Planned Changes for MSW Incinerators/ Waste-to-Energy Facilities Proposed Private Incinerators for Regulated Medical Wastes; On-Site Incinerator Upgrades/Decommissioning; HHC Proposals; Proposed Autoclave Facility Upgrades of Current Landfills and Remediation of Closed Landfills Sludge-Management Facilities Currently Proposed Changes for Managing Harbor Debris Currently Proposed Changes for Managing Dredge Spoils	4-3 4-3 4-3 4-4 4-6 4-8 4-10 4-11 4-11
PART 5.		NING NEEDS AND POLICY OBJECTIVES agement Needs and Goals	
	5.1 5.1.2 5.1.3 5.2 5.2.1 5.2.2 5.2.3 5.3.1 5.3.2 5.3.3 5.4 5.4.1 5.4.2 5.4.3 5.5.1 5.5.2 5.5.3 5.5.3	Regulatory Compliance Policy Objectives Sludge-Management Needs and Goals Capacity Needs Regulatory Compliance Policy Objectives Medical-Waste-Management Needs and Goals Capacity Needs Regulatory Compliance Policy Objectives Harbor-Debris-Management Needs and Goals Capacity Needs Regulatory Compliance Policy Objectives Dredge-Spoils-Management Needs and Goals Capacity Needs Regulatory Compliance Policy Objectives Construction-and-Demolition-Debris- Management Needs and Goals Capacity Needs Regulatory Compliance Policy Objectives Construction-and-Demolition-Debris- Management Needs and Goals Capacity Needs Regulatory Compliance	5-1 5-3 5-8 5-9 5-10 5-12 5-12 5-14 5-14 5-15 5-15 5-15 5-17 5-17 5-17 5-17 5-17

6.	Environmer	ntal Evaluation Criteria and Methodologies	
	6.1 6.2 6.3 6.4 6.5 6.6	Air-Impact Analysis Water-Quality Analyses Traffic-Impact Analyses Noise-Impact Analyses Odor Impacts Infrastructural/Utility-Systems/ Community Services Analysis Energy Impacts Secondary Economic Impacts	6-1 6-2 6-4 6-5 6-6 6-6 6-7
	6.9 6.10 6.11	Land-Use Impacts Facility Siting Public Health	6-8 6-8 6-9
7.		VENTION OF WASTE-MANAGEMENT ALTERNATIVES vention Alternatives	
	7.1	Reducing the Generation of MSW Barriers to Waste Prevention	7-1 7-2
	7.1.2		7-3
	7.1.4 7.1.5 7.2	Waste-Prevention Program Waste Prevention Programs/Policies	7-4 7-6 7-10
	7.3 7.4	in Sludge Reducing the Generation of Medical Waste Reducing the Generation of Harbor Debris	7-11 7-11 7-15
	7.5	Environmental and Cost Impacts of Prevention Options	7–16
8.	Alternati	ve Recycling Options	
	8.1.1	Decision Factors in Developing a Recycling Program for Municipal Solid Wastes Alternative Recycling Programs for Materials Collected from Non-Comercial	8-1
	8.1.2	Waste Generators Alternative Recycling Programs for Materials Collected from Commercial	8-3
	8.2 8.2.1	Establishments Alternative Collection Systems Collection System Options for	8-9 8-9
	8.2.2	Non-Commercial Waste Generators Alternative Collection Programs for	8-9
		Commercial Establishments	8-13

	8.3	Alternative Processing Facilities for	0 14
	0.4	Recyclable Materials	8-14 8-16
	8.4	Markets	8-16
	8.4.1 8.4.2		0-10
	0.4.2	Regional Supplies of Recyclable Materials	8-23
	8.4.3		0 23
	0.4.5	State and Federal Governments	
		to Expand Markets	8-24
	8.5	Differential Waste-Stream Impacts from	0 1.
	0.5	Alternative Recycling Programs	8-25
	8.6	Most Viable Recycling Program Options	8-28
0		- · · · · · · · · · · · · · · · · · · ·	
9.	Alternati	ve Composting Options	
	9.1	Composting Municipal Solid Waste	9-2
	9.1.1		9-2
	9.1.2	Collection Alternatives for MSW	
		Compost Systems	9-5
	9.1.3	<u> </u>	
		Municipal Solid Waste	9-10
	9.2	Sludge Composting	9-15
	9.3	Composting Mixed Waste Streams	9-16
	9.4	Market/End Uses	9-17
	9.4.1	Existing Market/End Uses	9-17
	9.4.2	Market Potential By Compost Type	9-21
	9.4.3		9-22
	9.5	Regulatory Requirements	9-22 9-22
	9.5.1	Operational Regulations	9-22
	9.5.2 9.6	Use Regulations Compost System Impacts	9-23
	9.7	Viable Program Options	9-24
	9.7	Viable Flogram Options	J 24
10.	Waste-to-	Energy Systems	
	10.1	Processing Technologies and Sub-Component	
		Systems	10-1
	10.1.1	Mass-Burn Systems	10-2
	10.1.2	Refuse-Derived Fuel	10-3
	10.1.3	Fluidized-Bed Combustion Systems	10-4
	10.1.4	Pyrolysis Systems	10-5
	10.1.5	Biogasification Systems	10-5
	10.1.6	Ocean-Burning of Harbor Debris	10-5
	10.1.7	Alternatives for Retrofitting Existing	10.0
	40 4 5	Municipal and Hospital Incinerators	10-6
	10.1.8	Other Technologies	10-6
	10.1.9	Sub-Component Systems	10-6
	10.2	Potential Options for Integrating Process	10 15
	10 2	Streams in Waste-to-Energy Systems	10-12
	10.3	Ash Treatment/Re-Use/Disposal Alternatives	10-12

	10.4	Regulatory Requirements	10-14
	10.5	Cost Impacts of Waste-to-Energy Alternatives Siting	10-14 10-15
	10.7	Environmental Impacts of Waste-to-Energy Alternatives Viable Program Options	10-16 10-16
11.	Landfill A	Alternatives, within New York City and Outside City	:
	11.1 11.1.2 11.2 11.3 11.3.1 11.3.2 11.4 11.5 11.6 11.7	Non-Municipal (Out-of-City) Landfill Alternatives Landfill Design and Technology Alternatives Description of Alternatives	11-1 11-1 11-2 11-4 11-5 11-5 11-7 11-8 11-8 11-9
12.	Alternati Stations	ves for Collection, Transport, and Transfer	
	12.1 12.1.1 12.1.2 12.1.3 12.2 12.3 12.4 12.5 12.6	Alternatives for Municipal Solid Waste Collection Options Transfer Alternatives for Municipal Solid Waste Export Transport Options for Municipal Solid Wastes Alternatives for Transporting De-Watered Sewage Sludge Alternatives for Collecting and Transporting Medical Waste Alternatives for Collecting and Transporting Harbor Debris Alternatives for Transporting Dredge Spoils Alternatives for Collecting, Transferring, and Transporting Construction and Demolition Debris	12-1 12-1 12-4 12-5 12-8 12-8 12-9 12-9
13.	Siting Co	onsiderations	13- 1

14.	Implement	ation Factors and Alternatives	
	14.1	Collection-System Implementation Alternatives Public versus Private Collection Systems	14-1 14-2
	14.1.2	Alternatives for Structuring, Collecting, and Monitoring User Fees Alternative Institutional Structures for	14-4
	14.3	Developing and Operating Waste-Management Facilities	14-5
	14.3	Alternative Over-Arching Institutional Structures Alternatives for Site Acquisition	14-6 14-8
	14.5	Scheduling Alternatives for Implementing this Plan	14-9
PART		MPREHENSIVE PLAN FOR THE INTEGRATED MANAGEMENTY ORK CITY'S SOLID WASTES	NT OF
15.	The Plann	ing Process	
	15.1 15.1.1 15.1.2 15.1.3 15.1.4 15.1.5 15.1.6 15.1.7 15.2 15.2.1 15.2.2	Constructing the Initial-Phase Scenarios Waste-Stream Parameters Collection System Parameters Processing System Parameters Construction of Initial-Phase Scenarios Scenario-Evaluation Assumptions Sensitivity Analyses Conclusions of Initial-Phase Analyses Intermediate-Phase Scenario Analyses Methodology for Analysis Create the Template for Intermediate- Phase Analyses: Testing Variations of the Hypothesized "Best" Scenarios (and Comparing them to the Baseline and the "Benchmarks") Final-Phase Scenario Analyses	15-2 15-2 15-5 15-5 15-6 15-7 15-10 15-11 15-15 15-15
16.	The Compo	Final-Phase Scenario Analyses nents of the Waste-Management System	15-24
	·	•	16-3
	16.1 16.1.1 16.1.2	Waste-Prevention Programs MSW-Prevention Programs Programs for Reducing Pollutants	16–3
	16.1.3	in Sludge Medical-Waste-Prevention Programs	16-5 16-6
	16.1.4 16.2	Harbor-Debris-Prevention Programs Recycling Programs	16-8 16-8
	16.2.1	Recycling Programs for Residential MSW	16-8

	16.2.2	Recycling Programs for Institutional	
		MSW	16–13
	16.2.3	Recycling Programs for Commercial/	
		Industrial MSW	16-15
	16.2.4	Recycling Programs for Medical Waste	16–17
	16.2.5	Recycling Programs for Construction	
		and Demolition Waste	16-19
	16.2.6	Recycling Programs for Harbor Debris	16-21
	16.3	Composting Programs	16-21
	16.3.1	Composting Programs for MSW	16-21
	16.3.2	Composting Programs for Sludge	16-26
	16.3.3	Composting Programs for Mixed Waste	
		Streams	16-26
	16. <u>4</u>	Waste-to-Energy	16-27
	16.4.1	Waste-to-Energy Program for MSW	16-27
	16.4.2	Waste-to-Energy Program for Medical	
		Waste	16-27
	16.4.3	Waste-to-Energy Prgram for Harbor Debris	16-28
	16.4.4	Construction and Demolition Waste	16-28
	16.4.5	Mixed Waste Streams	16-28
	16.5	Landfilling	16-29
	16.5.1	MSW By-Pass and Processing Residues	
		(Not including ash residue from waste-	
		to-energy facilities)	16-29
	16.5.2	Sludge	16-29
	16.5.3	Harbor Debris	16-29
	16.5.4	Dredge Spoils	16-29
	16.5.5	Construction and Demolition Waste	16–31
	16.5.6	Waste-to-Energy/Incinerator Ash	16 21
	16.6	Residue	16-31
	16.6	Collection, Transfer, and Transport	16-31
		Systems	10-31
17.	Environmo	ntal and Economic Impacts of the Plan	
1 / .	Environme	ital and Economic impaces of the fran	
	17.1	The Environmental Impact Evaluation Process	5
	17.1.1		17.1-1
		Air Analyses	17.1-2
	17.1.3	Water Analyses	17.1-6
	17.1.4	Transportation Analyses	17.1-8
	17.1.5	Noise Analyses	17.1-9
	17.1.6	Odor Analyses	17.1-16
	17.1.7	Infrastructure/Utility-System Analyses	17.1-16
	17.1.8	Energy Analyses	17.1-19
		_	

	17.1.9	Land-Use Impacts: Acreage Requirements; Landfill Volume Requirements; Siting	
		Requirements; Visual Impacts; Impacts	
		on Waterfront Usage (and Consistency wit	h
			11
		Coastal-Zone-Management Objectives);	17.1-22
	47 4 40	"Quality of Life" Impacts	
	17.1.10		17.1-27
	17.1.11		17.1-33
	17.1.12	Secondary Economic Impacts	17.1-34
	17.2	Impacts of the Individual Program and	
		Waste-Stream Components	
	17.2.1	Prevention-Program Impacts	17.2-1
	17.2.2	Recycling Program Impacts	17.2-6
	17.2.3	Compost Program Impacts	17.2-15
	17.2.4	Waste-to-Energy Program Impacts	17.2-21
	17.2.5	Landfill Program Impacts	17.2-25
	17.3	Cumulative Impacts of Proposed Waste-	
		Management Systems	
	17.3.1	Costs and Waste-Stream Impacts	17.3-1
	17.3.2	Cumulative Environmental Impacts of	
		Integrated Waste-Management Systems	17.3-7
	17.3.3	General Cumulative Impacts from All	
		Programs for All Waste Streams	
		Combined	17.3-23
	17.4	Environmental and Economic Impacts of	17.3-23
	17.4	the Near-Term Implementation Plan	17.4-1
		the hear-rerm imprementation rian	17.3-1
18.	Policy Cor	mnliance	
10.	TOTICY CO.	"PITANCE	
	18.1	Compliance With State Waste-Prevention	
	10.1	Goals	18-1
	18.2		10-1
	10.2	Compliance With State Recycling/	10 1
	10 0	Composting Goals	18-1
	18.3	Compliance With the State Solid Waste	
	40.4	Management Priorities	18-1
	18.4	Compliance with Section 120-aa of the	
		General Municipal Law	18-2
19.	The Implem	mentation Process for the Plan	
	19.1	Implementation Schedule	19-1
	19.1.1	MSW	19-1
	19.1.2	Sludge Facilities	19-22
	19.1.3	Medical Waste Facilities	19-22
	19.1.4	Dredge Spoils Facilities	19-24
	19.2	Administrative Structures	19-25
	19.2.1	Department of Sanitation	19-26
	19.2.2	Coordination Among City Agencies	19-27
	- · · - -		

	19.3	Legislative Initiatives for Plan	
		Implementation	19-28
	19.3.1	Federal/State Waste Reduction and	
	13.3.1	Recycling Proposals	19-29
	19.3.2		
	13.3.4	Proposals	19-36
	19.4	Funding the Plan	19-40
	19.4.1	The City Budget	19-40
			15 10
	19.4.2	Structures	19-42
2.0		- for Undeting this Dlan	
20.	Procedure	s for Updating this Plan	
	20.1	Monitoring Procedures	20-1
	20.2	Research and Development Programs	20-3
	20.3	Public Consultation	20-5
	20.4	Schedule for Updating this Plan	20-6
	20.5	Council Review of Modifications to Plan	20-6
21.	Participa	tion in the Preparation of this Plan	
	21.1	The Public Participation Process	21-1
	21.1.1	Local Participants in this Planning	
	21.1.1	Process	21-1
	21.1.2	Consultation with Representatives	
	21.1.2	of Neighboring Jurisdictions	21-2
	21.2	Responsiveness Summary	21-2
	21.2.1	Responses to DEC Comments	21-2
	21.2.2		21-68
	21.2.3	Responses to Reports by the Comptroller	2. 00
	21.2.3	and NYPIRG	21-112
	21.2.4	Responses to Written Comments	21-152
	21.2.5	Responses to Comments at Public Hearings	21-182
	~		

LIST OF TABLES

Table No.		<u>Page</u>
2.2.2-1	Population Forecasts by Borough and Density	2-5
7.1.5-1	Potential for Waste Prevention (Year 2000)	7-11
7.6-1	Summary of Prevention Program Impact on Facility Group Pollutant Costs	7–17
8.1.1-1	Conceptual Ranges of Alternatives for Recycling Program Design	8-8
8.5-1	Residential Waste-Stream Recycling Rates in Alternative Recycling Programs (Year 2000)	8-29
9.1.2-1	Containers Used in Organics Collection Programs	9–7
9.1.2-2	Collection Efficiencies for Organic Waste	9-9
9.4-1	Rating of Various Compost Products According to Key Characteristics	9-17
9.4.2-1	Potential Compost Markets in the New York City Area	9–19
9.4.2-2	Preferred Use of Compost Products by Potential Compost Markets, Based on Quality	9-21
9.5.2-1	Class I and Class II Compost Comparative Standards	9-23
12.1.1-1	Summary of Alternative Collection Systems	12-4
12.1.3-1	Cost Comparison of Truck, Rail, and Marine Transport	12–6
15.1.1-1	MSW Waste Component Category Options	15-4
15.1.3-1	List of Reference Facilities	15-6
15.1.4-1	First-Phase Scenarios	15-7

Table No.		<u>Page</u>
15.1.7-1	First-Phase Scenarios Ranked By Cost (Mid-Range Assumptions for Residential Waste Only)	15-12
15.3-1	Outcome of Initial-Phase Analyses	15-13
15.2.2-1	Scenarios for Intermediate-Phase Analysis (Residential and Institutional Refuse Only)	15–18
15.2.2-2	Second-Phase Scenarios in Chronological Order (Cost Comparison Summary (Residential and Institutional Waste, Mid-Range Assumptions)	15-20
15.3-1	Elements of Final Solid Waste Management Systems (Residential and Institutional Waste)	15–26
15.3-2	Elements of Final Solid Waste Management Systems (Residential, Institutional and Commercial Waste)	15–28
16.1.3-1	Prevention Impacts of Proposed Medical-Waste Programs	16-7
16.2.1-1	Materials Targeted in the High Quality Source-Separation Program	16-9
16.2.1-2	Estimate of Materials Captured and Marketed in Proposed High-Quality Recycling Program (Year 2000, Residential and Institutional Waste Streams	16-14
16.2.4-1	Projected Recycling Diversion Rates for Medical Waste	16-17
16.2.5-1	Projected Recycling Diversion Rates for C&D Waste	16–19
16.2.5-2	Projected Quantities of Materials Recovered from C&D Recycling Program	16-21
16.3.1-1	Residential Wastes Designated for Proposed Source-Separated Organics-Composting Program	16-23

Table No.		<u>Page</u>
16.3.1-2	Potential Compost Markets in the New York City Area	16–25
16.3.1-3	Compost Generated by Each System as Percent of Available Market	16–25
16.5.6-1	Ash Disposal Requirements in Alternative MSW WTE Programs (Year 2000)	16–31
17.1.2-1	Reference Facility Air Emissions As a Multiple of Standard MRF	17.1-3
17.1.2-2	Ratio of Standard to Maximum Ground-Level Concentrations	17.1-4
17.1.2-3	Net Air Emissions, First-Phase Scenarios	17.1-4
17.1.2-4	Vehicular Air Emissions (Tons Per Year, Year 2000)	17.1-6
17.1.3-1	Process Water Discharge	17.1-7
17.1.3-2	Landfill Leachate	17.1-7
17.1.7-1	Reference Facility Water Supply/Sewer Discharge	17.1-20
17.1.7-2	Water Usage and Discharge	17.1-22
17.1.9-1	Reference Facility Siting Matrix	17.1-24
17.1.10-1	Comparison of Air Modelling Results for Systems A amd B	17.1–32
17.1.11-1	Reference Facility Capital Costs	17.1-35
17.1.11-2	Reference Facility Operating Costs	17.1-37
17.2.2-1	MSW Recycling Collection Tons and Cost (Year 2000)	17.2-7
17.2.2-2	MSW Recycling Program Facility Costs and Requirements (Year 2000)	17.2-10
17.2.2-3	Net Air Emissions from Proposed MSW-Recycling Program	17.2-11

Table No.		<u>Page</u>
17.2.2-4	Net Water Usage and Discharge Requirements for MSW Recycling Facilities	17.2-11
17.2.2-5	Summary of MSW Recycling Program Costs and System Requirements (Year 2000)	17.2-12
17.2.2-6	Medical Waste Recycling-Program Costs (Year 2000)	17.2-13
17.2.2-7	Construction and Demolition Recycling Program Costs (Year 2000)	17.2-14
17.2.2-8	Net Air Emissions from Proposed Construction & Demolition Processing Program (Tons Per Year)	17.2-14
17.2.2-9	Construction & Demolition Processing Water Supply/Sewer Discharge (000s of Gallons Per Year)	17.2-14
17.2.3-1	MSW-Compost Collection: Tons and Costs	17.2-16
17.2.3-2	Compost Facility Costs and Requirements (Year 2000)	17.2-17
17.2.3-3	Summary of Compost Program Costs (Year 2000)	17.2-17
17.2.3-4	Heavy Metals in Solid Waste Compost	17.2-18
17.2.3-5	Net Facility Air Emissions from MSW Compost Programs	17.2-19
17.2.3-6	Net Facility Water Usage and Sewage Discharge Requirements for Proposed Compost Programs	17.2-19
17.2.3-7	Proposed Sludge-Management Program (Year 2000)	17.2-19
17.2.3-8	Net Facility Air Emissions from Proposed Sludge Compost Program	17.2-20
17.2.3-9	Net Water Usage and Sewage Discharge Requirements of Proposed Sludge Compost Program	17.2-20

Table No.		<u>Page</u>
17.2.3-10	Medical Waste Composting Program (Year 2000)	17.2-20
17.2.4-1	Waste-to-Energy Program Tonnages and Acreage and Landfill Requirements (Year 2000)	17.2-22
17.2.4-2	Waste-to-Energy Program Costs (Year 2000)	17.2-22
17.2.4-3	MSW WTE Collection Cost (Year 2000)	17.2-23
17.2.4-4	Net Facility Air Emissions from Proposed Alternative MSW Waste-to-Energy Programs	17.2-23
17.2.4-5	Net Water Impacts from Proposed MSW Waste-to-Energy Programs	17.2-24
17.2.4-6	Regulated-Medical-Waste Waste-to-Energy Program (Year 2000)	17.2-24
17.2.4-7	Net Facility Air Emissions from Proposed Medical Waste-to-Energy Program	17.2-24
17.2.4-8	Net Water-Pollutant Loadings to Sewer System from Proposed Medical WTE Program	17.2-25
17.2.4-9	Net Water Usage and Sewage Discharge Requirements for Proposed Medical WTE Program	17.2-25
17.2.4-10	Harbor-Debris Waste-to-Energy Program (Year 2000)	17.2-25
17.2.5-1	Landfill Tons and Volume Requirements	17.2-26
17.2.5-2	Costs of MSW Landfill Facilities	17.2- 27
17.2.5-3	Net Air Emissions from Landfills and Ashfills in Alternative MSW Programs	17.2-27
17.2.5-4	Cost of Landfill Disposal for Waste- Water Residuals (Year 2000)	17.2-28
17.2.5-5	Cost of Landfill Disposal for Medical Waste (Year 2000)	17.2-28

Table No.		<u>Page</u>
17.2.5-6	Cost of Landfill Disposal for Construction and Demolition Debris (Year 2000)	17.2-28
17.2.5-7	Cost of Landfill Disposal for Harbor Debris (Year 2000)	17.2-28
17.2.6-1	Transfer Miles in Alternate MSW-Management Systems	17.2-28
17.2.6-2	Marine-Transfer System Costs for Alternative MSW-Management Systems	17.2-29
17.3.1-1	Cost-Per-Ton Comparison of Proposed MSW Systems, Compared to Maximum-Incineration, No-Incineration, and Projected-Baseline Benchmarks	17.3-1
17.3.1-2	Summary of Capital & Operating Costs in Systems A,B, No-Burn, Maximum-Burn	17.3-1
17.3.1-3	Net-Present-Value Costs and Waste- Management Percentages Over 20 years	17.3-2
17.3.1-4	MSW-System Acreage Requirements	17.3-4
17.3.1-5	Sludge Management Summary: Year 2000	17.3-4
17.3.1-6	Regulated-Medical-Waste Management Summary (Year 2000)	17.3-5
17.3.1-7	Construction & Demolition Debris Summary (Year 2000)	17.3-6
17.3.1-8	Harbor-Debris Management Summary (Year 2000)	17.3-6
17.3.1-9	Dredge-Spoils Management Summary (Year 2000)	17.3-7
17.3.2-1	Net Air Emissions From <u>All</u> Facilities in Integrated Waste-Management Systems	17.3-8
17.3.2-2	Net Air Emissions From <u>All</u> Vehicles Related to MSW Management Systems	17.3-8
17.3.2-3	Ambient-Air Pollutant Concentrations from <u>All</u> Major Facilities in Integrated Management Systems	17.3-8

Table No.		<u>Page</u>
17.3.2-4	Air Pollutants from <u>All</u> Major Facilities in Integrated Waste-Management Plan Deposited on Surface Waters	17.3-11
17.3.4-4a	Cumulative Traffic Impacts Levels of Service and Seconds of Delay at Sampled Intersections	17.3-13
17.3.2-5	Pollutant Loadings from Process Water Discharged by <u>All</u> Facilities in Integrated Waste-Management Plan	17.3-15
17.3.2-6	Total Water Usage and Sewer Discharge from <u>All</u> Facilities in Integrated Waste-Management Plan	17.3-15
17.3.2-7	Energy Impacts of Alternative Systems	17.3-17
17.3.2-8	Energy Impacts of Non-MSW Waste Streams	17.3-18
17.3.2-9	Secondary Economic Impacts Due to Proposed MSW Systems	17.3-20
17.3.2-10	Ranking of Alternative MSW-Management Systems in Relation to Quantifiable Environmental and Cost Impacts	17.3-21
17.3.2-11	Evaluation of Alternative Systems in Relation to Public-Policy Objectives	17.3-22
17.4-1	Percentage of Weight Handled by Each Waste-Management Option by Year	17.4-2
17.4-2	Summary of Capital and Operating Costs (Year 2000, \$M)	17.4-3
17.4-3	MSW-System Acreage Requirements	17.4-5
17.4-4	Net Air Loadings, MSW Facilities (Tons Per Year)	17.4-5
17.4-5	Ambient Air-Pollutant Concentrations From All Major Facilities in Integrated Management Systems	17.4-5
17.4-6	Air Pollutants From All Major Facilities in Integrated Waste-Management Plan Deposited on Surface Waters	17.4-8

Table No.		<u>Page</u>
17.4-7	Total Water Usuage and Sewer Discharge From All Facilities in Integrated Waste- Management Plan	17.4-8
17.4-8	Near-Term Implementation Plan Facility Sewer-Discharge Impacts on WPCP Drainage Areas	17.4-9
19.4.1-1	Capital Budget for Near-Term Implementation Plan	19-37
19.4.1-2	Operating Budget for Near-Term Implementation Plan	19–37
21.2.2-1	Effect of Reduction/Elimination of Some Existing Incineration Sources on NOx Emissions	21-97
21.2.3-1	Comparison of Annual Emissions of Selected Pollutants	21-128
21.2.3-2	Estimated Maximum Impact from a 3,000-TPD MSW Incinerator Using 2 Scenarios	21–135
21.2.3-3	Comparison of Annual Emissions: Con Ed Hudson Avenue Plant and BNY WTE Plant	21–136

LIST OF MAPS AND FIGURES

Figure No.		Page
2.2.2-1	Persons per Household in the Five Boroughs of New York City	2-6
3.2.3-1	Existing Department of Sanitation Waste- Management Facilities	3-7
3.2-4-1	Private Waste-Transfer Stations	3-9
3.6.1-1	Closed Landfills	3-22
3.7-1	Water Pollution Control Plants	3-29
5.1.1–1	Projected MSW Quantities (Residential and Institutional Only)	5-4
5.1.1-2	Projected MSW Quantities, Including Commercial Waste	5-5
5.1.1-3	MSW Recycling Facility Requirements	5-6
5.1.1.4	Alternative Growth Projections for Residential MSW	5-7
5.2.1-1	Current and Projected Sludge Quantities and Composition	5-11
5.3.1-1	Medical Wastes (Regulated and Non-Regulated): Quantities and Composition	5–13
5.4.1-1	Current and Projected Harbor Debris Quantities and Composition	5–16
5.5.1-1	Current and Projected Dredge Spoils Tonnages, 1990	5–18
5.6.1-1	Construction and Demolition Debris Composition	5–20
6.2-1	Existing New York State Surface Water Classifications	6-3
8.4.2-1	Regional Demand and Supply Relationships for Secondary Recyclable Fiber Materials	8–26

NYC SWMP Final GEIS, Figures 8-26-92

<u>Figure</u>		<u>Page</u>
8.4.2-2	Regional Demand and Supply Relationships for Selected Recyclable Materials	8-27
13-1	Comparison of Maximum Ambient Air Quality Impacts for a Prototypical Waste-to-Energy Facility Under Varying Terrain and Receptor Elevations	13–5
13-2	Differential Water-Quality Impacts in New York Harbor System Due to Unit Pollutant Discharges	13-6
13-3	Generalized NYC Zoning: Residential and Industrial	13-8
13-4	Generalized NYC Zoning: Commercial and Industrial (M and C-8)	13–9
15.3-1	Materials-Recovery Facility Wastesheds: Systems A and B	15–30
15.3-2	<pre>In-Vessel MSW Compost Facility Wastesheds: System B</pre>	15–31
15.3-3	Waste-to-Energy Facility Wastesheds: System A	15-32
15.3-4	Waste-to-Energy Facility Wastesheds: System B	15-33
16.5.1-1	Tons of MSW Landfilled Under Alternative MSW-Management Systems (Excluding Ash, Year 2000)	16-30
17.1.4-1	Vehicular Trips Generated By Reference Facilities	17.1-10
17.1.4-2	Key Access Intersections for Potential Bronx Facility Locations	17.1-11
17.1.4-3	Key Access Intersections for Potential Brooklyn Facility Locatioons	17.1-12

Figure No.		<u>Page</u>
17.1.4-4	Key Access Intersections for Potential Manhattan Facility Locations	17.1–13
17.1.4-5	Key Access Intersections for Potential Queens Facility Locations	17.1-14
17.1.4-6	Key Access Intersections for Potential Staten island facility Locations	17.1-15
17.1.5-1	Reference Facility Noise Impact	17.1-17
17.1.6-1	Reference Facility Odor Impacts	17.1-18
17.1.7-1	Reference Facility Water Usage and Sewage Outflow	17.1-21
17.1.9	Reference Facility Siting Matrix	17.1-23
17.2.1-1	Effect of Prevention Program Effectiveness on Cost-Benefit	17.2-4
17.3.1-1	Percent of Wastes Handled by Program in Alternative MSW-Management Systems (Year 2000)	17.3-3
17.3.1-2	Program Costs of Alternative MSW-Management Systems (Year 2000)	17.3-3
17.3.2-1	Isopleth Map of Ambient Air Pollutant Concentrations Due to Facility Emissions: System A (Annual PM10 Concentrations)	17.3-9
17.3.2-2	Isopleth Map of Ambient Air Pollutant Concentrations Due to Facility Emissions: System B (Annual PM10 Concentrations)	17.3-10
17.3.2-3	Facility Sewer Discharge Impacts on WPCP Drainage Areas	17.3-17
17.4-1	Percent of MSW Handled by Program	17.4-4
17.4-2	Program Costs of MSW Management Systems	17.4-4

Figure No.		<u>Page</u>
17.4-3	Isopleth Map of Ambient Air-Pollutant Concentrations Due to Near-Term Implementation Plan Facility Emissions (Annual PM10 Concentrations)	17.4-6
17.4-4	Isopleth Map of Ambient Air-Pollutant Concentrations Due to Near-Term Implementation Plan Facility Emissions (24-Hour PM10 Concentrations)	17.4-7
19.2-1	DOS Organizational Chart	19-23
21.2.1-1	Fresh Kills Life Expectancy Under Various Waste-Input Assumptions	21-5
21.2.3-1	Pre- and Post-Operational Dioxin Measurements in Ambient Air	21-125