



New York City Department of Sanitation

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NEW YORK CITY RECYCLING —IN CONTEXT—

A Comprehensive Analysis of Recycling in Major U.S. Cities



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Abbreviations and Definitions

BWPRR	Bureau of Waste Prevention, Reuse and Recycling (formerly known as the Recycling Programs and Planning Division)
Capture Rate	Percentage of items recycled out of all the recyclables present in the waste stream. The amount of recyclables in the waste stream is based on waste composition sampling.
Community District/ Sanitation District	One of the 59 administrative districts of NYC whose Boards advise Borough Presidents and City agencies on planning and services. Sanitation Districts, designated by the NYC Department of Sanitation for operational/administrative purposes, contain the same boundaries as community districts.
DOS/Department/ Sanitation	NYC Department of Sanitation
Diversion Rate	The portion of total discarded materials collected by the NYC Department of Sanitation that is diverted from the waste stream through recycling. Diversion rate is measured by dividing the weight of collected recyclables by the weight of collected waste plus recyclables.
EPA	United States Environmental Protection Agency
Expanded Recycling/ Expansion	Addition of mixed paper, beverage cartons, bulk and household metal to the materials collected for recycling citywide. The Expansion was phased-in by borough from 1995 to 1997.
HDPE	High-density polyethylene, one of the resins collected by DOS for recycling
MGP	Metal, glass, and plastic items collected in municipal recycling programs
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
Local Law 19	Local Law 19 of 1989 (the NYC Recycling Law)
Low-Diversion District	Sanitation Districts with diversion rates below 12%.
PET	Polyethylene Terephthalate, one of the resins collected by DOS for recycling
The “Program”	The NYC Recycling Program
QBUFs	Quantity-Based User Fees, where residents are charged for garbage collection according to the volume of waste they generate
Recycling	For the purposes of this report, this term refers to that fraction of total waste that is set out and collected for recycling. May also refer to the act of recycling.
Refuse	For the purposes of this report, this term refers to that fraction of total waste that is set out and collected for disposal. Also called trash or garbage.
Waste	For the purposes of this report, refuse and recycling set out for collection.
Waste Prevention	The practice of reducing waste by preventing its creation. This includes: buying products that have the least amount of packaging or are packaged to last longer; not buying more of a product than needed; reusing, donating, or repairing items that might otherwise be discarded as trash or for recycling.

Director's Note

In the year 2000, New York City attained a residential recycling rate of 20%, an all-time-high since recycling was made mandatory here in 1989. This accomplishment stems from the continual efforts by the City's Department of Sanitation since 1986 to coordinate infrastructure, collection, public education, and contracting such that this dense City of nearly eight million could efficiently and reliably divert 2,200 tons to recycling each day.¹

Since 1993, the Department of Sanitation ("the Department") has run a full-service Recycling Program for all City residents as well as public and nonprofit institutions. Municipal trucks and crews collect recyclables at curbside once a week from all households in the City, providing the same level of service to single-family homes, high-rise apartment buildings, and everything in between.² In fact, unlike many other U.S. cities, recycling in residences of all sizes has been part of the City's curbside program from its inception.



A NYC Department of Sanitation worker loads blue plastic bags (containing beverage cartons, bottles, cans, metal, and foil) into a recycling truck.

NYC Residents sort recycling into two color-coded categories for separate collection:

- Mixed paper (such as newspaper, magazines, catalogs, junk mail, paperback/telephone books, and all types of cardboard) is placed in a *green*-labeled bin or *clear* plastic bag.
- Beverage cartons, bottles, cans, metal, and foil are placed, all together, in a *blue*-labeled bin or *blue* plastic bag.



A worker loads cardboard and mixed paper into a paper recycling truck.

To achieve compliance among the millions living here, the Department conducts extensive recycling outreach and education.³ Department messages regularly appear in venues that include subway trains and platforms, bus shelters, phone kiosks, newspapers, TV, and the radio. These placements feature the friendly and informative "recycling bin and bag" characters that New Yorkers have come to know and love. The Department also conducts special events for particular audiences, organizing fun and educational



The Department of Sanitation uses recycling bin and bag characters to teach New Yorkers how to comply with NYC recycling regulations.

activities for building superintendents, schoolchildren, and residents of districts with lower-than-average recycling rates. And unlike other municipal recycling programs in the U.S., New York City's program is mandatory. Single-family homes and apartment buildings alike are required to recycle, and chronic noncompliance is met with tickets and fines.

In sum, full and frequent service to all residents, the comprehensive collection of marketable secondary materials in the waste stream, and a high public profile come together to make recycling work in New York City. Ongoing survey and focus-group research has confirmed that the Department's messages are hitting home. New Yorkers overwhelmingly report liking their recycling program, and show a strong knowledge of its rules and procedures.⁴

But as this report will show, evaluating NYC's 20% residential recycling rate against other benchmarks is a tricky business.

National averages generally combine commercial and residential recycling into one overall rate (as reflected in President Clinton's Year 2000 recycling goal of 25%,⁵ or the most

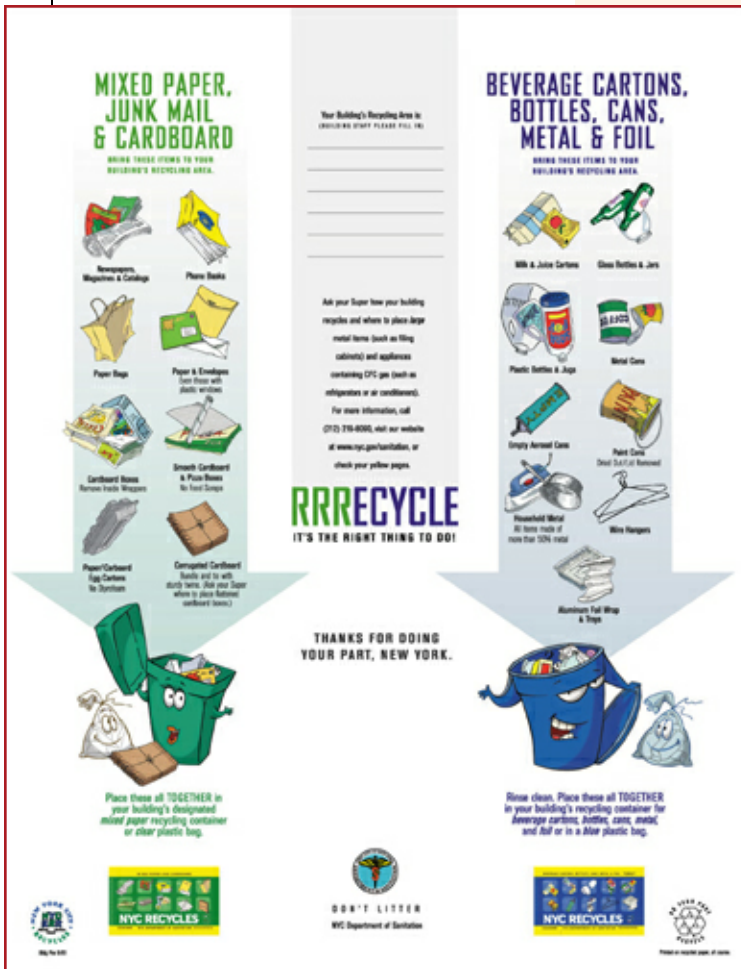


Phone kiosks are but one of the many venues for DOS advertising.

recent EPA figures showing an average 28% recycling rate nationwide⁶). But some cities in the U.S. report higher rates. A recent article in *Waste News* magazine summarized self-assessed rates for thirty large U.S. cities, and reported some localities as surpassing the 25% mark. (See Appendix I for a summary of this survey.)

These findings raise a number of questions. How should we assess NYC's 20% rate in comparison to other cities? What can we learn from studying their programs? How should we interpret our achievement of a 20% recycling rate given what the City has already done? To summarize, this includes:

- 1** Mounting citywide public education campaigns for more than seven years.
- 2** Mandating and enforcing recycling.
- 3** Providing weekly curbside collection to *all* residents.
- 4** Collecting the major recyclable materials found in the waste stream.



The Department of Sanitation’s recently redesigned residential building poster provides tenants with a quick and easy reference for how to separate their recyclables and allows building staff to write in site-specific instructions.

The Department takes the position that to answer these questions accurately, we must make sure that we are comparing “apples to apples,” rather than “apples to oranges” when we compare NYC’s recycling statistics to those of other U.S. cities. This first requires studying how different jurisdictions calculate their recycling rate (what materials they count, what kind of generators they include, and the source of their data). Second, it means looking at the recycling-relevant characteristics of particular localities. New York City is unlike any other city in the nation

because of the following two factors: the predominance of apartment buildings (many of them built decades ago) and the corresponding scarcity of yards. When both factors are properly taken into account, NYC actually comes out ahead of, or at least on par with, other U.S. municipalities in terms of recycling performance.

However, before even examining how NYC compares to other cities, it is necessary to understand what the Department of Sanitation has *already done* to achieve 20% recycling in this crowded urban environment. This will set the stage for an informed discussion of comparisons among existing recycling programs nationwide, and a consideration of future options for NYC.

I would like to thank Samantha MacBride and Susan Cohen from the Bureau of Waste Prevention, Reuse and Recycling for their contributions to this report.

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History of the Program

The challenge of changing the way New Yorkers handle their garbage is not a new one. Only the iron will of Peter Stuyvesant in the mid-17th century could stop the residents of this burgeoning metropolis from throwing rubbish, filth, ashes, oyster shells, and dead animals into the streets.⁷ Over a century later, the visionary Colonel George Waring, modernizer of waste management in this city, had to deploy a squad of forty officers to



At the turn of the century, Colonel Waring revolutionized sanitation in New York City, in part by raising pay, benefits, and morale among Sanitation workers.



In Colonel Waring's day, paper was source-separated.

enforce new rules requiring households to separate the material they put out for curbside collection. His extensive (though short-lived) program for turn-of-the-century New York set up a system in which paper, wood, metal, rags, and animal products were collected and recovered for beneficial use.

Yet despite those reforms and some recycling during World War II, New Yorkers throughout most of the second half of the 20th century had the luxury of simply throwing out all household waste, with no sorting necessary. That began to change in fall 1986, with the phase-in of what has become the current Recycling Program. Voluntary, newspaper-only recycling was launched that year in Community Board 2 in Manhattan. By the following summer, each borough had a single-district, newspaper pilot project. Recycling became mandatory with the passage of Local Law 19 of 1989, the *New York City Recycling Law*. (See Appendix II for complete text.) This set the stage for the introduction of the program we now have today.



Today, recyclables and trash are placed at the curb for collection by the NYC Department of Sanitation. Mixed paper is placed in clear bags. Corrugated cardboard is bundled and tied. Beverage cartons, bottles, cans, metal, and foil are placed in blue bags. Trash is set out in black bags.

The Department now collects materials from more than three million residences and five thousand institutions throughout the City's five boroughs. These efforts are supplemented with auxiliary programs that:

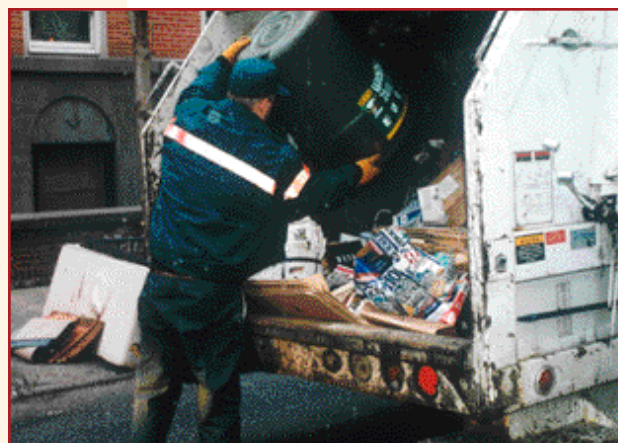
- Promote voluntary waste prevention through a Stuff Exchange hotline (1-877-NYC STUFF) and the NYC Wastele\$\$ website (www.nycwasteless.com).
- Collect thousands of tons of fall leaves and Christmas trees for composting.
- Encourage backyard composting and grass recycling (leaving clippings on the lawn) through the City's four botanical gardens and the Compost Project website (www.nyccompost.org).
- Centrally compost yard waste and discarded food from Riker's Island (the City's largest jail).
- Monitor and enforce commercial recycling regulations.

Early Challenges to “Modern” Recycling in NYC

Out of necessity, recycling in New York developed in stages, undergoing revisions along the way. In the 1980's, there was little recycling infrastructure in place, nor was there much in the way of experience from other comparable large cities. Collection, processing, and marketing components had to be put in place during a time when local and national demand for the materials collected was changing. Budget constraints that emerged in the early and mid-1990's contributed added complexity.

On the collection side, systems had to be developed and tested for both truck types and labor changes associated with new collection routes. Overall, DOS had to balance operational factors (such as fewer trips and less material separation) that reduce costs, and in turn reduce the value of the materials collected, against factors that increase both cost and value.

Over the course of a decade, DOS experimented with collecting recyclables: separated and mixed together (commingled);



Extensive information about the Department's Composting Programs can be conveniently accessed on the Web.

A DOS worker dumps mixed paper from a green bin into a recycling truck.



This containerized packer truck is able to collect metal dumpsters full of recyclables.



Some large apartment buildings, as well as some DOS-serviced public institutions, set out recyclables in metal containers (dumpsters) rather than in cans or bags at curbside.

in metal dumpsters; in bins and in bags; and in single- and dual-bin trucks, side-loaders, back-loaders, and containerized packer trucks (E-Z packs). The Department also negotiated route changes and productivity targets when labor contract renewals allowed.

On the processing and marketing side, infrastructure had to be developed or expanded. At the outset, the City lacked the facilities—known as material recovery facilities, or MRFs—to receive recyclables and prepare them for market. In addition, the Department had to decide whether to assume some or all of the market risk in selling secondary materials, or to pay the cost of letting other parties assume these risks. Ultimately, NYC opted for the latter.

The contractual system of private MRFs and market-linked prices in place today is very different from what was envisioned a decade ago, when there was discussion of having one or two city-managed MRFs in each borough. Over time, DOS developed an institutional understanding of secondary materials markets for paper, metal, glass, and plastic. These markets involved industries that were themselves changing as productive capacity was added around the country to address legislative and consumer demands, and to use the tens of thousands of tons of post-consumer “secondary raw” materials being generated through municipal recycling programs. Today we tend to take this capacity for granted, but industrial use of secondary materials from the residential waste stream was limited in the early 1990’s.



At a material recovery facility (MRF), employees separate plastics from metal and glass on the “sort line.”



Thousands of tons of recyclables are processed in New York City every day.

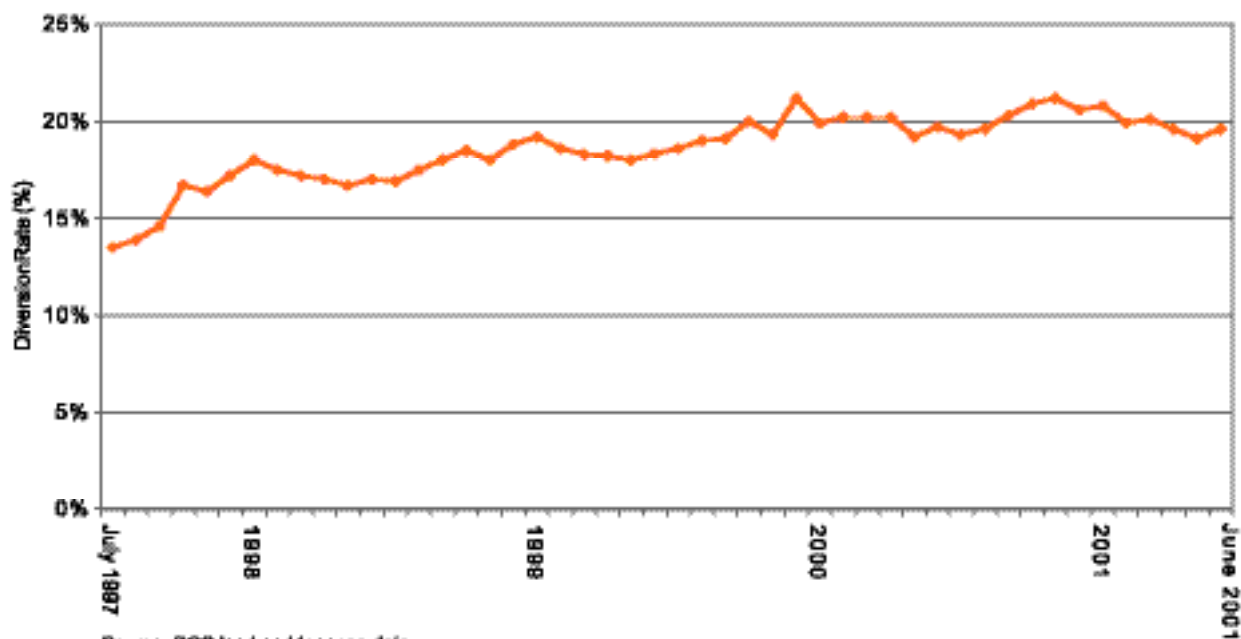
Given these challenges, the Department developed a recycling implementation strategy for each of New York’s five boroughs. Uniform citywide advertising campaigns began in 1993 when entire boroughs—and, indeed, the City as a whole—began to standardize recycling.

As shown in Table 1, the Department started recycling certain materials in designated districts within each borough before going borough wide. Recycling was fully implemented in Staten Island in 1990, followed by Manhattan and the Bronx in 1992, and then Brooklyn and Queens in 1993. As of 1993, the Department collected citywide the following materials for recycling: newspapers, magazines, corrugated cardboard, metal cans, glass bottles and jars, and plastic bottles and jugs. From 1995 to 1997, the Department expanded the materials it collected for recycling to include mixed paper, beverage cartons, and household and bulk metal.

Other additions to the Recycling Program that were phased in include the collection of fall leaves and Christmas trees for composting and a move to weekly collection of recyclables. Depending upon population density and waste generation rates, some districts received weekly recycling collection while others had their recyclables collected every other week. Beginning in 1998, the Department began to expand recycling collection frequency. It is now weekly throughout the City, and daily for many public schools.

Figure 1 below shows that as Expanded Recycling and weekly collection have become part of New York City living, there has been a slow but steady improvement in the recycling rate (which is referred to in NYC as the “diversion rate”). The diversion rate has climbed from 13% in 1997 to its current rate of 20% today.

Figure 1
Diversion Rate for Waste Managed by the NYC Dept. of Sanitation
(July 1997 through June 2001)



Source: DOS load and tonnage data.

Note: Data shown here begin in 1997, rather than earlier, because it was in this year that "Expanded Recycling" was implemented citywide.

Table 1

**NYC Recycling History:
The Gradual Phase-in of a Program Citywide**

1986	Municipally coordinated voluntary recycling begins in NYC with newspaper recycling in Manhattan’s Community District 2.
1987	At least one district in each borough receives voluntary newspaper recycling collection.
1988	A total of four districts in Staten Island, Brooklyn, and Queens receive voluntary metal and glass recycling collection. An additional district is added for newspaper collection in Queens.
1989	Local Law 19 is passed and establishes the following materials to be collected for recycling: (1) newspaper , (2) magazines/corrugated cardboard , (3) metal/glass , and (4) plastic . Three additional districts are added in Staten Island and the Bronx for newspaper and metal/glass recycling. A district in Brooklyn is added for newspaper and magazines/corrugated-cardboard recycling. In Manhattan, magazine/corrugated-cardboard recycling is added to the two existing districts receiving newspaper collection.
1990	The entire borough of Staten Island , five districts in Queens, and one district in Brooklyn receive recycling collection for all of the mandated materials. All of Manhattan receives collection for two of the four mandated materials. Five districts in Brooklyn and two districts in the Bronx recycle three of the four mandated materials. Fall Leaf and yard waste collection for composting starts in Staten Island.
1992	Manhattan and the Bronx receive recycling collection for all of the mandated materials. The Department releases its first Comprehensive Solid Waste Management Plan.
1993	Brooklyn and Queens receive recycling collection for all the mandated materials. Christmas tree collection for composting begins in Manhattan and Staten Island.
1994	Christmas tree collection for composting is now citywide .
1995	The Department introduces “ Expanded Recycling ,” adding three additional material groups: (1) mixed paper, (2) beverage containers, and (3) household and bulk metal to the mandatory Recycling Program. Once again, this is phased in borough by borough, starting in Staten Island .
1996	The Bronx begins Expanded Recycling.
1997	Manhattan, Brooklyn, and Queens join Expanded Recycling—the full program is now citywide. Parts of the Bronx added to the fall leaf and yard waste collection program.
1998	Parts of Brooklyn added to the fall leaf and yard waste collection program.
1999	Weekly , rather than biweekly, recycling collection is made uniform throughout Brooklyn, Manhattan, Queens and Staten Island. All of Queens added to the leaf collection program. Now all areas of the city that generate large quantities of fall leaves are collected.
2000	Weekly recycling comes to the Bronx. All of New York City is now serviced with full-scale recycling collection at this frequency.

As this brief program history shows, recycling has been already implemented full-scale throughout the City’s five boroughs, with each household serviced every week. The next section of this report will examine how other cities structure their recycling programs and assess their success. This will provide a launching point for New York’s own evaluation of its recycling future.

Comparing New York’s Recycling Rate to Other Cities

Recycling Rate Basics

As shown in the formula below, the recycling rate (which NYC refers to as the “diversion rate”) is a measure of the tonnages of recyclables collected, divided by all waste (trash plus recyclables) generated. Because it is standard procedure for facilities to weigh the trash and recyclables that are delivered to them, data on these tonnages are generally accurate and up-to-date. The recycling rate has consequently been used since the 1970’s to evaluate the success of recycling programs. The national recycling rate has climbed from



A DOS truck is weighed on a scale before and after tipping its recyclables or refuse load. The data is fed into a computer and tracked daily.

7% to 20% since municipal recycling programs began to be introduced throughout the U.S.⁸

One should note that this standard formula does not account for “contamination,” or the presence of non-recyclable items in the loads that are collected for recycling. Ideally, one would subtract the weight of such items from the numerator of this formula. But in contrast to the routine ease of weighing trucks, this would require frequent waste composition studies—quite a costly, disruptive, and time-consuming proposition. For this reason, *none* of the cities we examined, nor the EPA’s national recycling rate estimates, account for contamination. Rates are therefore comparable in formula, if imperfect.⁹

Yet while calculation of the recycling rate has nearly always followed the same formula, what is included in its numerator and denominator varies. Some cities calculate residential and commercial recycling rates separately because their public sanitation department handles residential waste, while private haulers service industries and businesses. In such cases, the municipality may publish its

What Is the Recycling Rate?

The recycling rate is known from daily weighing of garbage and recycling trucks, and is calculated as:

$$\frac{\text{Tons collected for recycling}}{\text{Tons of all waste generated (recyclables + garbage)}}$$

It is the same as the “diversion rate” when it measures how much waste is being “diverted” from disposal to recovery for beneficial use.

Other municipalities call the rate at which waste is “diverted” from landfilling (through recycling OR incineration) as the diversion rate. In the case of New York City, however, diversion refers specifically to tonnages of waste diverted from disposal (including landfilling and incineration) to recycling.



DOS workers tip blue bags full of metal, glass, and plastic recyclables at a material recovery facility (MRF) for processing by private contractors.

own data as the “residential rate,” but will rely on periodic reporting from private waste generators, transporters, or processors for the commercial numbers.

In other cases, municipalities may choose to aggregate data on residential and commercial tonnages into one overall rate. This is often done because the service of both waste streams (residential and commercial) is privatized and separate records are not kept. For example, the city of Jacksonville, Florida, which reports a commercial-residential recycling rate at around 40%, uses data from privately operated disposal facilities and MRFs to calculate combined residential-commercial tonnages and rates.

Still other cities report *some* household recycling as “residential,” but fold other portions of it into the commercial stream. As will be detailed later, this is frequently the case when the municipality provides waste collection and recycling to smaller scale housing (single family homes and buildings up to four units) while commercial carters serve the larger apartment buildings. Portland, Oregon and Los Angeles, California represent two examples of this common division of

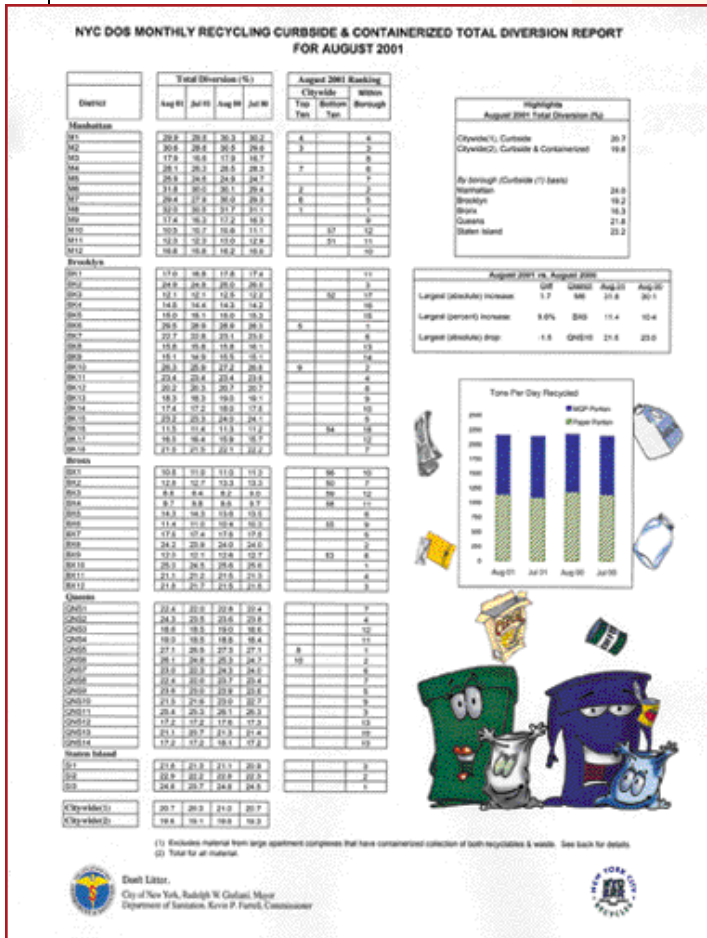
responsibility and labor. In such cases, “residential” recycling actually refers to “small-scale residential” recycling, while “large-scale residential recycling” (if it takes place at all) gets aggregated with other commercial recovery figures.

In New York, by contrast, *all* residential (and some institutional)¹⁰ waste collection is tracked by weighing-in and weighing-out each and every sanitation truck as it tips its load at an MRF or waste transfer station. Since apartment buildings and single-family homes receive the same service, “residential waste tonnages” reflect what all NYC households generate.

After NYC Sanitation trucks weigh in and out, net weights are fed directly into a centralized computer system, providing a detailed historical record of tonnages passing through the system each day. Because trucks are coded according to where they collect, tonnage information is also linked to data about where it was generated. This forms the basis for the diversion rate that the Department reports—broken down by community district—each month. (See Appendix III for a breakdown of NYC’s diversion rate by community district for fiscal year 2001.)

Private carters (as opposed to the Department of Sanitation) handle NYC commercial waste disposal and recycling. This activity falls under only partial jurisdiction of the Department of Sanitation and, due to the differences in waste streams and management methods, is not aggregated with residential data.¹¹

Such differences in the way cities calculate their diversion rates make it difficult to definitively claim that one city’s recycling program is better than another’s—although such comparisons are nevertheless often made.



composition and what is included in its recycling program. The mix of these two features influence the maximum recycling rate that a municipality can achieve independent of citizen participation.

This idea can be illustrated by considering the example of four imaginary cities, labeled A through D in Table 2 on the next page. All the communities have the same amount of paper, metal/glass/plastic, food, and other materials in their waste. They differ, however, in the quantity of feathers in their waste stream and whether this material is included in their recycling programs. To avoid confusion with existing recycling programs, the scenario presented in Table 2 involves a material (such as feathers) which is not typically collected for recycling.

In this fictitious scenario, City A has a great deal of feathers in its waste stream, and collects feathers under its recycling program, capturing 70% for recycling. City B has the same proportion of feathers, but does not collect them for recycling. As would be expected, City B has a much lower recycling rate. City C, however, has *no* feathers in its waste, and consequently collects none for recycling. Note that City C's recycling rate is 16 points lower than City A, purely due to the lack of feathers in its waste stream! Moreover, consider the case of City D, which collects the same proportion of its feathers (70%) for recycling as City A. The fact that City D has fewer feathers in its overall waste means that it underperforms City A by 6 points.

Clearly, these examples are oversimplified. But they serve to highlight the importance of making consistent comparisons among localities based on both what is in their waste stream and what their recycling programs accept. In other words, this means

Each month, DOS publishes data on the diversion rates attained in each of the City's 59 Sanitation districts. The report also shows change from past months and over the course of a year.

As will be detailed in the sections to follow, residential and commercial waste have very different characteristics in terms of their composition and measurement. For this reason, it is important to be careful about comparing residential, commercial, and aggregated residential-commercial rates.

How Waste Composition and What Is Collected for Recycling Can Influence a City's Recycling Rate

The magnitude of a municipality's recycling rate (be it residential, commercial, or aggregate) is fundamentally limited by two essential and interrelated local factors—its waste stream

Table 2

**Diversion Achieved Under Different Materials-Collection Scenarios
(for four imaginary cities)**

City	A	B	C	D
<i>included in recycling program</i>	paper, MGP, feathers*	paper, MGP	paper, MGP	paper, MGP, feathers*
<i>waste stream (tons per day)</i>				
feathers	100	100	0	50
paper	30	30	30	30
MGP	50	50	50	50
food	60	60	60	60
other	10	10	10	10
all waste (tons per day)	250	250	150	200
<i>recyclables collected (tons per day)</i>				
paper	15	15	15	15
MGP	30	30	30	30
feathers	70	0	0	35
all recycling (tons per day)	115	45	45	80
recycling rate	46%	18%	30%	40%

* To avoid confusion with existing recycling programs, the scenarios presented involve feathers, an item that is typically not collected for recycling.

comparing “apples to apples” instead of “apples to oranges.”

As will be shown in the following discussion, the composition of NYC’s residential waste stream reflects its unusual density and housing characteristics, giving it a profile unlike many other jurisdictions. Thus, calculations from other jurisdictions need to be adjusted before accurate comparisons to NYC can be made.

Real Cross-City Comparisons

In February 2001, *Waste News* published a review of thirty municipal recycling programs

in major cities across the U.S. (Table 3 shows the reported recycling rates.) These rankings, however, do not tell the whole story.

Simple comparison of reported recycling rates without accounting for important measurement differences (such as commercial service coverage, yard waste and “other” recycling, as well as housing density) is indeed a case of comparing “apples to oranges.”

Table 4 shows how NYC’s ranking changes from seventeenth to ninth when additional information (from the *Waste News* survey, the U.S. census, and the cities

themselves) is accounted for quantitatively. Moreover, when other factors such as population size and the age and density of the housing stock are taken into account, New York emerges as doing as well or better than most U.S. cities.

The following sections will show that when differences in measurement mechanisms, waste composition, and housing density are taken into account, New York's program turns out to rank among the most successful nationwide. This will be important to keep in mind as we look to the future of recycling in New York City.

Research Note

*The information in the **Waste News** survey (reproduced in its entirety in Appendix I) forms the base of the comparison to follow. In writing this report, we also conducted additional research, contacting localities in some cases with specific questions. This information supplements the **Waste News** data and is cited where relevant.*

Commercial-Residential Measurement Discrepancies

As Table 4 shows, ten out of the thirty municipalities reported their “recycling rate” as reflecting aggregated commercial and residential sources, while the remaining twenty cities (including New York) limited their reporting to residential waste only.¹²

Table 3

City Recycling Rates as Reported in *Waste News*, February 2001

	Recycling rate reported in <i>Waste News</i>	Rank
Portland	53.6%	1
Seattle	52.0%	2
Chicago	47.9%	3
San Jose	47.0%	4
San Diego	46.0%	5
San Francisco	42.0%	6
Los Angeles	40.9%	7
Jacksonville	39.0%	8
Baltimore	35.3%	9
Philadelphia	32.5%	10
Austin	28.5%	11
Milwaukee	28.0%	12
San Antonio	26.3%	13
Indianapolis	24.0%	14
Charlotte	24.0%	14
Oklahoma City	23.6%	15
Memphis	19.9%	16
New York	19.7%	17
Dallas	19.0%	18
Phoenix	18.0%	19
Washington	17.0%	20
Houston	16.0%	21
Boston	14.0%	22
Columbus	9.7%	23
Nashville	8.0%	24
Denver	7.5%	25
Fort Worth	7.2%	26
Detroit	7.2%	26
El Paso	4.0%	27
Cleveland	2.0%	28

Table 4**Comparison of Cities by Recycling Rate Adjusted to Exclude Yard and "Other Waste" Recycling
(information on commercial recycling and density provided for context)**

	Recycling rate for Paper/MGP only (not counting yard waste and "other" recycling)	Rank	Percentage points of reported recycling rate that come from yard waste recycling	Percentage points coming from "other" recycling	Percent of housing 5 or more units	Rank	Density (people/ square mile)	Rank	Includes commercial?
Portland	35.7%	2	12.5%	4.1%	24.8%	20	3,508	14	y
Seattle	39.9%	1	20.1%	0.0%	36.5%	10	6,153	12	y
Chicago	21.7%	7	3.7%	29.8%	39.9%	8	12,252	3	y
San Jose	23.1%	6	27.0%	4.0%	19.1%	28	4,566	13	y
San Diego	27.0%	4	26.1%	0.0%	33.0%	12	3,428	15	
San Francisco	19.4%	8	0.9%	27.2%	41.9%	6	15,502	2	y
Los Angeles	14.4%	16	26.9%	4.1%	43.5%	3	7,427	8	
Jacksonville	30.8%	3	9.2%	2.7%	20.6%	25	837	29	y
Baltimore	8.8%	20	1.9%	24.6%	20.4%	26	9,109	7	y
Philadelphia	6.2%	24	0.0%	0.0%	16.7%	30	11,736	5	y
Austin	18.8%	10	10.1%	1.8%	35.8%	11	2,138	24	
Milwaukee	17.2%	13	11.1%	1.9%	22.5%	23	6,536	11	
San Antonio	15.6%	15	0.0%	12.7%	25.4%	18	2,811	20	
Indianapolis	9.2%	18	4.9%	11.4%	25.9%	17	2,022	26	y
Charlotte	9.1%	19	10.9%	3.9%	28.1%	15	2,272	23	
Oklahoma City	23.6%	5	0.0%	0.0%	21.9%	24	731	30	
Memphis	3.1%	28	17.4%	0.0%	25.2%	19	2,384	21	
New York	19.2%	9	0.6%	0.0%	62.5%	1	23,705	1	
Dallas	18.1%	11	1.1%	0.0%	42.9%	5	2,941	19	
Phoenix	18.0%	12	0.0%	0.0%	27.3%	16	2,342	22	
Washington	15.8%	14	0.0%	1.4%	50.1%	2	9,884	6	
Houston	5.2%	26	7.4%	4.0%	40.7%	7	3,020	18	
Boston	13.0%	17	1.0%	0.0%	43.0%	4	11,865	4	
Columbus	4.1%	27	5.8%	0.0%	29.5%	14	3,316	16	
Nashville	8.0%	21	0.0%	0.0%	30.5%	13	1,032	28	
Denver	7.3%	22	0.1%	0.1%	37.2%	9	3,050	17	
Fort Worth	7.2%	23	0.0%	0.0%	24.5%	21	1,592	27	
Detroit	6.1%	25	1.2%	0.0%	16.9%	29	7,411	9	
El Paso	1.2%	30	2.7%	0.1%	23.1%	22	2,100	25	y
Cleveland	2.0%	29	0.0%	0.0%	19.7%	27	6,566	10	

Among the cities surveyed by *Waste News*, the following cities included recycling from commercial sources in their overall rate: Baltimore, Chicago, El Paso, Indianapolis, Jacksonville, Philadelphia, Portland, San Francisco, San Jose, and Seattle. In most cases we were able to find data (either from *Waste News* or directly from the cities themselves) on the residential rate, but for Baltimore, El Paso, Indianapolis, and Jacksonville, only aggregate data was available.

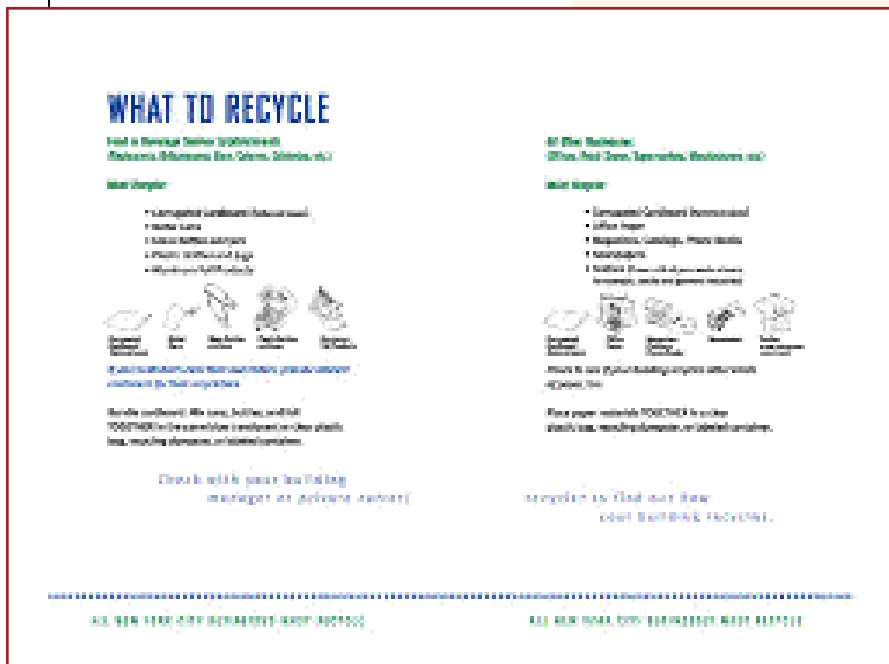
In addition, while Chicago and San Jose did report a recycling rate specific to residential waste, they did not make data available on the breakdown of materials in their residential stream (as opposed to the commercial stream). For all of these cities, we had no choice but to use aggregate commercial-residential data to compare against our own residential-only information. In the context of this report, therefore, comparisons between those cities

and New York should be interpreted with some caution.

In most cases, however, cities reported recycling rate and materials breakdown for their residential waste streams. The cities of Austin, Boston, Charlotte, Cleveland, Columbus, Dallas, Denver, Detroit, Fort Worth, Houston, Los Angeles, Memphis, Milwaukee, Nashville, Oklahoma City, Phoenix, San Antonio, San Diego, and Washington were like New York in considering “residential” recycling alone as making up their city’s “official rate.” In addition, Seattle, Portland, and San Francisco had extensive waste stream data available on the Web, enabling us to go beyond the aggregate figures reported in the *Waste News* survey. Comparisons between NYC and these cities are therefore on firmer ground.

A note is in order here about commercial recycling in NYC. Businesses are required under City law to recycle and are subject to recycling and other sanitation-related enforcement by the Department of Sanitation. They must also adhere to requirements set out by the City’s Trade Waste Commission and the Department of Environmental Conservation in addition to the State Department of Environmental Protection. Commercial refuse and recycling collection in NYC is handled through private carters and does not involve the Department of Sanitation. During the 1990’s, the City’s Trade Waste Commission created a competitive and economically efficient private carting industry in New York City and ensured that private carters

provide their customers with information on recycling and how recycling can reduce hauling costs.



The Department distributes information to all commercial waste generators (including food and beverage establishments as well as offices, manufacturers, retail stores, and supermarkets) which details the recycling arrangements that they are required by law to establish.

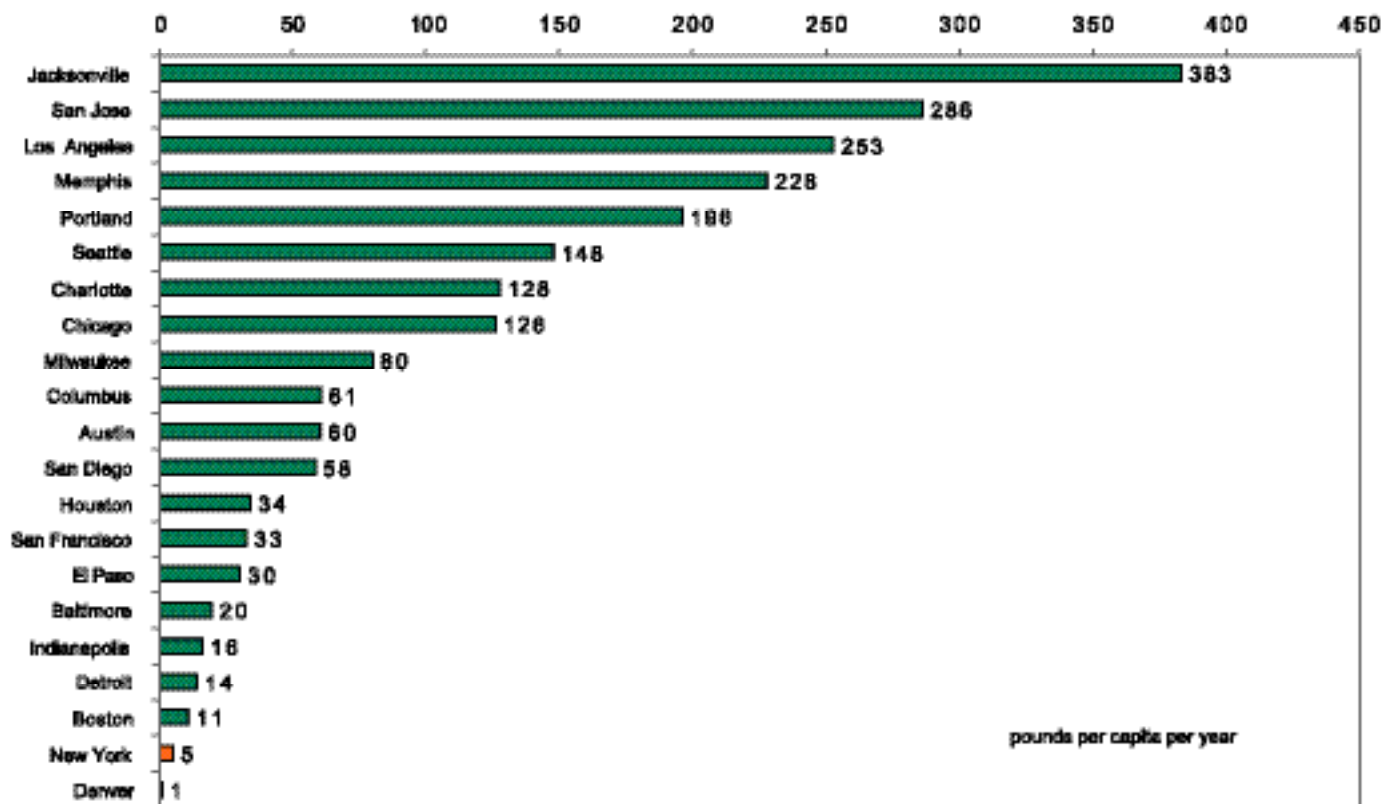
Why does NYC opt to report its “official” rate as that for residential (and other Department-managed) recycling, and not aggregate commercial recycling into its overall rate? The commercial recycling rate was, overall, around 63% for 2000 and is estimated at 71% for 2001. The reason that these data are kept separate relates in part to the structure of State and local legislation, which gives the Department operational jurisdiction over only the “public” portions of the waste stream. Another reason has to do with the incomparability of commercial and residential waste. Most of NYC’s commercial recycling comes from the reuse of clean fill and construction/demolition (C&D) debris. As will be detailed in the sections that follow, such recycling is simply

not comparable to the sort of recycling that residents and public institutions carry out.

Yard Waste

A major finding of our review is that cities vary greatly in how much yard waste recycling (i.e., composting) contributes to their overall diversion figures. It comes as no surprise that cities with more yards generate more yard waste. And it is equally obvious that if they count composting as part of overall diversion, their rates get a boost. In fact, twenty-one out of thirty cities reported some amount of yard waste recycling in the *Waste News* survey (tonnages are summarized in Appendix III).

Figure 2
Annual Pounds of Recycled Yard Waste, per capita



Source: 2000 US Census and *Waste News*, City of Portland tonnage data.

Note: The cities not included on this chart do not collect yard waste for recycling.

A comparison of yard waste tonnages per capita (see Figure 2) shows that New York has one of the lowest annual *generation rates* among cities that accept this material as part of their recycling program. In other words, New Yorkers recycle less yard waste because they have far less of it to begin with.

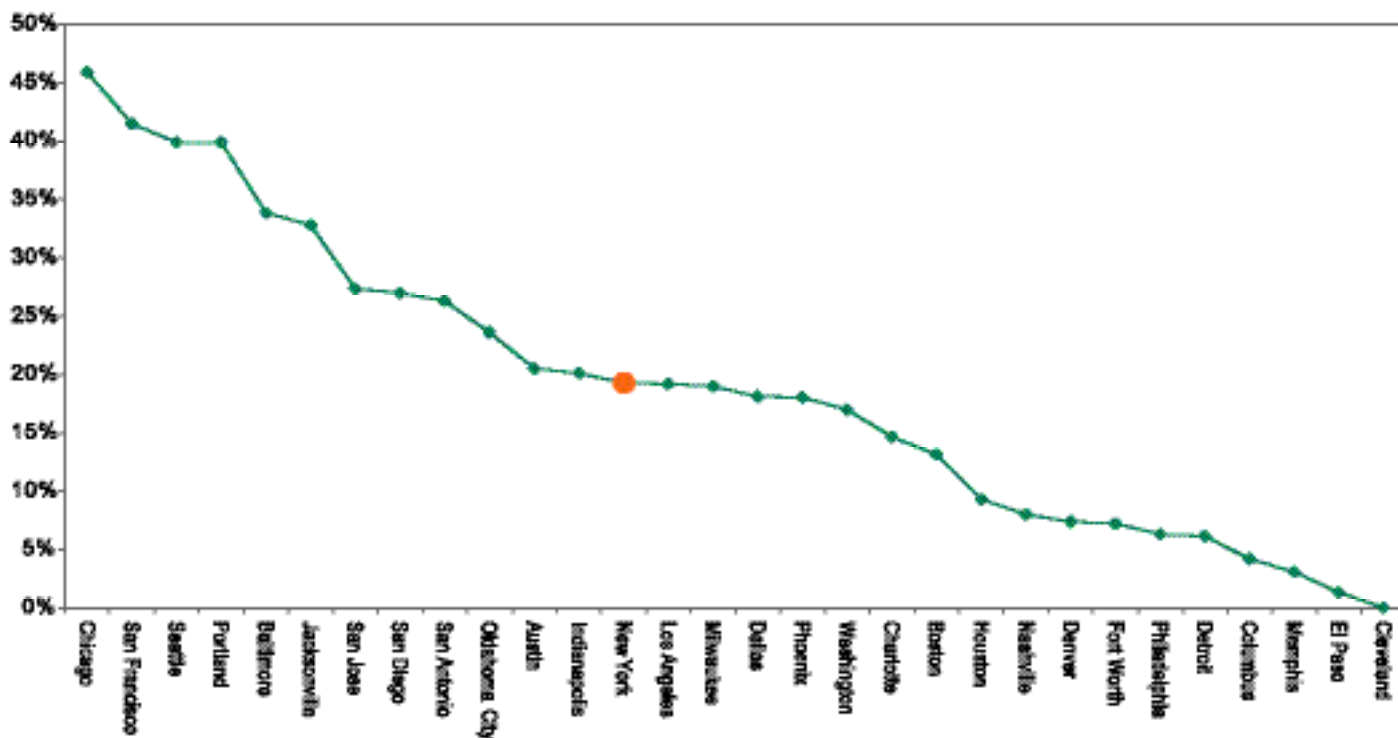
Moreover, the extent to which yard waste contributed to the calculation of recycling varies greatly. For example, 87% of Memphis's 19.9% recycling rate overall is due to the recycling of yard debris; while only 0.4% of New York's similar 19.7% rate comes from recycling this material. In order to get a sense of how recycling rates compared without the highly variable influence of yard waste, we recalculated the recycling rate without it (i.e., we subtracted reported yard waste tonnages from the numerator *and* denominator

of the recycling rate). After doing so, New York's performance in comparison to other cities improved (see Figure 3).¹³

Although yard waste composting is an important part of any municipality's recycling program, it is nevertheless more accurate to make comparisons between New York and other cities independent of this material. This is because, overall, yard waste makes up about 20% of all waste nationwide, yet it accounts for less than 5% of NYC's waste stream.¹⁴

With over 23,000 persons per square mile, New York is by far the densest city in the United States, and has correspondingly fewer lawns, gardens, and unpaved yards to generate residential yard debris. In the City's most recent citywide waste composition study (conducted in 1990) yard waste accounted for only 4.1% of

Figure 3
Reported Recycling Rates, Excluding Yard Waste



Notes: Materials tonnages were not available for the cities of Nashville and Cleveland. Their overall reported recycling rates are shown instead. See endnote 13 for calculation methodology.



In the fall, residents leave bags of leaves and yard waste at the curb for special DOS collection. DOS trucks transport the leaves and yard waste to special composting sites. Every spring and fall DOS funds compost giveback programs which distribute the finished compost to City residents.

New York's total waste stream. Subsequent sub-studies of different fractions of NYC's waste stream have confirmed that although there is a higher presence of yard debris in suburban-style neighborhoods of the outer boroughs, most areas of the City show a dearth of this material.¹⁵

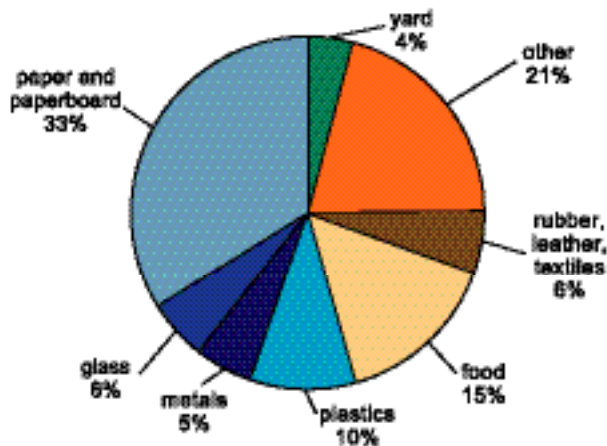
Figures 4 and 5 also show that paper, metal, glass, and plastic make up the bulk of

recyclable consumer products in the residential waste stream nationwide, accounting for close to half of all waste generated. Although their proportion may vary somewhat according to income or economic conditions, these materials generally represent consistent percentages across municipalities.

It is obvious that cities with more yard waste are able to report higher recycling rates—provided they have programs to collect such materials for composting. In fact, yard waste programs implemented in the last half-decade have boosted overall recycling rates considerably. *Resource Recycling* magazine reports that in Seattle, “the ban on disposing of yard waste at the curb...increased diversion rates significantly, [Waste Reduction and Recycling Manager Jeff] Gaisford says. ‘Almost half of what we recycle is yard waste.’”¹⁶

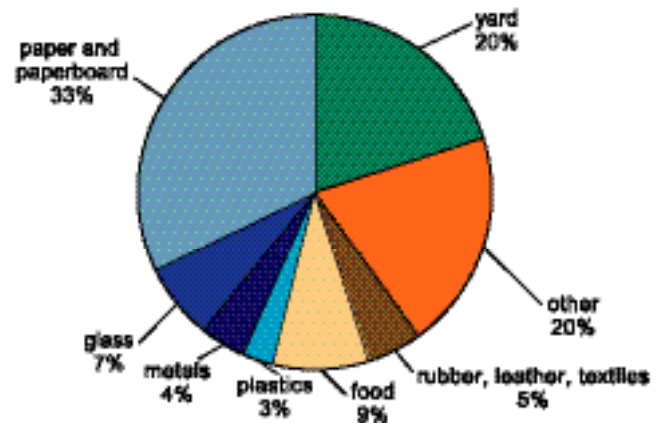
The “shot-in-the-arm” that yard waste has given recycling rates recently has not gone unnoticed outside of New York. Franklin Associates, the consulting firm that regularly derives national estimates of municipal solid waste (MSW) and recycling for the U.S. Environmental Protection Agency (EPA),

Figure 4
Materials Breakdown of Residential MSW in NYC



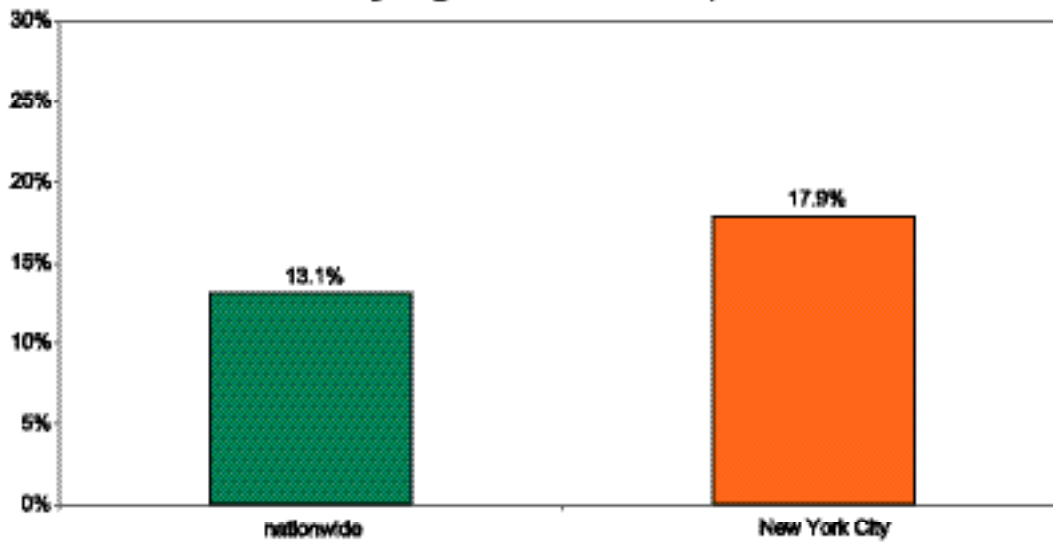
Source: 1990 NYC Waste Composition Study.

Figure 5
Materials Breakdown of Residential MSW Nationwide



Source: Franklin and Associates, 1999.

Figure 6
New York City vs. National Average
Recycling without Yard Waste, 1998



Source: Franklin and Associates, 1997 and 1998.

published data in 1996 estimating that nine percentage points of the 23% residential recovery rate comes from composting yard waste. In other words, excluding yard waste, the national residential recycling rate was around 14%.¹⁷ Franklin Associates also performed a special study comparing New York's recycling rate to the nation's average, and found that the *national* recycling rate, not counting yard waste, was only 13.1% at a time when New York's rate was 17.9% (see Figure 6).¹⁸

“Other” Recycling

In addition to yard waste, some cities count the recycling of materials *other* than paper, metal, glass, and plastic in their diversion rates. For example, Baltimore, which reports a 35% recycling rate for residential and commercial waste combined, recycles roughly 156,000 tons per year in total. According to their records, around 83,000 of this tonnage consists of materials such as C&D debris, wood, and ash that come from commercial and in some

cases industrial sources.¹⁹ Chicago, which states a 47.9% rate, recycles over 1.4 million tons of materials classified as “other,” almost all of which is C&D debris from the commercial sector.²⁰ Table 5 lists cities with the highest proportion of such “other” materials in their overall recycling, and contrasts them with NYC.

There are two major reasons why, as with yard waste, it is a good idea to set aside reports of “other” recycling and focus solely on paper, metal, glass, and plastic when assessing residential recycling programs. The first has to do with the problems associated with comparing residential-only to commercial or combined residential-commercial programs. In residential MSW, “other” waste consists of a hodgepodge of mixed materials, hygiene products, ceramics, residue, and other miscellaneous substances that are extremely difficult to recycle. In commercial waste, however, the much more recyclable C&D debris makes up the bulk of

Table 5

**Cities with the Highest Proportion of “Other” Recycling
(compared to NYC)**

City	Tonnage of “other” recycling	“Other” as fraction of all recycling
Baltimore	83,271	69.6%
San Francisco	367,422	64.7%
Chicago	1,423,631	62.2%
San Antonio	21,961	48.4%
Indianapolis	14,000	47.5%
Houston	16,350	24.8%
New York City	0	0%

**Additional Adjustments for
Bottle Bill Recycling**

A final discrepancy with regard to how municipal recycling rates are calculated involves counting bottle bill recycling as part of MGP diversion. The EPA calculates the overall national recycling rate by factoring in the recycling that occurs through state deposit systems. Some, but not all, cities follow suit. Portland, for example, includes over 12,000 tons per year of bottle bill recyclables in its calculation, which accounts for almost 5% of residential diversion.

what is classified as “other.” (This is reflected in the fact that the cities in Table 5 who recycle the largest amounts of “other,” all report commercial *and* residential recycling as their city’s aggregate rate.) It does not make sense, therefore, to compare “other” recycling under residential programs with “other” recycling in programs that also include commercial waste.

A second reason to exclude “other” waste from recycling rate calculations has to do with New York’s legislative requirements for how to calculate diversion rates. Although some 600,000 tons of C&D debris (collected at residential drop-off centers and from City Agency infrastructure projects) are reused each year by the Department of Sanitation, City law excludes counting this tonnage as part of New York City’s official diversion rate. According to some estimates, NYC’s diversion rate would reach approximately 40% if such materials were taken into account.²¹

Franklin Associates has estimated that NYC’s diversion rate would increase by more than 1.5 percentage points if its own “bottle bill material” were taken into account.²² But under Local Law 19, cans and bottles returned for deposit cannot be counted as part of NYC’s diversion.



DOS collects around 600,000 tons of construction and demolition debris from City building projects each year. None of this is counted towards the City’s recycling rate.



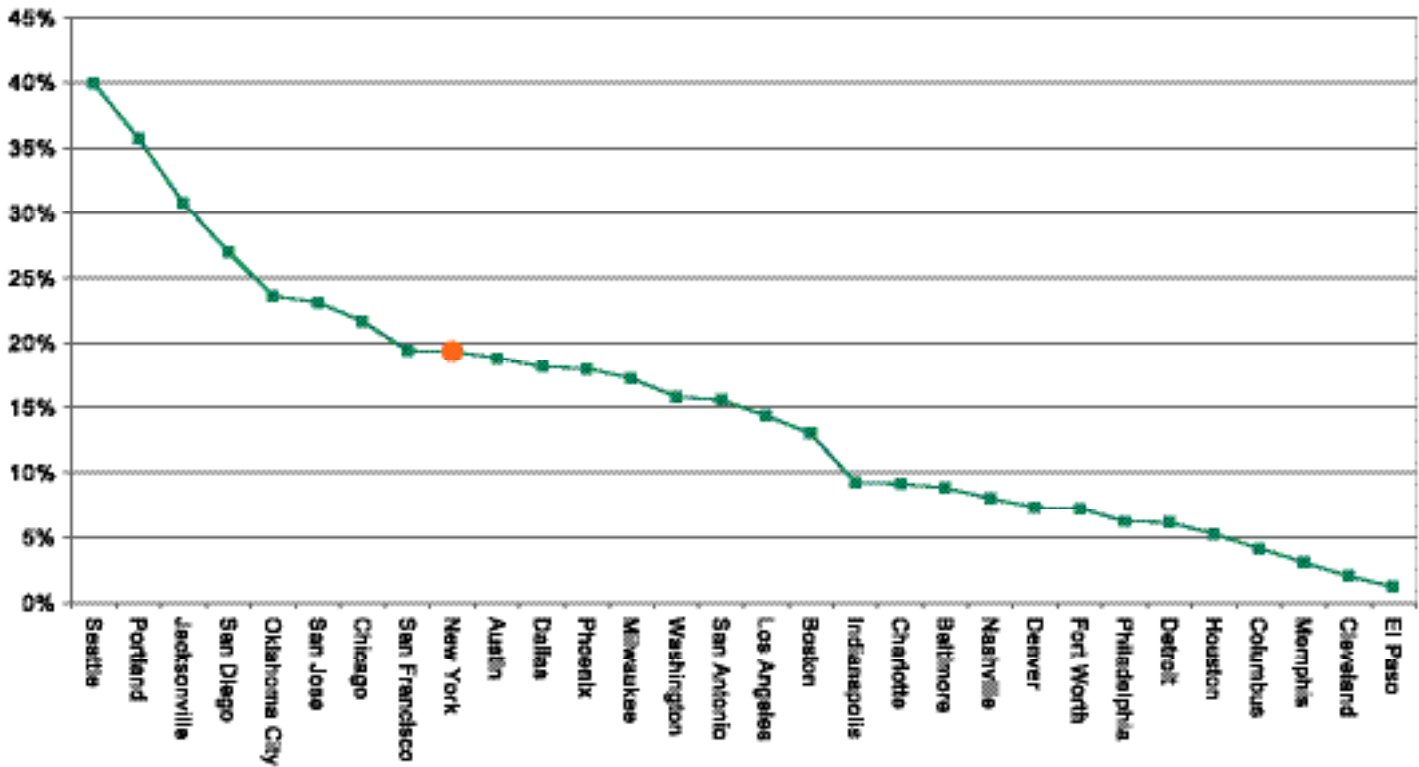
New York State's bottle bill imposes a 5-cent deposit on all beer and soft drink containers. To redeem the 5-cent deposit, individuals return the containers to retail outlets. This form of recycling is not counted in the City's overall recycling rate.

In sum, recalculating diversion without yard, "other," or bottle bill recycling allows for a more realistic comparison of recycling rates. Looking at recycling rates for paper and MGP alone makes it possible to evaluate New York's program versus its counterparts across the country in an "apples to (Big) Apple" fashion.

Explaining Remaining Differences

With the problematic yard waste, "other," and bottle bill recycling excluded, it becomes clear that New York City with its 19.3% adjusted recycling rate is doing better than many of its urban cousins (see Tables 6 and 7). At the same time, the adjusted rates of several cities still appear to exceed that of NYC (Table 8).

Figure 7
Adjusted Diversion Rate
 (for Metal, Glass, Plastic, and Paper Recycling Only)



Source: DOB calculations based on Waste News and Portland City data.



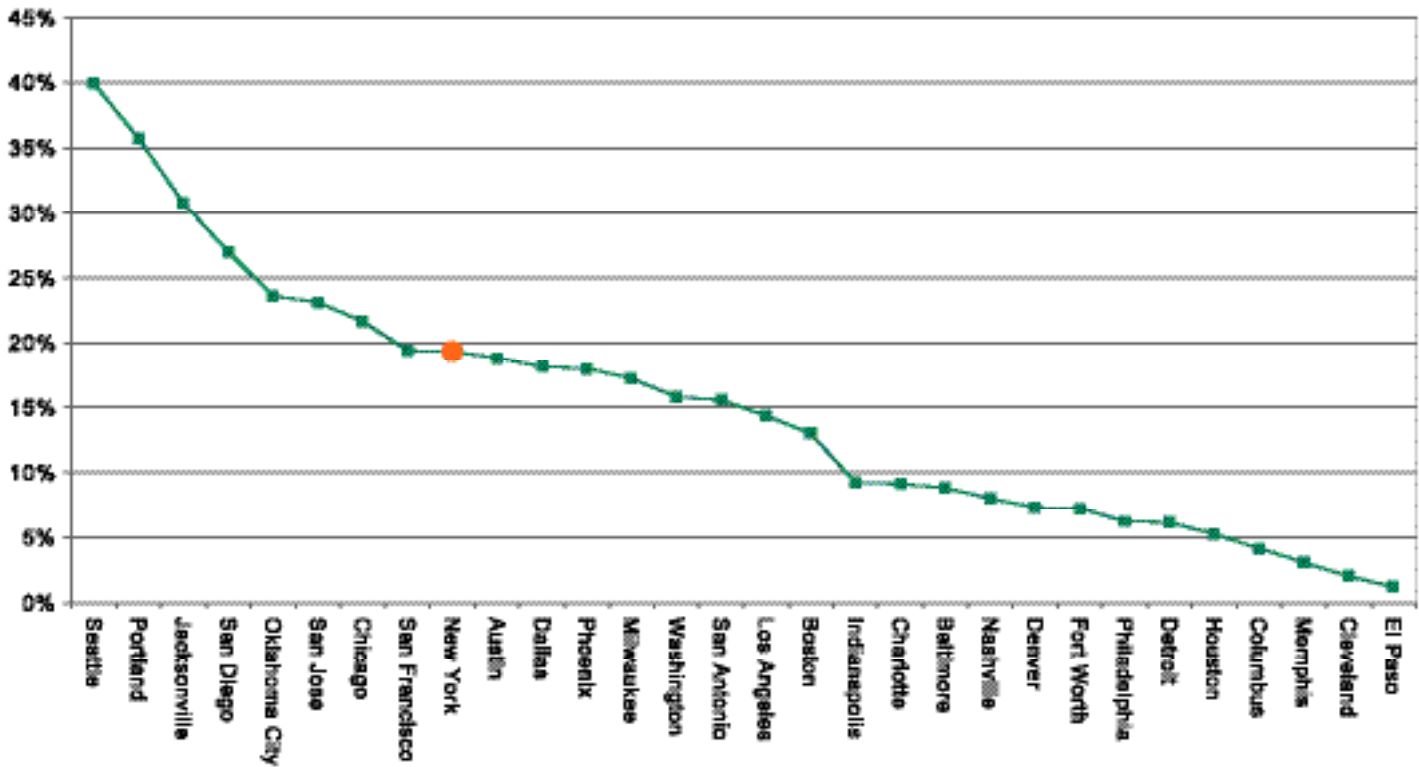
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Table 6**Major U.S. Cities with Lower Paper/MGP Diversion Rates than NYC**

Paper/MGP Diversion Rate	
Dallas	18.1%
Washington	15.8%
Los Angeles	14.4%
Boston	13.0%
Philadelphia	6.2%
Detroit	6.1%

What more can be learned by comparing NYC to other U.S. cities with higher paper/MGP diversion rates? Given the fact that NYC already collects the full range of major recyclables in the waste stream and provides comprehensive and frequent service to all residents, it is unlikely that variation in recycling program design explains the differences in recycling rates. Seattle, Portland, and the other municipalities listed in Table 8 all collect the same categories of paper, metal, glass, and plastic that New York City does, and in some cases provide less, rather than more, service coverage to residents.

Table 7**Smaller U.S. Municipalities with Lower Paper/MGP Diversion Rates than NYC**

Paper/MGP Diversion Rate	
Austin	18.8%
Phoenix	18.0%
Milwaukee	17.2%
San Antonio	15.6%
Indianapolis	9.2%
Charlotte	9.1%
Baltimore	8.8%
Nashville	8.0%
Denver	7.3%
Fort Worth	7.2%
Houston	5.2%
Columbus	4.1%
Memphis	3.1%
Cleveland	2.0%
El Paso	1.2%

A comparison of basic census data reveals an important characteristic in terms of

Table 8**U.S. Cities with a Higher Paper/MGP Recycling Rate than NYC**

Paper/MGP Diversion Rate		<i>as compared to...</i>	
Seattle	39.9%	New York <i>and...</i> San Francisco	19.3%
Portland	35.7%		
Jacksonville	30.8%		
San Diego	27.0%		
Oklahoma City	23.6%		
San Jose	23.1%		
Chicago	21.7%		

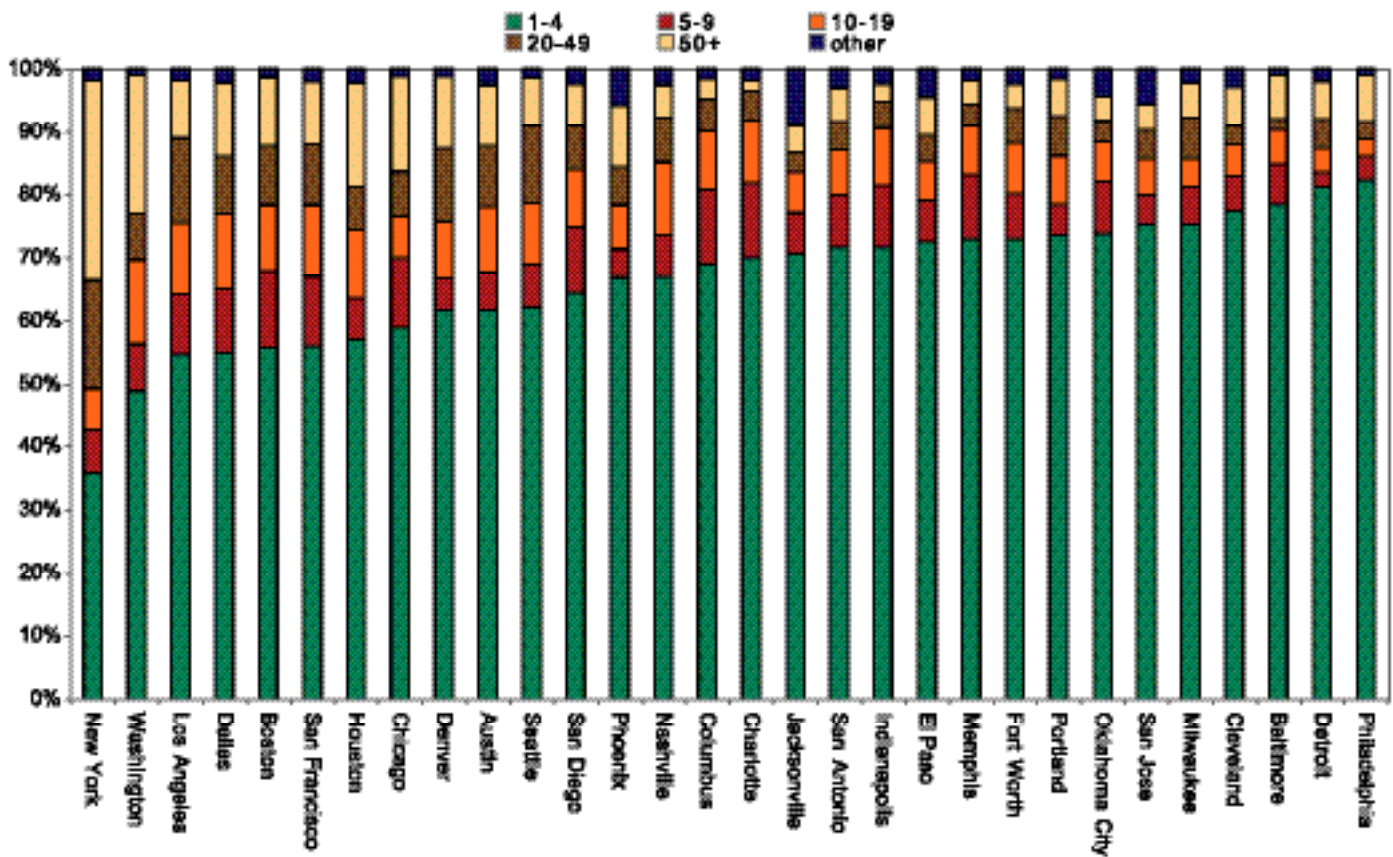


Around 60% of NYC's housing stock is multi-unit. High-rises are typical of Manhattan and many areas of the outer boroughs.

recycling rates which distinguishes NYC from all other cities: multi-unit housing. As shown in Figure 8, New York leads other cities in proportions of residential housing

containing 20-49 units *and* 50+ units, and correspondingly shows the lowest rate of single-, two-, and three-family occupancy in the nation.

**Figure 8
Breakdown of Housing Stock, by Units in Structure**



Source: 1990 US Census.

Note: "Other" includes trailers and mobile homes.

Multi-Family Units

It is well known in the recycling evaluation literature that recycling in multi-unit apartment buildings is particularly difficult. For instance, the EPA writes that:

...recovering recyclables...from multi-unit buildings is typically more challenging than collecting recyclables from single-family units. Variables such as space and layout, waste hauling contracts, length of resident tenancy, and janitorial work agreements differ from building to building.²³

A study by the Province of Ontario confirms the common finding that “participation and material capture rates in [multi-unit buildings] vary dramatically from building to building and are generally lower than in single family household recycling programs.”²⁴ They note that recycling arrangements requiring residents to bring materials to a central area, carry bins or bags on stairs or in elevators, and/or store recyclables may discourage residents from participating. This is especially true in buildings in which, “residents may take their waste to a garbage room or chute on each floor while they are asked to take their recyclable materials to a storage area on the ground floor, in basements or in outdoor sheds, *making the waste system more convenient than the recycling system for residents*” [emphasis added].²⁵

In addition, the Canadian study notes that recycling in multi-unit buildings requires cooperation not only of residents, but of building owners, superintendents, and/or property managers. And because recycling (and throwing out trash) is more anonymous within buildings than in front of houses, “social

peer pressure has little effect on participation or capture rates.”²⁶

Such observations are common in research conducted by public agencies, and are confirmed in academic work. In an article in the *Journal of Applied Social Psychology*, Richard Katzev observes that:

There can be little doubt that multi-family residents make a large and growing contribution to the nationwide solid waste problem. In addition, because it is often difficult for occupants of these buildings to recycle their waste materials, there is good reason to believe they contribute considerably more to the waste stream than their numbers alone suggest.²⁷

Katzev mentions the same barriers that EPA and Ontario reports describe, including “variations in physical structure, management operations, and collection systems...[and] the problems faced by haulers servicing such widely different situations.”²⁸ Moreover, he identifies an additional difficulty in “providing information and managing a program for highly transient individuals.”²⁹

Based on his study of determinants of recycling in multi-family residences in Portland, Katzev concludes that recycling participation is highly determined by what he terms three “system support variables,” which include “‘user-friendliness’ of the recycling system, its spatial location within the complex, and the degree to which the manager supported the program.”³⁰ User-friendliness is measured in terms of “convenience, safety (i.e., lighting), cleanliness, signage, accessibility, capacity for recycled materials, and adequacy of separated bins.”³¹

Multi-Unit Apartment Conditions in NYC

The research findings stated above correspond to the observations made by NYC Department of Sanitation personnel who regularly witness recycling on-site. To them, it comes as no surprise that house-dwellers and residents in apartment buildings experience recycling very differently. Although both groups face similar requirements *within the home* (having to separate waste into three categories corresponding to mixed paper, MGP, and garbage) and receive the same amount of service *at the collection end* (house-dwellers and apartment tenants alike receive the same number of weekly garbage and recycling collections), it is in *getting recyclables from the household to the curb* that the apartment building recycling experience diverges from that of the householder.

It is important to keep in mind that “multi-unit housing” in New York City can mean many things and each variation entails a different way that waste is handled. In some cases multi-unit housing refers to three-story brownstones (originally townhouses and now broken up into a number of units), or to four- and five-story “tenements” built before elevators. Both of these types of buildings require tenants to bring their own garbage and recyclables to the street and place them out for collection.

Multi-unit housing can also refer to small elevator buildings where tenants bring material to a centralized area and a custodian (who may be in charge of several buildings) carries material out to the street. In larger buildings tenants put garbage down a compactor chute but must bring recyclables to a centralized area on each floor or to the basement. In some full-service, high-rise buildings tenants put garbage and recycling

outside their apartment door and the building staff brings it to the basement (and in some cases sorts it) before it goes out onto the street.

In all of these cases, the building staff represents an important link between the home and the curbside, and can help or hurt



Common forms of housing in NYC (about 30%) consist of tenement buildings (three- to six-story walkups), brownstones (townhouses), and small apartment complexes.





Large apartment buildings (50+ units) represent about 32% of the housing stock in NYC.

the recycling effort. Where consolidation of recyclables takes place within a building, the staff must be properly trained and equipped for tasks such as sorting and consolidating recyclables correctly into the proper bags and



Smaller buildings usually require tenants to bring their recyclables to a central area either outside or inside the building. These indoor and outdoor recycling areas have been properly labeled by building maintenance staff, using NYC Department of Sanitation decals.

This garbage chute is typical of larger apartment buildings constructed in the mid to late 20th century. Originally used to drop refuse into incinerators (which are now banned), these chutes now route refuse into trash compactors. When there is space, recycling containers are located next to garbage chutes.

containers, and keeping recycling areas clear and sufficiently labeled.

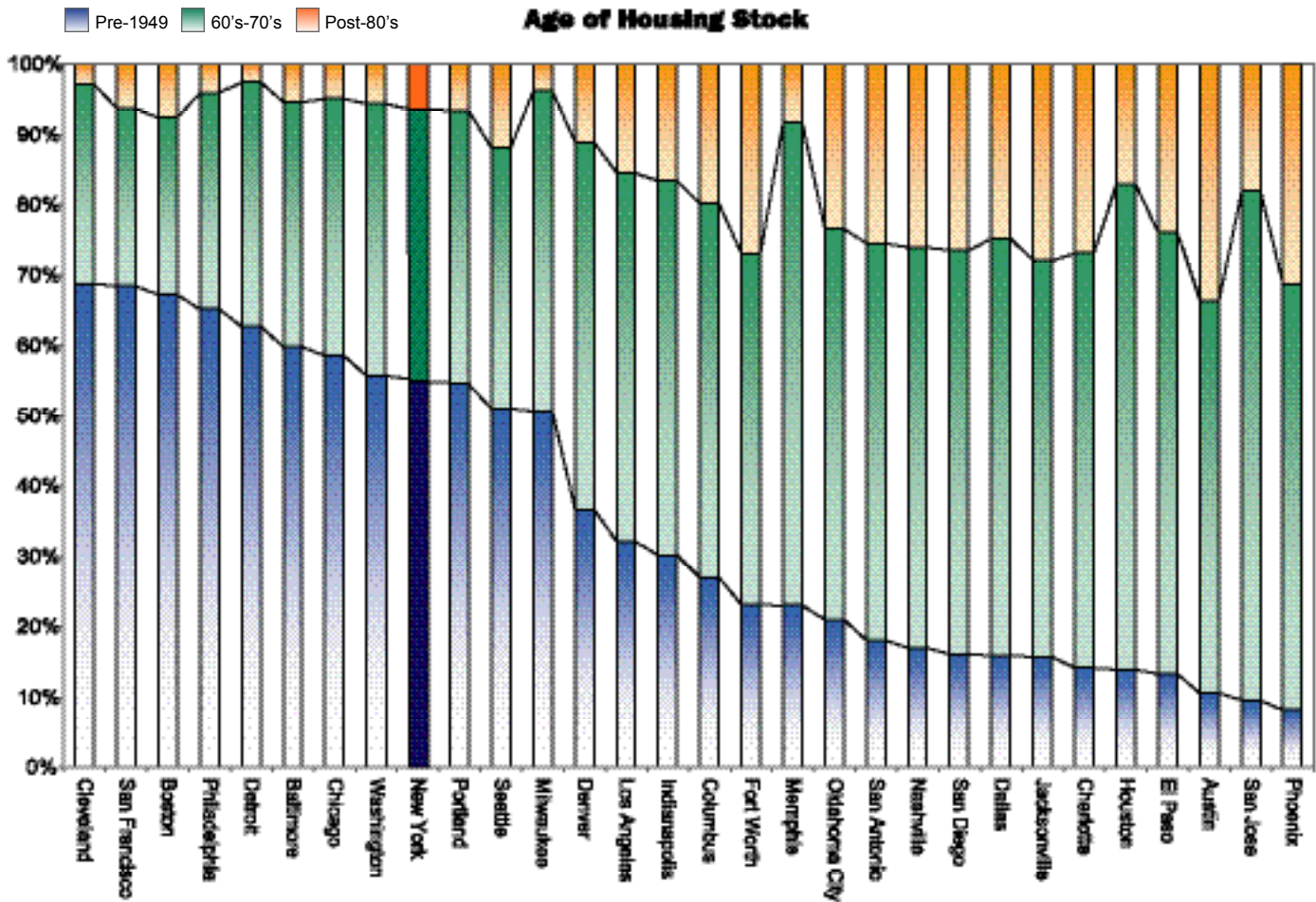
Even where tenants themselves bring material to containers outside the building, the extent to which there is proper labeling of bins, provision of clear or blue bags, and periodic review of bins directly affects the quality of recyclables. If, for example, a tenant brings down a bundle of newspaper but does not see a bin labeled for paper, that bundle may end up in the garbage. Similarly, if one person carelessly or inadvertently places newspaper in a bin labeled for bottles and cans, this will confuse other tenants about where they should place their recyclables. Without

some supervision, early mistakes can cause additional problems with proper separation of recyclables.

These phenomena are not unique to New York, but they certainly are more pronounced here than anywhere in the country. As mentioned before, New York has the highest representation of multi-unit buildings in the nation. And as shown in Figure 9, New York's housing is also among the oldest in American cities.

In New York, older apartment buildings are likely to be tenements or brownstones. Structures built from the 1940's to the 1970's

Figure 9
Age of Housing Stock



Source: 1990 US Census.

will likely be fitted with an “incinerator chute” (now used to deliver garbage to a compactor) that dates back to an era when residential incineration was legal and widely practiced in New York. Only the newest buildings have had the opportunity to integrate recycling into their original design.

The Garbage Chute: a New York Phenomenon

Most multistory buildings built between the 1940’s and late 1970’s have garbage chutes for tenants on each floor. Getting rid of trash is as easy as opening the hatch and dropping in a bag. But tenants usually have to bring their recyclables to the basement or to an outdoor area themselves. Some buildings with extensive staff (usually in the more affluent areas) allow tenants to leave recyclables in the chute room or outside their door. In either case, the relative ease of throwing things away vs. recycling them represents an added impediment to multi-unit recycling.

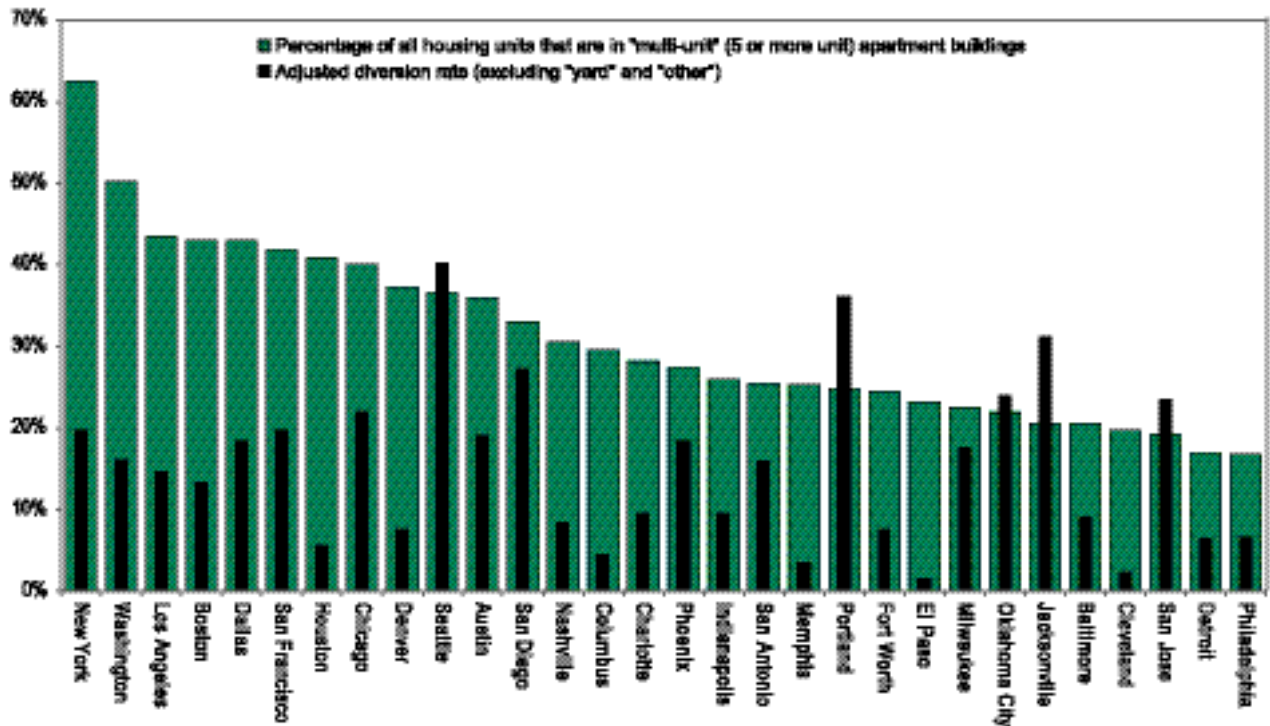
Comparisons in Context

A realistic comparison of NYC’s recycling rate to that of other U.S. cities can only be made after the following is taken into account:

- How a city calculates its recycling rate.
- The density and age of its housing stock.

What becomes overwhelming clear is that cities vary so much in what they choose to count as their “official recycling rate,” that no simple comparison between NYC and other cities makes sense. New York is the only city to report a recycling rate that covers 100% of its residents—single-family and multi-unit alike. Taking this into account reveals that New York is doing at least as well, if not better, than other American cities.

Figure 10
Diversion vs. Composition of Housing Stock



Source: DOS calculations based on Waste News, Portland City data, and 1990 US Census.

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The Garbage Chute: a New York Phenomenon

Most multistory buildings built between the 1940’s and late 1970’s have garbage chutes for tenants on each floor. Getting rid of trash is as easy as opening the hatch and dropping in a bag. But tenants usually have to bring their recyclables to the basement or to an outdoor area themselves. Some buildings with extensive staff (usually in the more affluent areas) allow tenants to leave recyclables in the chute room or outside their door. In either case, the relative ease of throwing things away vs. recycling them represents an added impediment to multi-unit recycling.

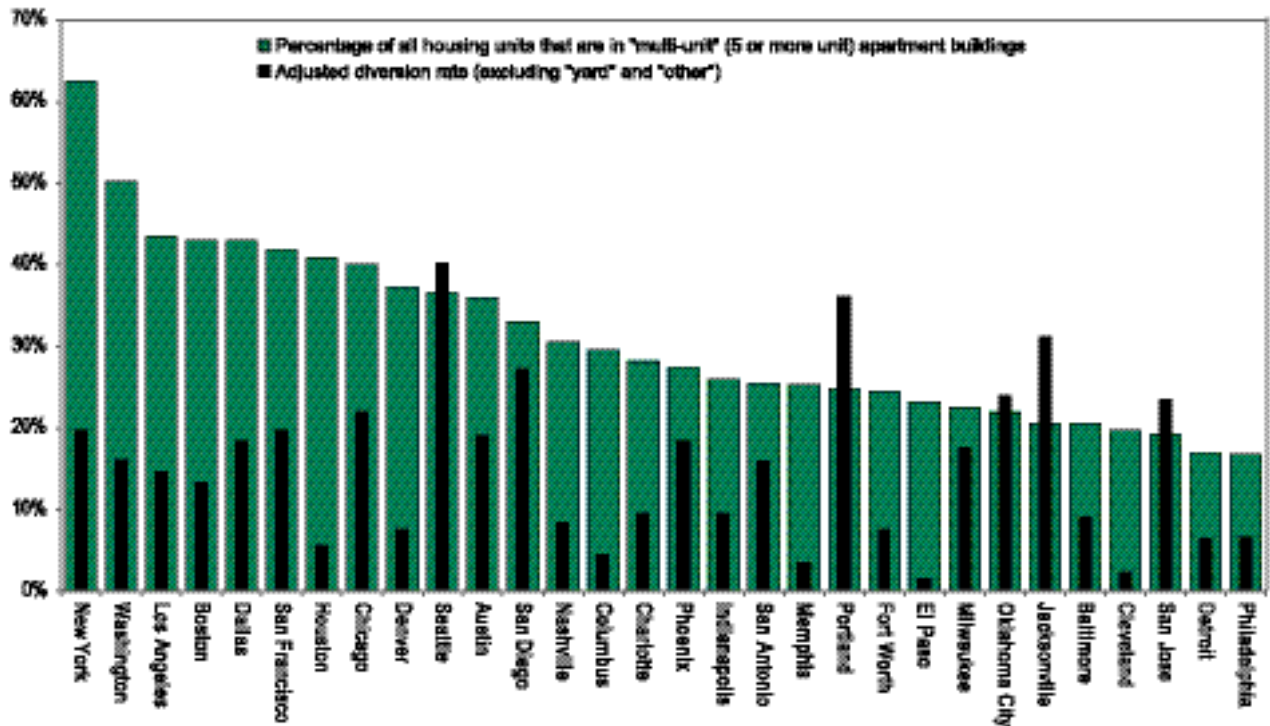
Comparisons in Context

A realistic comparison of NYC’s recycling rate to that of other U.S. cities can only be made after the following is taken into account:

- How a city calculates its recycling rate.
- The density and age of its housing stock.

What becomes overwhelming clear is that cities vary so much in what they choose to count as their “official recycling rate,” that no simple comparison between NYC and other cities makes sense. New York is the only city to report a recycling rate that covers 100% of its residents—single-family and multi-unit alike. Taking this into account reveals that New York is doing at least as well, if not better, than other American cities.

**Figure 10
Diversion vs. Composition of Housing Stock**



Source: DOS calculations based on Waste News, Portland City data, and 1990 US Census.

Figure 10 (on the previous page) highlights cities where the diversion rate appears considerably higher (i.e., exceeding NYC by more than four points). These include Seattle, Portland, Jacksonville, Oklahoma City, and San Diego. But just what are these seemingly high-diverting cities counting as “residential recycling?”

Recall that New York is the only city in the country to publicly provide uniform recycling collection to 100% of residences—multi-unit buildings and smaller houses alike. Its diversion rate therefore reflects everyone, including 1.9 million multifamily units and 1.1 million units consisting of single-, two-, or three-family homes. The recycling rate New York achieves and reports therefore heavily reflects the most challenging type of recycling.

In contrast, Oklahoma City and San Diego simply don’t require, count, or report multifamily recycling at all. Their reported residential recycling rates—before or after being adjusted for yard waste and “other”—are really “four units and under” residential rates.

Jacksonville, in contrast, does require multi-unit complexes to contract with private haulers for some or all multi-unit recycling collection, leaving smaller scale housing to be serviced by City crews. But in that city, multi-unit recycling is counted as part of “commercial recycling,” meaning again that its reported residential recycling rate reflects only small-scale housing. Jacksonville’s multi-unit recycling rate is not disaggregated from the overall commercial reporting, leaving no way of determining the diversion rate for this small segment of the housing stock.

Portland—the city reporting the highest paper/MGP recycling rate—has a garbage and

recycling collection system that is privately run, though overseen by the city administration. There, “residential recycling” also refers only to single-, two-, and three-unit dwelling recycling. Multi-unit buildings (which account for a quarter of the city’s units) are monitored and reported as part of commercial recycling, which Portland officials say is “structured much differently from the residential program, with...apartments required to recycle but able to choose their hauler and negotiate rates.”³² The service coverage for these buildings seems quite good. As of 1997, a study by Portland State University reported that over 90% of all multifamily units had some recycling access—mostly in the form of “shelters” or drop-off stations located outside the complexes. Yet Portland’s impressive 34.5% Paper-MGP recycling rate does not reflect recycling in multifamily residences—for which no separate data are available.

In fact, among the cities surveyed, only Seattle reports a separate, multifamily diversion rate. According to data on its website, apartment-building diversion in this city stands at 30%.³³ Yet even this multi-unit rate doesn’t count everyone; it only reflects the recycling rate among the 58% of apartment buildings who choose to participate in the city’s program—and who may be more motivated to recycle in the first place.³⁴

For years, Seattle Public Utilities (the entity overseeing the privately provided trash and recycling collection in this city) has carried out intensive efforts to encourage apartment-building recycling.³⁵ But as it stands currently, however, 42% of Seattle apartment buildings don’t recycle at all. No wonder that its “partial” multi-unit rate is so much higher than the national average, which was estimated in a recent study of apartment-house recycling in forty cities as 14.6%, excluding yard waste.³⁶

With so much of its housing multi-unit, New York's 20% rate for 100% residential coverage is a real accomplishment. But what about cities that are more like New York demographically than San Diego, Portland, Seattle, or Jacksonville? For example, take the case of a somewhat similar city to New York (in terms of density and age of housing stock)—Boston.

According to the Boston Neighborhood Recycling Coalition, “though the city provides free recycling collection to large apartment buildings if they request it, over 60% of all apartment buildings do not provide convenient recycling to their tenants. As a result, over 20% of Boston residents cannot recycle easily.”³⁷ This means that the 14% residential recycling rate that Boston reports excludes roughly 100,000 units in multifamily housing in that city.

The same situation applies in Chicago, another densely populated, older city. It doesn't count multi-unit recycling in its 27% diversion rate either (and bear in mind that without yard waste, this rate is 21.7%). In addition, Chicago does not keep data about diversion, or even compliance rates with its recycling ordinance, for the close to 40% of its housing stock that is multi-unit.

Los Angeles resembles NYC along different lines. With over three million residents, it is second only to New York in population. And like New York, its sanitation history has been one of public collection of residential waste, paired with private handling of the commercial sector. Yet in this city, very few multi-unit buildings recycle.³⁸ Mechanized curbside collection (described in the box at right) is inconvenient for multi-unit complexes, most of which prefer to contract with private waste carting services for dumpster

collection. But because recycling is not mandatory in LA (and there are no private fee-based incentives to hiring separate recycling collection), these buildings generally do not opt to recycle. As a result, Los Angeles doesn't count waste from these buildings in its 40.9% overall diversion rate (14.4% for paper and MGP alone).

Recycling in L.A.

Several years ago, L.A. implemented mechanized curbside collection, meaning that all waste must be put in standard-issue bins to be collected. Residents using the Bureau of Sanitation's (BOS) services are tracked through the city's water and sewerage database, and assessed a yearly sanitation maintenance fee. The BOS issues each householder one black bin for garbage, one blue bin for commingled paper and MGP recycling, and one green bin for yard trimmings. Extra garbage and yard waste bins are available for a monthly fee of \$10-15; extra recycling bins are free. Residents can also purchase one-time use tags to place on bagged trash if they generate an unusual amount once in a while. Scheduled bulk pickup and expanded “moving-day” collections are provided free.

In a number of other densely populated older cities, multi-unit buildings have simply been ignored. Washington, DC doesn't provide or require any recycling service to its 140,000 units of multifamily housing. Nor do newer high-density urban areas (Dallas, Houston); older industrial cities with some pockets of higher density housing (Detroit, Baltimore, Milwaukee); or other more diffusely populated localities (Indianapolis, Phoenix, San Antonio). The residential rates they report don't take multi-unit recycling into account at all.

Finally, there is San Francisco. With 40% of its housing stock multi-unit, a large portion of its buildings historic, and recycling



Through the City's four botanical gardens, the Department encourages backyard composting.

**New York's
give it
get it
buy it
sell it
rent it line**



**NYC STUFF
EXCHANGE**

877-NYC STUFF

The Department promoted the NYC Stuff Exchange hotline using advertisements on public transportation outlets such as the NYC subway.

available to close to 90% of apartment houses, it may be the most comparable city to New York in terms of the examples reviewed in this report. The city's privately serviced system attains a 50% diversion rate in the industrial sector, a 40% rate for the commercial sector, and a 35% rate overall for residential waste—suggesting at first glance a possible model for New York to follow.³⁹ Yet the San Francisco Recycling Program reports a diversion rate for apartment buildings of only 10%,⁴⁰ adding that:

materials are diverted in other ways: backyard composting, garage sales, the Bulky Item Collection Program, and additional bottle and can recycling at buy back and drop-off centers. We estimate that with these additional source reduction and recycling activities, the apartment recycling-rate is closer to 30%.⁴¹

NYC, of course, cannot by law count such diversion (with the exception of bulk metal) as part of its official rate. At the same time, its voluntary waste reduction programs provide many of the same options to apartment dwellers as San Francisco does. Backyard composting is promoted throughout the five boroughs. And the Department provides extensive information about reuse, repair, materials donation, and second-hand markets through its automated "Stuff Exchange" hotline (1-877-NYC STUFF).

Implications for NYC

There are several lessons that can be drawn from this report's analysis of municipal recycling in thirty major U.S. cities. First and foremost, there is great variation in program designs, private/public service mixes, recycling rate calculation methods, housing stocks, and population sizes among cities. This means that no two recycling programs are completely alike. So simply comparing New York City's 20% diversion rate to the rates of other places, based on what they refer to as their "official" recycling rate, will always mean comparing "apples to oranges." Therefore, this is not an accurate way to either evaluate the success of NYC's Recycling Program or to plan for future improvements.

Second, when the features that set NYC and its Recycling Program apart are taken into proper context, it becomes clear that achievement of a 20% recycling rate is quite remarkable. To recap, these features include:

- 1 Population Density.** NYC's population roughly equals the population of Los Angeles, Chicago, and Houston (the next three most populous cities) and is *nearly twice as dense* as the second densest city in the nation (San Francisco).
- 2 Multi-Unit Housing.** Close to 63% of NYC's housing stock is multi-unit.
- 3 Age of Housing Stock.** Over 90% of its housing dates from before "modern" recycling was implemented in the 1980's.
- 4 Citywide Recycling Service.** NYC is the only city whose Sanitation Department services 100% of all residences (which include free-standing homes, attached houses, brownstones,

tenements, small apartment houses, massive complexes, and skyscraping high-rises) with the same full-service, weekly curbside recycling collection.

- 5 Citywide Recycling Rate Calculation.** NYC is correspondingly the only city that covers *all* residences—from single family to multi-unit—in its reported residential recycling rate.
- 6 Yard Waste.** NYC has by far the lowest amount of yard waste relative to other waste components in the nation.
- 7 Recycling Rate Calculations.** By law, NYC excludes reuse of "other" materials (like C&D debris and bottle bill material) from its recycling rate.

Of course, recognizing that NYC is doing well, given these realities, doesn't mean that the City should rest on its laurels. Clearly, recycling can always be improved. But the goal of this report is to demonstrate that consideration of ways to increase the diversion rate should be undertaken with the City's unique characteristics in mind. This means accounting for what has already been done, rather than simply comparing NYC to other cities that superficially appear to be doing "better."

The remainder of this report will explore ways that NYC might realistically increase its diversion. These include:

- Quantity-Based User Fee or "Pay-As-You-Throw" systems.
- Enhancing individual participation in recycling through education and enforcement.
- Adding materials to the Recycling Program.
- Waste prevention.

Alternatives

Quantity-Based User Fees

A 1996 study of recycling in over 500 communities found that *charging residents directly* for garbage pickup (and not for recycling pickup) was the single most important program innovation for increasing diversion.⁴² The report noted that such an arrangement, known as a “Quantity-Based User Fee” (QBUF) system, represents “the single strongest variable of all...[and] lead(s) to significantly more recycling, *holding all other program features, demographics, etc. constant.*”⁴³

Seattle, Portland, San Francisco, and Los Angeles—among others—all utilize some form of QBUFs in their waste management systems. In these cities, residents pay according to the quantity of trash they generate, but benefit from subsidized or free recycling collection.

There are, however, drawbacks to imposing QBUFs in densely populated urban areas. It is easy enough to charge residents of single-, two-, and even three-unit housing based on the waste they put out at curbside, but beyond that size, building management must take over the responsibility of consolidating tenants’ trash and recyclables. And unlike gas, electricity, or even water, there are no “meters” that can monitor waste generation apartment by apartment. Thus, at best, hauling-cost savings from QBUFs can be passed on communally to tenants, but not in proportion to their individual efforts.

Furthermore, multi-unit tenants don’t directly experience financial gains from

their participation, as sociologist Peter Collier of Portland State University notes:

...non-recycling behavior does not have a direct cost to multifamily dwellers. In a single-family study conducted by [Portland State University’s] Recycling Education Project (REP), 43% of the respondents reported being motivated to recycle by the prospect of saving money on their garbage service fee...Since non-recyclers report that the lack of economic rewards is a major reason not to recycle, not having the opportunity to experience direct savings on garbage serviced fees due to increased levels of personal recycling works against recycling in multifamily dwellings.⁴⁴

In addition, there are significant community or “peer” pressure differences between single- and multifamily recycling:

Another motivational issue relates to the absence of community reinforcers in regard to promoting recycling in multifamily complexes. One advantage of [single-family] curbside programs is that the placement of materials in front of homes provides a prompt for other homeowners to recycle, as well as an opportunity for the modeling of “ideal” behavior. This opportunity is missing in multifamily complexes; even if other tenants are recycling, there is no way for an individual to be aware of this unless the behavior is observed accidentally.⁴⁵

In Portland (where 90% of multifamily housing has access to recycling), participation is promoted through some revenue-sharing arrangements between landlords and tenants, and in other cases simply through

general appeals to “goodwill” and civic commitment.

While there is no data on the diversion actually achieved, it is conceivable that this mix of approaches works in a city with 25%—or around 50,000 units—of its housing multi-family. In the more populous and denser Seattle, however, we see only 58% of apartment buildings even signing up to reap the cost-benefits of QBUFs. San Francisco, which is unlike most densely populated, older cities in that it has always had a private, quantity-priced waste management system, seems to be achieving a lower multi-unit diversion rate with QBUFs than New York does without them. And Los Angeles reports very few apartment buildings taking advantage of its lower cost curbside service, due to the economy of having everything hauled away in one large dumpster.

In fact, New York’s characteristics make it difficult to imagine how QBUFs would work here, if applied to residents. Because of a number of density-related considerations—including the impossibility of accounting for each multi-unit resident’s waste separately, and the need to pick up everything to keep sidewalks and streets clear and clean—the City’s sanitation system has always been paid for out of general tax revenues rather than user fees. Nevertheless, as one of the few proven means of increasing recycling, it may be realistic to consider QBUFs here in the future for targeted sectors, such as public institutions and City agencies—provided there is political consensus for their introduction.

Enhancing Participation

Another obvious method to increase diversion of residential waste is to get *more* people to

recycle *more*, and recycle *better*. In practical terms, this means increasing the participation, diversion, and capture rates, respectively. Clearly, no one would disagree that these are good goals for any city. Yet to understand how achievable such increases could be *in a real-world context* requires, first of all, examining the overall composition of the waste stream. This is because waste composition, regardless of citizen participation, *fundamentally determines* the maximum attainable diversion and capture rates.

What Is the Capture Rate?

The capture rate can only be estimated.

It is calculated as:

$$\frac{\text{Tons of recycling placed out for recycling collection}}{\text{Tons of all recyclables in the waste stream}}$$

It basically measures “how well” people are recycling by estimating how much of what should be recycled actually is recycled (as opposed to the diversion rate, which just measures how much people are putting in the recycling bin).

NYC’s Current Waste Composition— Roughly 35% Paper/MGP

In the past decade or so, the Department has conducted four separate waste composition studies of NYC trash and recycling.⁴⁶ Their results vary quite a bit, in no small part because they examine different segments of the NYC residential population. However, taken together they suggest that somewhere between 24 and 45% of the waste stream consists of paper and MGP materials currently designated as recyclable under the curbside program (see Table 9).

Each of the estimates cited in Table 9 on the following page has its problems. The 1989 Study (in addition to being ten years

Table 9

**Estimates of the Percentage of Recyclables in New York City’s Waste Stream
(including recyclables correctly recycled, and those thrown out with refuse)
A summary of four separate waste composition studies**

Study Year	1989	1997	1997	1997
Study Population	Citywide	Staten Island	Low-diversion districts in the Bronx and Brooklyn	Low-density “suburban” housing in the outer boroughs
Recyclable Material				
Paper	31%	21%	14%	24%
Metal + Glass	12%	7%	7%	12%
Recyclable Plastic	2%	1%	2%	2%
Beverage Cartons	n.a.	0.3%	0.5%	n.a.
Total Percentage of Recyclables in the Waste Stream	45%	30%	24%	38%

Note: “n.a.” indicates that this category was not assessed in this waste composition study.

out-of-date) was conducted before recycling began in NYC and likely over-counted the fraction of recyclable paper and glass—since it included fine glass shards and soiled paper (napkins, etc.) in its totals. The 1997 Staten Island study and the 1997 low-density suburban study looked at recyclables in higher income neighborhoods with many freestanding houses. The 1997 low-diversion study, in contrast, examined recyclables generated in densely populated, low-income areas.

None of these sub-studies, therefore, paints an accurate picture of NYC as a whole. Still, they do present a range of percentages of metal, glass, plastic, and paper that are “potentially recyclable” in New York’s waste stream. With this information, and given that we know (from actual truck weights) that around 2,200 tons per day are actually recycled, New York’s overall capture rate can

be calculated in a range that averages roughly 50% (see Table 10).

Of course, the capture rate varies widely from person to person. It allows us, however, to envision what changes in individual behavior would be needed to boost the City’s diversion rate, given the underlying composition of the waste stream. Table 11 shows that capture rates of 73% and 88% would be needed to boost NYC’s diversion rate to 25% and 30% respectively.

Looking at the scenarios presented in Table 11, a number of questions arise. Is it realistic to assume that *on average* people will recycle close to 75% or 90% of everything they should? Bear in mind that this would have to mean either:

- 1 That *everyone* (100% of citizens!) would be recycling at this desired capture rate, or

Table 10

**Estimates of the Average New Yorker's Capture Rate
A summary of four separate waste composition studies
in tons per day (tpd)**

Study Year	1989	1997	1997	1997
Study Population	Citywide	Staten Island	Low-diversion districts in the Bronx and Brooklyn	Low-density "suburban" housing in the outer boroughs
<i>if this much is actually recycled...</i>	2,200 tpd	2,200 tpd	2,200 tpd	2,200 tpd
<i>and this many recyclables are in the waste stream...</i>	6,352 tpd	4,193 tpd	3,310 tpd	5,362 tpd
<i>the estimated average capture rate is...</i>	36%	55%	69%	35%

2 That some people would have to recycle at *even higher* rates.

Let's say New York City aimed for a 75% capture rate, given a waste stream of 14,000 tons per day (tpd) and potentially recyclable fraction of 4,800 tpd. This would yield 3,600 tpd of recyclables—and a diversion rate of a 25% (3,600/14,000)—assuming each and every New Yorker recycled

three-quarters of the recyclables they threw out each week.

But what if not everyone recycled at this rate? What if, for example, 20% of City residents only recycled 50% of the recyclables in their waste stream? Let's call this 20% the "low compliance portion." This would mean that, to achieve a citywide capture rate of 75%, the rest of the population (let's call them the

Table 11

**Comparison of Alternative Scenarios
The capture rate needed to achieve 25% or 30% diversion
in tons per day (tpd)**

A	B		C	D = A x C	D/B
assuming the total waste stream is...	and the recyclable portion of the waste stream (averaged from the estimates in Table 10) is around...	THEN	a diversion rate of...	would mean a recycled tonnage of...	which requires a capture rate of...
14,000 tpd	4,800 tpd		25%	3,500 tpd	73%
14,000 tpd	4,800 tpd		30%	4,250 tpd	88%

“high compliance portion”) would have to make up the difference. In this case, the remaining 80% of residents would have to recycle (or capture) 81% of all their recyclables.

Doing the Math

If NYC aims for a 75% Capture Rate, the “high compliance portion” of the population must achieve a capture rate that equals:

$$\frac{75\% - [\text{“low compliance portion”} \times \text{“low compliance capture rate”}]}{\text{“high compliance portion”}}$$

Let’s consider some other scenarios. If only 10% of the NYC population didn’t recycle *at all*, then the rest of the population would need to achieve a capture of 83%. If half of the population recycled with a capture rate of 50%, the remaining half, it turns out, would have to recycle *everything* (100%) that could be recycled. And if 40% of New Yorkers captured recyclables at 50%, the rest of the City would have to capture at 110%—a logical impossibility.

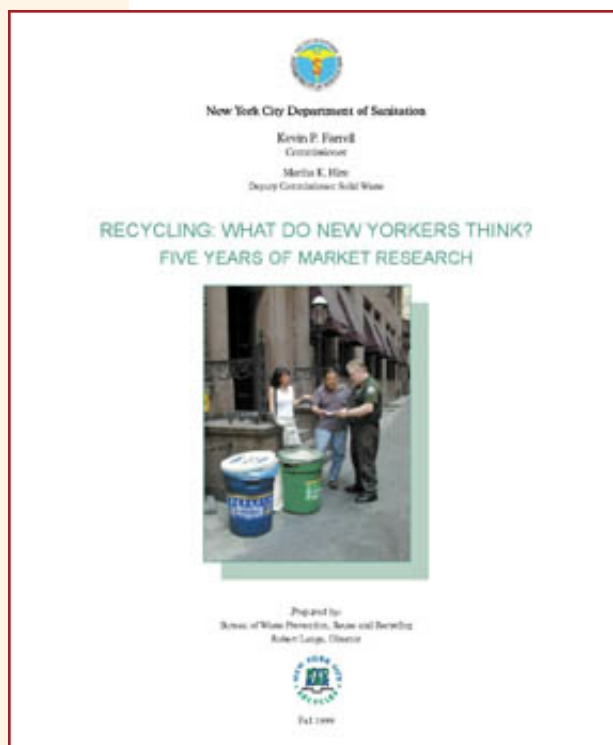
Even if NYC expected all of its residents to capture 75% of their recyclables, such a goal would be extremely difficult to attain. Seattle, for example, shows a capture rate of around 60% for paper and MGP for the year 1999.⁴⁷ The same capture rate (60%) in NYC would mean a diversion rate increase to only 21%.

What should one draw from all these calculations? A better understanding of the relationship between participation and diversion will lead to more realistic program planning. Under the present Recycling Program, the City may be nearing the limit for attainable diversion. This does not mean we should stop trying to increase participation, just that we should know what to expect from it.

What We Know from Market Research

The only way to increase the capture rate for residential waste is to increase recycling participation in the home. This means, through persuasion or legal sanction, getting more people to recycle more, and recycle better. How might people respond to additional “persuasion” or stepped up enforcement?

Fortunately, we have a good idea about the former from five separate surveys—each administered to over 1,000 randomly selected New Yorkers by telephone—which the Department has conducted over the last three years. Results of these surveys are discussed in detail in the Department’s fall 1999 report, *Recycling: What Do New Yorkers Think?*



Published in 1999, this report details the extensive market research conducted on the Department of Sanitation’s behalf about what NYC residents think about recycling.

majority of measures of Program acceptance—in terms of approval, knowledge, and behaviors—are holding steady suggests that the messages about what to recycle, how to recycle, and why recycling is important have made their way into the “New York state of mind.”

This does not mean that the Department should relent in its public education. The practical nuisance of recycling, the continual influx and out-migration of residents in this City, and the pressures that waste export will place upon the City in the years to come all point to the urgency of continuing to promote recycling in NYC. What it does mean, however, is that there may be limits to what public education (i.e., “persuasion”) can achieve in terms of further improvements in diversion.

Enforcement

Enforcement of residential recycling compliance is another story. While the vast majority of New Yorkers know that recycling is mandatory (and many cite “obeying the law” as their main reason for recycling) it remains an inescapable fact that the Program cannot be enforced evenly in multifamily buildings. Because it is not generally possible to attribute what is in the trash and recycling to particular tenants in multi-unit buildings, enforcement in such dwellings is very difficult. As it stands, building management can only be fined if recycling is not *set up or set out* properly (i.e., if a recycling area is not labeled and maintained, or recyclables are placed out for collection in improper containers).

This leaves recycling enforcement efforts in NYC somewhat at an impasse. To increase recycling, how much of an incentive would more frequent and stiffer fines be? In

apartment houses, who should be ticketed? Should the Department refuse to pick up garbage bags if they contain recyclables? These questions all relate to the level of *sanction* that is appropriate to bring to bear on New York City citizens, and corresponding *expectations* of citizen compliance. In this regard, it’s interesting to compare NYC’s recycling ordinance, Local Law 19, to other laws that regulate citizen behavior.

Most such laws—like anti-litter or dog waste ordinances—regulate *public* behavior. Recycling, on the other hand, is one of the very few private, household activities dictated by administrative law. In fact, for apartment dwellers the structure of the recycling ordinance most closely resembles decency laws that in some states regulate personal behavior in the home. At the same time, with recycling there is a measurable outcome of this behavior—tons of recyclables—that is constantly evaluated (clearly not the case with other statutes governing private behavior). But while it’s possible to know that the recycling law is not being complied with in a quantitative manner (if the expected tons aren’t coming in), it’s generally not possible to identify individual offenders.

To compound this problem, consider the unique way that compliance is quantified under Local Law 19. Under most administrative laws, data on compliance come from records of the number of tickets issued, summonses written, or the like. These laws simply prohibit certain actions. There are no direct measurements of how many people *are* complying, and consequently the standards by which to judge whether the law is “working” are indistinct. With recycling, on the other hand, the fact that each recycling truck is weighed means that there is daily, measured data against which to evaluate a desired level

of compliance—albeit abstractly (i.e., not at the level of the individual complying citizen).

In sum, the particular qualities of the recycling law mean that the tons of recyclables collected are “read” as an indicator of compliance that can never really be directly measured—or controlled. This is not because of a deliberate intention on the part of the legislators who drafted Local Law 19, but merely due to the nature of recycling as an operational phenomenon. How does all this relate to making decisions about what to expect in the way of compliance, and what levels of enforcement are appropriate? It only highlights that achievement of diversion rate improvement should not be expected to come about as a result of extraordinary control of private behavior, or over and above what is assumed under other similar laws.

With such an enforcement picture, and given a decade of sustained and varied public education, it may well be possible that the City is reaching the upper limits of what can reasonably be expected in the way of residential compliance. The Department recognizes that there are no easy solutions to the dilemma of how to get people to recycle more or better. Yet government programs are unlikely to work without general public consensus of their appropriateness and fairness. In fact, a lack of general consensus could actually hurt recycling.

Recycling Additional Materials

Given that improvements in the diversion rate are probably going to be marginal under the current Program, the next logical question is whether there is potential for the inclusion of *additional* materials in NYC’s Recycling Program. If one imagines the NYC waste stream after the removal of items that are

designated as recyclable under the current NYC Recycling Program, what remains?

The four waste composition studies cited previously in this report shed some light. Table 12 shows fractions of *nonrecyclable*⁴⁹ MGP, *organic waste*, and *residue* in the total waste stream. Variations in the sorting methods employed in the different studies mean that some of the categories are not comparable (for example, the 1997 Low-Diversion District study categorized food with “residue”). Still, these studies’ results do provide some general estimates of the composition of the City’s waste stream as a whole.

What Is Designated as “Recyclable” under NYC’s Current Recycling Program?

ALL types of metal, including: aluminum cans, steel “tin” cans, aluminum foil products, bulk metal, and any item containing more than 50% metal

Plastic bottles and jugs

Glass jars and bottles

*Beverage cartons (milk cartons, aseptic juice packs, etc.)
Corrugated and smooth cardboard, newspaper, office paper, magazines, junk mail, phone books, paper bags, wrapping paper, and other types of mixed (not tissue) paper*

As Table 12 (on page 45) shows, around 9 to 22% of all waste is what the Department considers “non-recyclable” MGP and paper. This includes plastics other than HDPE and PET bottles and jugs,⁵⁰ paper that is likely to be soiled with food or other matter (tissues, paper plates, etc.), glass that breaks easily and which is dangerous to handle (shards, plate glass, mirrors) and “mixed-material” items (like toys or home furnishings).

Food likely makes up another 6 to 17% of garbage, with other organic materials at lower rates. Yard waste clearly varies from area to area—in Staten Island and in suburban areas of the outer boroughs, it stands at around 17%, close to the national average. In the context of the City as a whole, however, it accounts for much less (4%). Textiles, a category some have argued for inclusion in the NYC Recycling Program, account for about 3 to 5% of the stream, while wood, another highly variable category, probably represents 2 to 6%. Finally, “residue”—a mixture of materials such as diapers and other hygiene products; household hazardous waste; rubber, ceramics and other unusual materials; and “fines” (pieces of waste so small and mixed they defy categorization)—probably accounts for about 14 to 17% of the waste stream.

Can any of these “leftovers” be targeted for recycling? In particular, is it realistic to think that any of the “lost” MGP or paper could be safely recovered for recycling, without prohibitive cost? For the organic fraction of the stream, composting comes to mind—can more yard waste composting be done, and should the Department collect source-separated food and tissue paper (napkins, etc.)? Should textiles be designated and collected along with paper or MGP? And does it make sense to target anything in the residue category? In formulating answers, it is once again important to review what the Department is already doing.

“Non-Recyclable” Plastics and Other Inorganics

In the U.S.’s free-market economy, the *prices* that recyclable materials command largely determine what municipalities collect. This explains why all cities designate HDPE and PET plastics in their recycling program, yet very few collect other resins.

Similarly, because markets for substances like ceramics and Styrofoam are severely limited or nonexistent, they are uniformly excluded from municipal programs. These materials are present in relatively small quantities in the waste stream but cost a great deal to accept and process. Weighed against the marginal benefit of preventing their disposal, the costs of adding them to a recycling program are usually too great.

For instance, San Francisco explains that “less than 2% of the 85 million pounds of plastic we use every year is recycled...[because] even though most plastics are technically recyclable, the recycling infrastructure for plastics is still in its infancy.”⁵¹ These limitations are especially important in large cities like New York that depend on private processors to accept and process recyclables continuously. With very little space available to store collected materials, processors cannot stockpile unmarketable items, which can easily clog the waste management system and lead to recycling infrastructure failure.

Yard Waste

In suburban and semi-suburban neighborhoods throughout New York City, the Department already collects leaves, brush, and pumpkins seasonally; it also picks up Christmas trees citywide. This results in over 20,000 tons per year of material composted in windrows at four sites throughout the City. This represents a recovery rate of around 27%—leaving a remaining 100,000 tons of yard trimmings to be either handled at home, or collected as refuse.

Much of this tonnage consists of grass clippings—a heavy, seasonal material which the Department unfortunately cannot collect for windrow composting due to the potential odor problems that would affect communities

Table 12

**Estimates of the Composition of the NYC Waste Stream
After Currently Designated Recyclables Are Removed
A summary of four separate waste composition studies**

Study Year	1989	1997	1997	1997
Study Population	Citywide	Staten Island	Low-diversion districts in the Bronx and Brooklyn	Low-density "suburban" housing in the outer boroughs
Composition				
Non-recyclable MGP and paper				
metal	0.00%	0.00%	0.00%	0.70%
plastic	7.30%	n.a.	n.a.	4.80%
paper (contaminated or non-designated)	n.a.	6.40%	0.59%	7.20%
non-metal bulk	7.23%	7.53%	1.49%	3.80%
non-specified MGP (including plate glass)	n.a.	7.60%	7.05%	n.a.
subtotal	14.53%	21.53%	9.13%	16.50%
Organic				
food	12.70%	5.55%	see notes	17.00%
textiles	4.70%	3.37%	4.05%	n.a.
wood	2.20%	5.70%	2.36%	n.a.
yard	4.10%	16.70%	0.00%	16.00%
subtotal	23.70%	31.32%	6.41%	33.00%
Residue				
ceramics	0.20%	n.a.	n.a.	n.a.
hazardous waste	0.40%	n.a.	n.a.	n.a.
hygiene	3.40%	n.a.	n.a.	2.50%
other organic	10.30%	n.a.	n.a.	0.50%
other inorganic	2.10%	n.a.	n.a.	11.00%
"general residue," including glass shards	n.a.	17.22%	see notes	n.a.
subtotal	16.40%	17.22%	61.00%	14.00%
TOTAL	54.63%	70.07%	76.54%	63.50%

Notes: "n.a." indicates that this category was not assessed in this waste composition study.
The "low diversion" study categorized residue and food together at 61% of total.



NYC Department of Sanitation workers load bags of leaves as part of the Department's fall leaf collection program.

located near compost sites. However, the Department does actively promote grass recycling or "leaving it on the lawn," and in a recent survey found that about a quarter of all New Yorkers with lawns to mow utilize this method to dispose of their clippings.⁵²



DOS workers load discarded Christmas trees as part of the Department's Christmas tree collection program.



Each of the outer boroughs has a composting site.



The Department's "Leave it on the lawn" brochure encourages residents to prevent yard waste by letting clippings break down on the lawn, rather than bagging them for disposal.

Clippings and other forms of yard waste can also be handled through backyard composting, which the Department has promoted citywide since 1997. Though it is hard to measure the number of participants or the diversion it is achieving, the Department's extensive and sustained outreach in this area guarantees that all New Yorkers with yards and gardening interest have resources to backyard compost if they choose. Details of the Department's efforts in this regard can be found in its fall 1999 report, *Backyard Composting in New York City: A Comprehensive Program Evaluation*.

Information about the Department's composting efforts in general is available at the Department's Compost Project website, at www.nyccompost.org, and in a forthcoming report reviewing the Department's composting efforts over the past decade (not yet issued).

Additional yard waste diversion might be achieved by:

- 1** Banning the collection of grass clippings outright.
- 2** Adding a special spring yard waste collection for brush and leaves that were missed in the fall.
- 3** Allowing landscapers to use DOS composting sites.

In addition, improving the Department's wood-composting capability beyond current levels (the Department's chippers and sites can only handle light brush and small trees) might enable it to compost some or all of the 45,000 tons of large trees and heavy brush that the Parks Department currently disposes each year.

A combination of such programs might increase the overall diversion rate by a few percentage points, if communities were willing to host expanded compost facilities—which is by no means assured given the protracted difficulties the Department has experienced in siting existing leaf composting stations in Queens and Brooklyn.

Food Waste

Food waste, representing around 15% of the overall waste stream, would seem another obvious category to target for composting. In some countries (Germany, the Netherlands) residents are in fact required to source-separate food, which is collected and transported to



The Department's comprehensive evaluation of backyard composting, summarized in this 1999 report, concludes that backyard composting is cost-effective and educational, but won't significantly increase the diversion rate, no matter how intensely it is promoted.

centralized, enclosed composting facilities. In the U.S. this is much less common.

Seattle hopes to add food composting to its recycling program in the future, but currently reports that “only the Backyard Composting Program helps residents to get food waste out of their garbage cans.”⁵³ Portland has a voluntary food-waste composting program, but it is limited only to businesses. San Francisco, on the other hand, has successfully completed a pilot program for organic waste collection, and is now providing single-family homes and small multi-unit residences with a green cart into which they place food and yard waste. According to initial results, the program has boosted diversion in the neighborhoods in which it is being tested by 10-15 percentage points.⁵⁴ Yet in buildings with greater numbers of units, participation in this program hinges on a volunteer tenant coordinator. As described by the program’s manager, Jack Macy:

Larger buildings (usually with six or more units) that do not have individual billing or trash and recycling service receive larger centralized black and blue bins to share, similar to their current citywide service. These large multiunit buildings do not get a green cart for compostables unless they requested one and identify a resident who will be responsible for the bin (additional outreach may be taken to bring these buildings into the program in the future).⁵⁵

In considering whether a similar arrangement would be a viable alternative for New York City, two important facts should be kept in mind. First, the siting of composting facilities is extremely unpopular—community

concerns about composting yard waste (which is considered relatively “clean”) pale in comparison to the intense opposition that arises to stations that process discarded food. San Francisco’s privately managed collection system has fortunately enabled private haulers to build upon existing relationships with established composting facilities near the city, who are willing to accept organics for processing. Consequently, no new facility siting has been required. Around NYC, in contrast, processing capacity would have to be created and/or contracted for by the City itself—a far more contentious process.

Second, there is evidence (even absent the serious siting problems that such a program would entail) that food-waste recycling would not fare well in NYC. In two separate pilot tests of food waste collection here in New York City, the Department found collection costs to far outweigh diversion benefits.⁵⁶

The Department first initiated testing of source-separation of food waste in Park Slope, Brooklyn in 1992. The pilot demonstrated that residents in medium-density (“brownstone”) housing, when educated through extensive and constant outreach programs, were willing to source-separate their organic waste. In fact, the Park Slope program achieved food-waste capture rates that approximated 50%.

However, the cost of adding a fourth truck route, at maximum load rates of five tons per truck (compared to an average of ten tons per truck for solid waste, eight tons per truck for paper recycling, and seven tons per truck for leaf collection) far exceeded the economic benefits of food waste recovery. Moreover, a similar pilot conducted in Starrett City, Brooklyn (which has higher density housing

more typical of the City) resulted in minimal food waste diversion that was so heavily contaminated it could not be composted.

Such findings indicate that the expense and difficulty of collecting source-separated food waste in densely populated areas make such programs unlikely for cities like New York. In fact, even in countries such as Germany and Holland, where source-separated composting plays a significant role as a waste management strategy, food-waste collection programs are not carried out with equal success in high-rise buildings in the larger, denser cities such as Berlin and Amsterdam.⁵⁷

The Composting Unit of the Bureau of Waste Prevention, Reuse and Recycling supports pilot projects to foster on-site, in-vessel composting of food and yard waste. These include not only an enclosed, agitated-bay composting facility for food waste on Riker's Island, but also in-vessel projects at New York Hospital in Queens and the New

York Botanical Garden. But viewing food-waste composting as an option for a segment of, or for the entire residential stream, is not presently a realistic option for NYC.

Textiles

Among the cities included in the *Waste News* survey, only San Jose collects textiles at curbside for recycling. Residents there are advised to place textiles in a separate clear bag in their recycling container along with the rest of their recycling, which is collected in one commingled stream, and heavily sorted at the recovery facility.⁵⁸

But most cities (including New York) advise residents to donate unwanted textiles to charity. The city of Milwaukee, for instance, reminds residents that donating even stained or unusable items to thrift shops helps diversion, since these sources recycle their cast-offs as fiber. Many cities' websites provide lists of charitable organizations that will accept

unwanted clothing, rugs, and other material. And surveys conducted by BWPRR have found that the majority of New Yorkers prefer to donate unwanted clothing to charity, rather than leaving it at curbside with recycling, because of concerns about scavenging.⁵⁹ Pilot tests of textile recycling in Park Slope confirmed this attitude, which resulted in minimal cloth left at the curb.

It is consequently unlikely that adding textiles to the Recycling Program would be received well,



In-vessel compost units at the New York Botanical Garden.

complied with, or would increase New York's diversion rate. Capitalizing on a pre-existing and well-known system of charities makes

much more sense. This is the spirit behind the Department's recently debuted "Stuff Exchange" (1-877-NYC-STUFF) which enables residents everywhere in the City to find out where to donate used textiles, as well as many other items.

"I need to get stuff."

"I need to get rid of stuff."



Looking to give stuff? Looking to get stuff?
With a single phone call, you can find the place nearest you
to do either – even rent stuff.
It's the NYC Stuff Exchange. Whether you're talking books
or clothes or furniture or pretty much anything around the house,
it's the one call to make.

1-877-NYC STUFF



New York's give it, get it, buy it, sell it, rent it line.

Waste Prevention

Recycling additional materials is not the only option for waste reduction. Preventing waste at the source is another alternative. New York City's recycling law actually requires the Commissioner of Sanitation to establish programs to *reduce* or recycle specified tonnage amounts. Since 1991, the Department has initiated a number of waste prevention programs to reduce the volume and toxicity of waste generated, working with residents, consumers, businesses, and non-profit and government agencies in NYC.⁶⁰

The methods the Department follows are similar to those used in other jurisdictions. To encourage waste prevention among residents, its Waste Prevention Unit distributes information on methods to reduce and reuse. Such recommendations encourage New Yorkers to purchase items with less packaging and in bulk; repair items rather than replace them; and bring their own shopping bags to the grocery store. It also explains how donating clothes, toys, furniture, and other durables for reuse, as well as patronizing second-hand stores, can help cut down on the amount of waste generated.

The Department recently promoted the "NYC Stuff Exchange" throughout New York City. This hotline provides residents with extensive information about reusing or renting items, rather than buying them new. It also tells residents how to donate or repair things instead of throwing them away.

REDUCE
REUSE
RECYCLE




If just 100 New Yorkers used coffee mugs daily, we'd save 50,000 paper and foam cups a year — about enough to line up from Battery Park to Central Park.

RRRETHINK

EVERY LITTLE BIT HELPS. When it comes to waste and New York City, the amount of trash we throw out in one week would fill the Empire State Building. And every New Yorker can help cut down on it. Start by reusing items and finding creative new "uses" for others. Highlighted are just a few ideas. You can also help out by using the NYC Stuff Exchange. With one phone call, find out where to rent items, donate stuff, and even buy used furniture, electronics, clothing, and more in your neighborhood...call 877-8VC STUFF.

THANKS FOR DOING YOUR PART NEW YORK.

Have a creative "reuse" idea? Be sure to share it with your friends and family. For more information, visit our website at www.nyc.gov/sanitation, or call 212-219-8090.



DON'T LITTER.
City of New York, Kathleen W. Gilliam, Mayor
Department of Sanitation, Kevin P. Farrell, Commissioner



Reuse glass jars, plastic takeout containers, and yogurt containers for storing leftovers.



Reuse the backs of bills, letters, envelopes, and other discarded paper for shopping lists, memos, or messages.



Return wire hangers to the dry cleaners. (Wire hangers can also be recycled through NYC's recycling program.)



Say "no bags please" when you buy small items. Try to carry a reusable bag for other items.



Say "no thanks" to items that you don't need, such as extra napkins, plastic utensils, and condiments.



Create a book, magazine, and music exchange among your friends, family, and co-workers.

Such an effort requires that researchers make extensive yet tentative assumptions about what would occur in the *absence* of a program. Unlike directly measurable outcomes in recycling programs (such as tonnages or diversion rates), assumptions about the impacts of waste prevention rely on forecasting consumption patterns that are subject to a host of outside economic influences. It is consequently very hard to pin down just what the effect of a waste prevention program has been.

When reliable prevention measurement can be established, moreover, the results of the Department's research suggest that its programs have minimal impacts on the waste stream as a whole. Often the costs of measuring waste prevented actually outweigh any anticipated savings in collection and disposal costs.

Policy initiatives that might have a measurable impact—including those targeting packaging, materials composition, or producer buyback requirements—simply fall out of the purview of municipal policy. Influencing markets requires national legislation regulating producers, and involves influencing the national and international economy in a direction contrary to the economic trend that has occurred since the early nineties. General output of consumer products has increased, notwithstanding. For example, Americans used 10% more paper per capita in 1997 than a decade earlier, and 34% more than two decades earlier.⁶² Even in the "Green" social

In the spring of 2001, the Department of Sanitation ran this full-page newspaper ad in the City's major daily papers to encourage NYC residents to practice waste prevention.

But unlike other cities, the Department has also made extensive efforts to actually *measure* the impacts such programs had on the tonnage of waste generated. Its research in this area is summarized in a series of reports entitled *Measuring Waste Prevention in New York City*.⁶¹

These reports present several important findings. The first highlights the inherent difficulty in measuring a desired policy outcome in terms of what does and does *not* happen.

democracies of Germany and the Netherlands, where a tradition of stronger government regulation has enabled the imposition of producer taxes for waste reduction (such as Germany's Green Dot program), overall output of consumables has continued to grow.

Overall, the Department's research suggests that it is unfounded and unrealistic to assume reduction of a sizeable portion of NYC's waste stream through local waste prevention initiatives. The City's experience in this arena is not unique. New York State has suspended an assessment of whether a statewide 8-10% waste prevention goal has been met "because it is extremely difficult to quantify waste reduction achieved."

Even setting aside the difficulty of measurement, the quantity of waste prevented through programs aimed at household and institutional waste is relatively small. At best it is projected to be somewhat less than one percentage point of the current diversion rate.⁶³

The consultant who derived these estimates for the Department (CalRecovery, Inc.) took great pains to stress their tenuousness at the time, writing that "it is important to recognize the[ir] speculative character," and noting that "three key factors make the assumptions...at best educated guesses." These factors included:

- 1** "A near complete absence of data—many of the strategies [upon which the estimates were based] have never been implemented anywhere";
- 2** The fact that "waste prevention activities are likely to have interdependent and cross-cutting impacts. Efforts to reduce one type of waste may increase the generation of another. [But] a model that could account for these

interdependencies would be enormously expensive to develop and unwarranted given the dearth of data"; and

- 3** "The need to rely on composition data by material—[such data] simply do not provide the level of detail needed to make estimates of waste prevention impacts."

As a result, the consultant cautioned, "the assumptions that follow may err by considerable margins. *These assumptions should not be taken as estimates of likely programmatic impacts*, but as rough guesses intended to appraise the scale of impact of an aggressive waste prevention program, to uncover inconsistencies and to identify important subjects for future research."⁶⁴

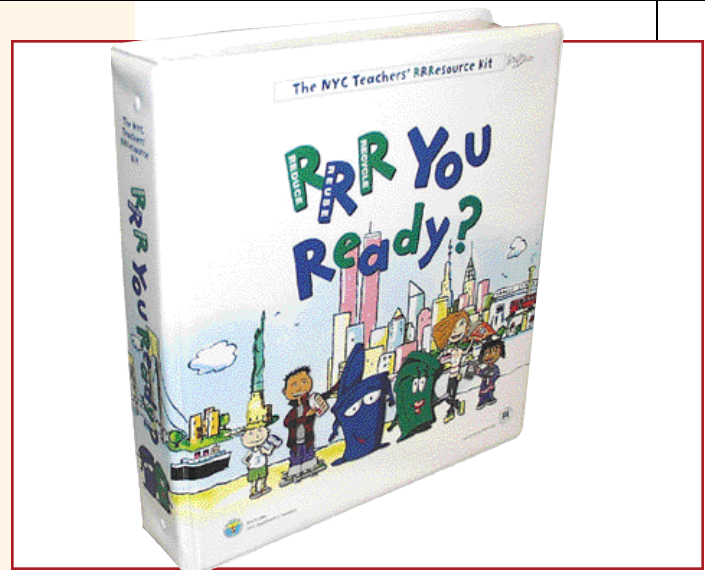
Overall, one might argue that without the Department's waste prevention efforts, disposal problems might be worse than they are now—but clearly, waste prevention is no cure-all. The Department believes that waste prevention is good materials management, and intends to continue to promote it. However, in the face of the driving forces of production and consumption in the national and now global economy, it would be bad policy for the New York City Department of Sanitation to plan as if its efforts could suffice to actually reduce consumption of things that end up in the local waste stream. Waste prevention is something that the Department (and others) should encourage, but since it cannot be accurately measured, it would be unwise to consider it any sort of "official" goal.

Next Steps

The information presented in this report should make it clear that there are many complex questions to keep in mind when thinking about how to increase diversion in New York City—and few easy answers. Finding those answers will involve a public process of consensus building, accompanied by continued research and reliance on measured data. Legislators, policy advisors, citizen groups, community coalitions, and experts in academia need to come together to advance recycling proposals that take into account the facts presented here, and which go beyond simply comparing NYC's diversion rate to that achieved elsewhere.

Specifically, the Department advocates setting aside, for the moment, expectations of significant waste reduction in the *residential* sector through waste prevention, backyard composting, Quantity-Based User Fees (QBUFs), or alternative-material recycling programs. While such initiatives certainly won't interfere with diversion rates already achieved, planning as if they will make a significant dent in the tonnages of waste New York City will have to export in coming years is, at present, unwarranted and unrealistic.

The Department strongly believes, however, that the *educational* value of such strategies is significant, and in future years may lead to realistic and substantial programs for reducing waste. For this reason, discussion of waste prevention, composting, and materials in the waste stream has been woven into the recently issued *RRR You Ready? The NYC Teachers' RRRResource Kit* for public elementary schools. These themes also continue to be a part of the Department's ongoing programs (as seen, for example, in the promotion of backyard composting through the Botanical Gardens).



In January 2001, the Department of Sanitation began distributing these Kits to NYC public elementary schools to promote education on recycling and waste prevention. The Kits contain original videos, lesson plans, extensive background information, and helpful resources.



This guide explains how to set up an outdoor compost bin and is widely distributed through NYC's four botanical gardens. Copies can also be ordered through the Department's Sanitation Action Center.

It may well be possible to implement QBUFs in the smaller and more diverse *institutional* sector. In this sector, linking collection to direct costs for certain agencies (such as schools and the Housing Authority) would be a bold step that could, potentially, increase citywide diversion by a measurable amount.

What New Ideas Should Be Pursued?

At the residential level, the Department recommends stepped-up enforcement for repeat violations, including escalating fines

to residents—both in single-family homes and in apartment buildings—as well as to apartment building owners.

A ban on the collection of grass clippings would be a means of increasing organics diversion without the problems of community opposition to new composting facilities. This, of course, is contingent upon attaining the necessary political consensus to implement such a proposal.

Overall, it is essential that ongoing advertising and other public outreach programs be maintained at current levels; these efforts expand and reinforce knowledge about recycling, which is the strongest tool for making it work.

The Department is currently in the planning stages for an updated, comprehensive citywide waste composition study, which it expects to complete sometime in or around 2005. The data from this study will enable a fresh look at New York City's residential waste stream, with an eye towards:

- Identifying additional materials that might realistically be recycled in a cost-efficient, operationally sound manner.
- Better understanding the relationship between housing characteristics and recycling compliance.

As part of its spring 2001 ad campaign, the Department of Sanitation ran this full-page ad in the City's major daily papers to encourage New Yorkers to continue their recycling efforts.

Endnotes

- ¹ Department of Sanitation, Bureau of Planning and Budget. *Residential Recycling Diversion Report*, December 2000.
- ² Some larger buildings place material in centralized containers for mechanized collection rather than at curbside; five-day-a-week collection is provided to public school routes.
- ³ Past education and outreach efforts are summarized in: Department of Sanitation, Bureau of Waste Prevention, Reuse and Recycling. *NYC Recycles: More than a Decade of Outreach Activities by the NYC Department of Sanitation FY 1986-1999*, Fall 1999.
- ⁴ Department of Sanitation, Bureau of Waste Prevention, Reuse and Recycling. *Recycling: What Do New Yorkers Think?*, Fall 1999.
- ⁵ Clinton, William J. 2000. "America Recycles Day Presidential Message." November 15, 1999 White House Proclamation.
- ⁶ Environmental Protection Agency. *Characterization of Municipal Solid Waste in the United States: 1998 Update*, September 1999 (EPA530-R-99-021).
- ⁷ Burrows, Edwin G. and Wallace, Mike. *Gotham, A History of New York City to 1898*, 1999 (Oxford University Press, New York).
- ⁸ Franklin Associates, Ltd. *Solid Waste Management at the Crossroads*, December 1997 (Franklin Associates, Ltd.: Prairie Village, KS).
- ⁹ Civic and environmental advocates in NYC have often called for adjustment of the City's diversion rate to account for contamination. A visit to the website of any other U.S. municipality will show that this is unprecedented in recycling program evaluation.
- ¹⁰ The Department also tracks institutional waste in this manner. Some previous waste composition studies have estimated NYC institutional waste as making up between 10 to 20% of the "Department-managed" waste stream, though as of yet there is no good data on this breakdown. Due to the subject matter of this report—which focuses on residential characteristics of cities—we will focus on residential waste collection and recycling.
- ¹¹ Businesses are required under City Law to recycle and are subject to enforcement by the Department of Sanitation. They must also adhere to requirements set out by the City's Trade Waste Commission and the Department of Environmental Conservation as well as the State Department of Environmental Protection. The commercial recycling rate was around 63% for 2000 and 71% for 2001. However, much of this consisted of clean fill and construction and demolition (C&D) debris.
- ¹² Note that NYC's reporting also includes some recycling by public institutions. Data on institutional and residential waste are not kept separately, but residential waste makes up the vast bulk (at least 80%) of Department-managed waste.
- ¹³ Based on available data on yard waste recycling, we subtracted yard waste tonnages from the numerator (representing recycling) and the denominator (representing recycling plus trash) for each city. In an optimal situation in which we had data on yard waste in the overall waste stream, we would have subtracted yard waste *recycling* from the numerator and yard waste overall (*recycled and disposed of*) from the denominator. However, we did not have access to data on disposed yard waste for most of the other cities. It should be noted that we used this alternate, approximate method uniformly, even for New York for which we had full information. Comparisons using this technique are therefore consistent overall if not entirely accurate for each case.
- ¹⁴ Franklin and Associates, Ltd. *Characterization of Municipal Solid Waste in the United States: 1960 to 2000 (1998 Update)*, March 1998 (Franklin Associates, Ltd.: Prairie Village, KS); Cascadia Consulting Group, Inc. *City of Seattle, Home Organics Waste Management Survey*, March 1996; Metropolitan Service District, Portland, OR. *Metro's Home Composting Demonstration Program*, 1992.

¹⁵ **Yard Waste Percentage Findings for NYC Residential Waste**

Study Year	Population %	Yard Waste	Study Year	Population %	Yard Waste
1989	Citywide	4.10%	1997	Staten Island	16.70%
	Brooklyn	4.00%	1997	Low-recycling rate districts in the Bronx and Brooklyn	0.00%
	Bronx	3.11%			
	Manhattan	1.81%	1997	Suburban-style neighborhoods in the outer boroughs	16.00%
	Queens	7.54%			
	Staten Island	11.19%			

- ¹⁶ Staff. "King County Strives for Recycling Crown," *Recycling Today*, November 2000, pp. 80, 82, 90.
- ¹⁷ Franklin Associates, Ltd. *Solid Waste Management at the Crossroads*, December 1997 (Franklin Associates, Ltd.: Prairie Village, KS).
- ¹⁸ The U.S. rate is for 1997; the New York rate is for 1998, the first full calendar year under the expanded program. Source: Franklin Associates, Ltd. *Municipal Solid Waste Recycling Rates; New York City and the United States; Comparison and Analysis*, June 1999 (Franklin Associates, Ltd.: Prairie Village, KS), pp. 1-2.
- ¹⁹ Telephone interview with Baltimore city recycling office, July 6, 2001.
- ²⁰ Telephone interview with Erin Keane of the City of Chicago, Dept. of the Environment, July 6, 2001.
- ²¹ New York City Department of Sanitation. *Comprehensive Solid Waste Management Plan: Final Update and Plan Modification*, February 15, 1996.
- ²² Franklin Associates, Ltd. *Municipal Solid Waste Recycling Rates; New York City and the United States; Comparison and Analysis*, June 1999 (Franklin Associates, Ltd.: Prairie Village, KS), pp. 1-2.
- ²³ Environmental Protection Agency, *Waste Prevention, Recycling, and Composting Options: Lessons from 30 Communities*, 1992 (EPA530-R-92-015), p. 52.
- ²⁴ Recycling Council of Ontario. *Assessment of Multi-Unit Recycling in Ontario*, August 2000, p. 6.
- ²⁵ Ibid.
- ²⁶ Ibid.
- ²⁷ Katzev, Richard; Blake, Gerald; and Messer, Barry. "Determinants of Participation in Multi-Family Recycling Programs," *Journal of Applied Social Psychology*, 1993, 23, 5, p. 375.
- ²⁸ Ibid.
- ²⁹ Ibid.
- ³⁰ Ibid, p. 374.
- ³¹ Ibid, p. 378.
- ³² City of Portland, Office of Sustainable Development, *Solid Waste and Recycling Division Management Report for 2000 Activities*, April 2001, p. 9.
- ³³ www.cityofseattle.net/util/solidwaste/default.htm.
- ³⁴ Seattle Public Utilities, *1999 Solid Waste Annual Report*, March 2000.
- ³⁵ Seattle Public Utilities, *City of Seattle Residential Solid Waste Services, Request for Proposals*, October 30, 1998.
- ³⁶ Stevens, Barbara. *Multi-Family Recycling: Costs, Diversion, and Program Characteristics*, May 1999 (prepared for US Conference of Mayors/US EPA).
- ³⁷ Boston Neighborhood Recycling Coalition, *Boston Recycling Report*, May 2000, at <http://www.bostonrecycles.org/reportmay00.html>, p. 9.
- ³⁸ Telephone interview with Richard Wozniak of the Los Angeles Bureau of Sanitation, July 30, 2001.
- ³⁹ www.sfrecycles.org/Publications/publications_content/summary.htm, "Recycling Summary."
- ⁴⁰ E-mail communication from Lisa Schiller, Residential and Special Projects Associate, San Francisco Recycling Program, July 30, 2001.
- ⁴¹ E-mail communication from Lisa Schiller, Residential and Special Projects Associate, San Francisco Recycling Program, July 30, 2001.
- ⁴² Skumatz, Lisa (SERA, Inc.), *Quantitative Effects of Program Choices on Recycling and Green Waste Diversion: Beyond Case Studies*; July 1996.
- ⁴³ Ibid, p. 21.
- ⁴⁴ Collier, Peter J. "Applying Social Psychology to Recycling in Multi-Family Apartment Buildings," paper presented at the 64th meeting of the Pacific Sociological Association, Portland, Oregon, April 1993.

- ⁴⁵ Ibid, p. 6.
- ⁴⁶ New York City Department of Sanitation. *A Comprehensive Solid Waste Management Plan for New York City and Final Generic Environmental Impact Statement, Appendix Volume 1.1, Waste Stream Data*, August 1992; New York City Department of Sanitation Operations Planning Evaluation and Control, *New York City Waste Composition Study 1989-1990* (four volumes); HDR Technologies, *Report on Staten Island District 3 Waste Composition Analysis*, June 1997; New York City Department of Sanitation, *Mixed Waste Processing in New York City: A Pilot Test Evaluation*, October 1999; and New York City Department of Sanitation, *Backyard Composting in New York City: A Comprehensive Program Evaluation*, June 1999.
- ⁴⁷ Calculations based on www.cityofseattle.net/util/solidwaste/default.htm, "Solid Waste at a Glance."
- ⁴⁸ Sociological research has shown a tendency of individuals to construct and reinforce their identity as "law abiding citizens" by contrasting themselves with others who they perceive as flouting the law.
- ⁴⁹ "Non-recyclable" of course means here "non-recyclable under NYC's current program." All materials are, in theory, recyclable at some level of technology and cost.
- ⁵⁰ In fact, in its public education material the Department instructs residents to recycle "plastic jugs and bottles" rather than specifying HDPE and PET plastics. This results in the *de facto* recycling of most of the HDPE and PET in the waste stream, while minimizing confusion and possible contamination with plastic items that are typically not made of PET or injection-molded HDPE (which interferes with processing of the more common blow-molded PET). These items include tubs, cups, take-out containers, caps, packaging, piping, hoses, toys, bags, films, cookware, and many other products.
- ⁵¹ www.sfrecycles.org/Publications/publications_content/plastics.htm, "Plastics."
- ⁵² New York City Department of Sanitation. *Recycling: What Do New Yorkers Think?*, Fall 1999, p. 102.
- ⁵³ Seattle Public Utilities, *1999 Solid Waste Annual Report*, March 2000, p. 8.
- ⁵⁴ www.sfrecycles.org.
- ⁵⁵ Macy, Jack. "San Francisco Takes Residential Organics Collection Fullscale," *Biocycle*, February 2000, p. 51.
- ⁵⁶ New York City Department of Sanitation. *Recycling: What Do New Yorkers Think?*, Fall 1999, p. 94.
- ⁵⁷ Cornell Waste Management Institute. *Roundtable Two: Reducing the NYC Waste Stream: The Potential Role for Composting*, April 3, 1999.
- ⁵⁸ Calls to the San Jose recycling bureau were not returned, so we have no data on the effectiveness of this program.
- ⁵⁹ New York City Department of Sanitation, *Recycling: What Do New Yorkers Think?*, op. cit., p. 83.
- ⁶⁰ For details on these initiatives, see: New York City Department of Sanitation, *New York City Recycles: More Than a Decade of Public Education and Outreach by the NYC Department of Sanitation, FY 1986-1999*, Fall 1999.
- ⁶¹ Available online at the Department's website www.nyc.gov/html/dos/home.html.
- ⁶² Miller Freeman. *Pulp & Paper 1999 North American Factbook*, 1998, p. 16. Calculations based on "consumption" (production plus net imports), a measure of domestic use.
- ⁶³ In fact, there is reason to believe that the potential effects of waste prevention are considerably smaller than optimistic predictions of a decade ago, when New York's recycling programs were just getting started. In 1992, the City's first Solid Waste Management Plan estimated that by the year 2000, New York would be achieving a residential waste reduction level of 340,000 tons per year, and an institutional waste reduction level of 23,000 tons. While there is no way to test whether or not this level has been achieved, it is doubtful that New York residents and institutions are "preventing" the creation of this much waste. These estimates—derived before the Department had implemented any of its many material-specific waste prevention programs—were based on an envisioned (but never realized) scenario in which: (1) widespread packaging and other legislation aimed at producers existed throughout the U.S., (2) quantity-based user fees (QBUFs) were imposed on the residential and institutional sectors in New York City, and (3) a host of material-specific programs, implemented at the City, State, or federal level, were in place.
- ⁶⁴ New York City Department of Sanitation. *Comprehensive Solid Waste Management Plan*, August 1992. Volume 4.1, pp. 22-76.

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MUNICIPAL RECYCLING SURVEY

Report comes from information supplied by the largest 30 municipalities in the United States, based on city population, not metropolitan areas

	NEW YORK	LOS ANGELES	CHICAGO	HOUSTON	PHILADELPHIA
Population	7,420,166	3,597,556	2,802,079	1,786,691	1,436,287
Recycling rate (%)	19.7%	40.9%	47.9%	16.0%	32.5%
Calculated for year ended:	June 2000	June 2000	June 2000	December 2000	December 2000
Rate includes: Residential Commercial Other	✓	✓	✓ ✓	✓	✓ ✓
Rates by category: Residential Commercial	19.7% N.A.	40.9% N.A.	26.8% N.A.	16.0% N.A.	6.3% N.A.
Materials included: (See key below) Paper Metal Plastic Glass Bulk Automotive Hazardous Organic Other	NP,OCC,MG,TB,MP,OP ALC,TC,APP PET,HDPE,BVC GCON FRN YARD	NP,OCC,MG,TB,MP,OP ALC,TC,APP PET,HDPE GCON ESRP YARD	NP,OCC,MG,TB,MP,OP ALC,TC PET,HDPE,PB GCON WOOD,CND YARD	NP,OCC,MG,TB,MP,OP ALC,TC,APP PET,HDPE GCON WOOD ABAT,TIRE,OIL HH,FLP YARD	NP,MG,TB,MP ALC,TC GCON TIRE
Total tonnage collected: By city By contracted haulers	749,000 749,000 0	691,870 691,870 0	2,287,708 294,909 1,992,799	66,000 66,000 0	44,794 44,794 0
Tonnage collected per material: Paper Metal Plastic Glass Yard trimmings Other	423,000 305,000 metal, plastic and glass combined 21,000 0	137,499 8,112 2,900 19,224 454,803 69,332	545,499 117,168 2,197 22,741 176,472 1,423,631	15,000 2,450 1,350 350 30,500 16,350	32,314 12,480 metal and plastic combined 0 0 0
Collection methods: <u>Curbside</u> Frequency Number of households Is program mandatory? How are materials collected: Program operated by: <u>Dropoff</u> Number of sites Program operated by: <u>Multifamily dwelling</u> Program operated by: <u>Other</u>	Yes Weekly 3 million Yes Single source City crews Yes 4 City crews Yes City crews None	Yes Weekly 750,000 N.A. Commingled, single source City crews Yes Varies City crews Yes City crews None	Yes Weekly 740,000 No Single source City crews No N.A. N.A. Yes Private haulers None	Yes Biweekly 140,000 No Commingled City crews Yes 11 City crews No N.A. Yard trimmings, weekly, 340,000 households served, operated by city crews and private haulers	Yes Weekly/biweekly 520,000 Yes Single source City crews Yes 3 N.A. Yes City crews, private haulers None
Commercial recycling program offered:	Commercial establishments must recycle and have it collected by private carters	N.A.	Recycling programs mandatory for owners, property managers	N.A.	N.A.
Recycling goals: Mandated goal Nonmandated goal Goals met	3,400 tons per day by 1999 No Yes	50% diversion by 2000 No No	25% by 2001 40% by 2002 Yes	No No N.A.	No 40% by 2002 No
Financial information: Recycling budget Overall solid waste budget Recyclables revenue Amount spent per resident on recycling: Recycling budget percentage of solid waste budget:	\$95,000,000 \$1,000,000,000 \$3,000,000 \$12.80 9.5%	\$80,000,000 \$121,000,000 \$1,729,680 \$22.24 6.6%	N.A. \$144,152,637 \$0 N.A. N.A.	\$6,000,000 \$55,000,000 \$550,000 \$3.36 10.9%	\$10,744,000 \$86,226,000 \$49,608 \$7.48 12.5%
Recycling contact: Title Telephone number Fax number Web site	Steven Lawitts Deputy Commissioner (212) 788-3993 (212) 788-3783 www.nyc.gov/sanitation	John de la Rosa Recycling Manager (213) 473-7930 (213) 473-7945 www.cityofla.org	Erin Keane Recycling Coordinator (312) 744-5918 (312) 744-6451 www.cityofchicago.org	Edward T. Chen Assistant Director (713) 837-9136 (713) 387-9246 www.ci.houston.tx.us/departme/sd/id/recycling.htm	David Robinson Recycling Coordinator (215) 686-5504 (215) 686-5455 www.phila.gov

NOTES: The recycling rate is not a diversion rate and does not include methods such as incineration. Population is based on 1998 figures from the Bureau of the Census, U.S. Commerce Department. N.A. — Not available or not applicable.

MATERIALS KEY: NP—newspaper; OCC—old corrugated containers; MG—magazines; TB—telephone books; MP—mixed paper; OP—office paper; ALC—aluminum cans; TC—tin cans; APP—appliances; PET—polyethylene terephthalate; HDPE—high density polyethylene; PB—plastic bags; BVC—beverage cartons, drink boxes; GCON—glass containers; TEX—textiles; WOOD—wood waste; CND—construction debris; FRN—furniture; AUTO—automobiles; ABAT—automobile batteries; TIRE—tires; OIL—oil, oil filters, grease; FLP—Fluorescent lamps; HH—household hazardous waste; ESRP—electronic scrap; FOOD—food waste; YARD—yard trimmings

MUNICIPAL RECYCLING SURVEY

Report comes from information supplied by the largest 30 municipalities in the United States, based on city population, not metropolitan areas

	SAN DIEGO	PHOENIX	SAN ANTONIO	DALLAS	DETROIT**
Population	1,220,666	1,198,064	1,114,130	1,075,894	970,196
Recycling rate (%)	46.0%	18.0%	26.3%	19.0%	7.2%
Calculated for year ended:	December 1999	June 2000	September 2000	September 2000	December 1998
Rate includes: Residential Commercial Other	✓	✓	✓	✓ Dropoff sites	✓
Rates by category: Residential Commercial	46.0% N.A.	18.0% N.A.	26.3% N.A.	19.0% N.A.	7.2% N.A.
Materials included: (See key below) Paper Metal Plastic Glass Bulk Automotive Hazardous Organic Other	NP,OCC,MG,TB,MP,OP ALC,TC,APP PET,HDPE,PB,BVC GCON TEX,WOOD,CND,FRN AUTO,ABAT,TIRE,OIL HH,ESRP,FLP YARD	NP,OCC,MG,MP,OP ALC,TC,APP PET,HDPE,BVC GCON	NP,TB ALC,TC,APP PET,HDPE GCON WOOD,FRN ABAT,TIRE,OIL HH	NP,MG,MP,OP ALC,TC,APP PET,HDPE GCON Aerosol cans, PVC	NP TC PET,HDPE GCON YARD
Total tonnage collected: By city By contracted haulers	N.A. 62,953 ¹ N.A.	106,970 53,485 53,485	45,408 43,483 1,925	8,387 5,692 2,695	42,649 42,649 0
Tonnage collected per material: Paper Metal Plastic Glass Yard trimmings Other	23,400 604 860 2,424 35,665 0	92,422 5,241 4,493 4,814 N.A. 0	17,953 945 1,877 2,672 N.A. 21,961	6,506 269 229 897 486 0	162 35,578 32 10 6,826 41
Collection methods: <u>Curbside</u> Frequency Number of households Is program mandatory? How are materials collected: Program operated by: <u>Dropoff</u> Number of sites Program operated by: <u>Multifamily dwelling</u> Program operated by: <u>Other</u>	Yes Biweekly 153,000 No Commingled City crews Yes 50 City crews No N.A. None	Yes Weekly 325,000 No Commingled City crews, private haulers Yes 3 City crews, private haulers No N.A. None	Yes Weekly 294,000 No Commingled City crews No N.A. No N.A. Phone books, brush, appliances	Yes Weekly 232,000 No Commingled Private haulers Yes 47 City crews, private haulers No N.A. Office paper	No N.A. N.A. N.A. N.A. N.A. Yes 1 N.A. No N.A. None
Commercial recycling program offered:	Technical assistance	N.A.	N.A.	N.A.	N.A.
Recycling goals: Mandated goal Nonmandated goal Goals met	50% diversion by 2000 No No	No No N.A.	No No N.A.	No No N.A.	No No N.A.
Financial information: Recycling budget Overall solid waste budget Recyclables revenue Amount spent per resident on recycling: Recycling budget percentage of solid waste budget:	\$17,700,875 \$78,229,956 \$391,518 \$14.50 22.6%	\$5,291,345 \$59,047,000 \$6,800,000 \$4.42 9.0%	\$2,563,403 \$42,278,641 \$942,795 \$2.30 6.1%	\$2,116,648 \$43,694,000 N.A. \$1.97 4.8%	N.A. N.A. N.A. N.A. N.A.
Recycling contact: Title Telephone number Fax number Web site	Kip Sturdevan Recycling Program Manager (858) 694-7000 (858) 492-5021 www.sannet.gov	Wanda Wildman Solid Waste Contracts Administrator (602) 262-7949 (602) 534-9864 www.ci.phoenix.az.us/garbage	Stephen Haney Assistant Solid Waste Manager (210) 207-6413 (210) 207-6401 www.ci.sat.tx.us	Jody Puckett Director of Sanitation (214) 670-3555 (214) 670-0198 dallascityhall.org	Michael Brinker General Manager (313) 876-0141 (313) 876-1457 www.ci.detroit.mi.us/dpw

NOTES: The recycling rate is not a diversion rate and does not include methods such as incineration. Population is based on 1998 figures from the Bureau of the Census, U.S. Commerce Department. N.A. — Not available or not applicable.
(1) Tonnage collected by residential program only. ** Detroit did not update information from last year's survey.

MATERIALS KEY: NP—newspaper; OCC—old corrugated containers; MG—magazines; TB—telephone books; MP—mixed paper; OP—office paper; ALC—aluminum cans; TC—tin cans; APP—appliances; PET—polyethylene terephthalate; HDPE—high density polyethylene; PB—plastic bags; BVC—beverage cartons, drink boxes; GCON—glass containers; TEX—textiles; WOOD—wood waste; CND—construction debris; FRN—furniture; AUTO—automobiles; ABAT—automobile batteries; TIRE—tires; OIL—oil, oil filters, grease; FLP—Fluorescent lamps; HH—household hazardous waste; ESRP—electronic scrap; FOOD—food waste; YARD—yard trimmings

MUNICIPAL RECYCLING SURVEY

Report comes from information supplied by the largest 30 municipalities in the United States, based on city population, not metropolitan areas

	SAN JOSE	SAN FRANCISCO	INDIANAPOLIS	JACKSONVILLE	COLUMBUS
Population	861,284	745,774	741,304	693,630	670,234
Recycling rate (%)	47.0%	42.0%	24.0%	39.0%	9.7%
Calculated for year ended:	December 1999	December 1999	December 2000	December 1999	December 1999
Rate includes:					
Residential	✓	✓	✓	✓	✓
Commercial	✓	✓	✓	✓	
Other	Industrial	City government, industrial	✓		
Rates by category:					
Residential	46.0%	N.A.	N.A.	N.A.	9.7%
Commercial	47.0%	N.A.	N.A.	N.A.	N.A.
Materials included: (See key below)					
Paper	NP,OCC,MG,TB,MP,OP	NP,OCC,MG,TB,MP,OP	NP,OCC,MG,TB,MP,OP	NP,OCC,MG,TB,MP,OP	NP,OCC,MG,TB,MP,OP
Metal	ALC,TC,APP	ALC,TC	ALC,TC,APP	ALC,TC,APP	ALC,TC,APP
Plastic	PET,HDPE,PB,BVC	PET,HDPE	PET,HDPE,PB	PET,HDPE	PET,HDPE,BVC
Glass	GCON	GCON	GCON	GCON	GCON
Bulk	TEX,WOOD,CND,FRN		WOOD,CND,FRN	TEX,WOOD,CND	WOOD
Automotive	OIL		OIL	AUTO,TIRE	TIRE
Hazardous	HH		HH		HH
Organic	YARD		YARD	FOOD,YARD	YARD
Other			Batteries		
Total tonnage collected:	214,260'	568,138	29,452'	563,696	34,211
By city	0	0	N.A.	4,213	1,129
By contracted haulers	214,260	568,138	N.A.	559,483	33,082
Tonnage collected per material:					
Paper	62,919	144,317	9,452 paper, metal, plastic, and glass combined	148,096	8,581
Metal	N.A.	18,638		221,436	1,944
Plastic	N.A.	2,659		5,028	1,038
Glass	9,813	22,954		17,453	2,189
Yard trimmings	123,277	12,148	6,000	132,918	20,316
Other	18,251	367,422	14,000	38,765	143
Collection methods:					
Curbside	Yes	Yes	Yes	Yes	Yes
Frequency	Weekly	Weekly	Weekly/Biweekly	Weekly	Weekly
Number of households	N.A.	333,000	220,000	250,000	20,000
Is program mandatory?	No	No	No	Yes	No
How are materials collected:	Commingled, single source	Commingled, single source	Commingled, single source	Commingled	Single source
Program operated by:	Private haulers	Private haulers	City crews, private haulers	City crews, private haulers	Private haulers
Dropoff	Yes	Yes	Yes	Yes	Yes
Number of sites	3	24	28	N.A.	68
Program operated by:	Private haulers	Private haulers	N.A.	Private haulers	Private haulers
Multifamily dwelling	Yes	Yes	No	Yes	Yes
Program operated by:	Private haulers	Private haulers	N.A.	Private haulers	Private haulers
Other	None	Bulky items, oil	None	None	None
Commercial recycling program offered:	Technical assistance, financial incentives	N.A.	N.A.	N.A.	N.A.
Recycling goals:					
Mandated goal	50% diversion by 2000	50% diversion by 2000	No	30% by 1994	No
Nonmandated goal	No	No	No	No	15% diversion by 2005
Goals met	N.A.	N.A.	N.A.	Yes	N.A.
Financial information:					
Recycling budget	N.A.	N.A.	N.A.	N.A.	\$2,506,938
Overall solid waste budget	\$61,000,000	\$3,900,000	N.A.	\$65,325,018	\$33,000,000
Recyclables revenue	N.A.	N.A.	N.A.	\$1,195,839	\$24,172
Amount spent per resident on recycling:	N.A.	N.A.	N.A.	N.A.	\$3.74
Recycling budget percentage of solid waste budget:	N.A.	N.A.	N.A.	N.A.	7.6%
Recycling contact:					
Title	Ellen Ryan Division Manager	Paul Horcher Director of Solid Waste Management Program	Michele Gosnell Contract Compliance Officer	Jackie Eldridge Recycling Coordinator	Gerald Edwards Administrator of Refuse Collection Division
Telephone number	(408) 277-5533	(415) 554-3400	(317) 327-2988	(904) 665-4732	(614) 645-7620
Fax number	(408) 277-3669	(415) 554-3434	(317) 327-2984	(904) 665-4471	(614) 645-7296
Web site	www.sjrecycles.org	www.sfrecycle.org	www.indygov.org	www.coj.net	cityofcolumbus.org

NOTES: The recycling rate is not a diversion rate and does not include methods such as incineration. Population is based on 1998 figures from the Bureau of the Census, U.S. Commerce Department. N.A. — Not available or not applicable.

(1) Tonnage collected by residential program only.

MATERIALS KEY: NP—newspaper; OCC—old corrugated containers; MG—magazines; TB—telephone books; MP—mixed paper; OP—office paper; ALC—aluminum cans; TC—tin cans; APP—appliances; PET—polyethylene terephthalate; HDPE—high density polyethylene; PB—plastic bags; BVC—beverage cartons, drink boxes; GCON—glass containers; TEX—textiles; WOOD—wood waste; CND—construction debris; FRN—furniture; AUTO—automobiles; ABAT—automobile batteries; TIRE—tires; OIL—oil, oil filters, grease; FLP—Fluorescent lamps; HH—household hazardous waste; ESRP—electronic scrap; FOOD—food waste; YARD—yard trimmings

MUNICIPAL RECYCLING SURVEY

Report comes from information supplied by the largest 30 municipalities in the United States, based on city population, not metropolitan areas

	BALTIMORE	EL PASO**	MEMPHIS	MILWAUKEE	BOSTON
Population	645,593	615,032	603,507	578,364	555,447
Recycling rate (%)	35.3%	4.0%	19.9%	28.0%	14.0%
Calculated for year ended:	December 1999	September 1999	June 2000	December 1999	June 2000
Rate includes:					
Residential	✓	✓	✓	✓	✓
Commercial	✓	✓			
Other					
Rates by category:					
Residential	N.A.	N.A.	19.9%	28.0%	14.0%
Commercial	N.A.	N.A.	N.A.	N.A.	N.A.
Materials included: (See key below)					
Paper	NP,OCC,MG,TB,MP,OP	NP,OCC,MG,TB,MP,OP	NP,TB,OP	NP,OCC,MG,TB	NP,OCC,MG,TB,MP,IP
Metal	ALC,TC,APP	ALC,TC,APP	ALC,TC,APP	ALC,TC,APP	ALC,TC,APP
Plastic	PET,HDPE	PET,HDPE,PB,BVC	PET,HDPE	PET,HDPE	PET,HDPE,BVC
Glass	GCON		GCON	GCON	GCON
Bulk	WOOD		WOOD	TEX,WOOD	WOOD
Automotive	AUTO,ABAT,TIRE,OIL	ABAT,TIRE,OIL		ABAT,TIRE,OIL	
Hazardous	HH	HH			
Organic	YARD,FOOD	YARD	YARD	YARD	YARD
Other					PVC, junk mail
Total tonnage collected:	156,936 ¹	13,850	78,808	58,128	42,000
By city	120,478	13,850	78,151	58,128	14,000
By contracted haulers	36,458	0	657	0	28,000
Tonnage collected per material:					
Paper	19,156 ²	3,556	6,039	23,418	15,000
Metal	10,825	347	705	1,501	24,000 paper, metal and glass combined
Plastic	0	180	1,107	1,490	
Glass	44	0	2,214	4,727	
Yard trimmings	6,369	9,333	68,743	23,119	3,000
Other	83,271	434	N.A.	3,873	N.A.
Collection methods:					
<u>Curbside</u>	Yes	No	Yes	Yes	Yes
Frequency	Weekly	N.A.	Weekly	Monthly	Weekly
Number of households	233,000	N.A.	195,000	193,000	250,000
Is program mandatory?	No	N.A.	No	Yes	No
How are materials collected:	Commingled	N.A.	Commingled	Single source	Commingled
Program operated by:	City crews	N.A.	City crews	City crews	Private haulers
<u>Dropoff</u>	Yes	Yes	Yes	Yes	Yes
Number of sites	6	13	1	2	5
Program operated by:	City crews, private haulers	N.A.	City crews	City crews	City crews, private haulers
<u>Multifamily dwelling</u>	No	No	No	No	Yes
Program operated by:	N.A.	N.A.	N.A.	N.A.	Private haulers
<u>Other</u>	None	None	None	None	None
Commercial recycling program offered:	N.A.	N.A.	N.A.	N.A.	N.A.
Recycling goals:					
Mandated goal	20%	N.A.	No	106 lbs. per person annually	No
Nonmandated goal	No	N.A.	25% reduction annually	No	40,000 tons by 2005
Goals met	Yes	N.A.	Yes	Yes	N.A.
Financial information:					
Recycling budget	\$900,000	\$767,943	\$1,500,000	\$9,000,000	\$2,200,000
Overall solid waste budget	\$55,000,000	\$24,686,395	\$42,000,000	\$32,000,000	\$26,000,000
Recyclables revenue	N.A.	\$117,063	\$370,000	0	N.A.
Amount spent per resident on recycling:	\$1.39	\$1.25	\$2.49	\$15.56	\$3.96
Recycling budget percentage of solid waste budget:	1.6%	3.1%	3.6%	28.1%	8.5%
Recycling contact:					
Title	S. Dale Thompson Recycling Coordinator	Richard Razo Recycling Coordinator	Andy Ashford Administrator of Recycling & Composting	Mike Engelbart Resource Recovery Manager	Susan Cascino Recycling Director
Telephone number	(410) 396-5918	(915) 621-6720	(901) 576-6900	(414) 286-2355	(617) 635-4959
Fax number	(410) 396-2964	(915) 621-6711	(901) 576-6879	(414) 286-3344	(617) 635-3481
Web site	www.ci.baltimore.md.us	www.ci.el-paso.tx.us	www.memphiswaste.org	www.ci.mil.wi.us	www.ci.boston.ma.us

NOTES: The recycling rate is not a diversion rate and does not include methods such as incineration. Population is based on 1998 figures from the Bureau of the Census, U.S. Commerce Department. N.A. — Not available, or not applicable. (1) Tonnage collected by residential program only. (2) Baltimore included only curbside collection in its figures for tonnage collected per material. (3) Boston's nonmandated goal includes 10,000 tons of yard waste and 30,000 tons from curbside recycling. ** El Paso did not update information from last year's survey.

MATERIALS KEY: NP—newspaper; OCC—old corrugated containers; MG—magazines; TB—telephone books; MP—mixed paper; OP—office paper; ALC—aluminum cans; TC—tin cans; APP—appliances; PET—polyethylene terephthalate; HDPE—high density polyethylene; PB—plastic bags; BVC—beverage cartons, drink boxes; GCON—glass containers; TEX—textiles; WOOD—wood waste; CND—construction debris; FRN—furniture; AUTO—automobiles; ABAT—automobile batteries; TIRE—tires; OIL—oil, oil filters, grease; FLP—Fluorescent lamps; HH—household hazardous waste; ESRP—electronic scrap; FOOD—food waste; YARD—yard trimmings

MUNICIPAL RECYCLING SURVEY

Report comes from information supplied by the largest 30 municipalities in the United States, based on city population, not metropolitan areas

	AUSTIN	SEATTLE	WASHINGTON	NASHVILLE	CHARLOTTE
Population	552,434	536,978	523,124	510,274	504,637
Recycling rate (%)	28.5%	52.0%	17.0%	8.0%	24.0%
Calculated for year ended:	September 2000	December 1999	September 2000	June 2000	June 2000
Rate includes: Residential Commercial Other	✓	✓ ✓	✓	✓	✓
Rates by category: Residential Commercial	28.5% N.A.	57.0% 45.0%	17.0% N.A.	8.0% N.A.	24.0% N.A.
Materials included: (See key below) Paper Metal Plastic Glass Bulk Automotive Hazardous Organic Other	NP,OCC,MG,OP ALC,TC PET,HDPE GCON YARD	NP,OCC,MG,TB,MP,OP ALC,TC PET,HDPE,PB,3VC GCON WOOD YARD	NP,OCC,MG,TB,OP ALC,TC PET,HDPE GCON YARD	NP,OCC,MG,TB,MP,OP ALC,TC,APP PET,HDPE GCON WOOD,FRN YARD	NP,OCC,MG,TB ALC,TC,APP PET,HDPE GCON WOOD,CND TIRE YARD
Total tonnage collected: By city By contracted haulers	47,180 47,180 0	102,500 0 102,500	21,706 0 21,706	73,305 68,505 4,800	70,739 70,739 0
Tonnage collected per material: Paper Metal Plastic Glass Yard trimmings Other	22,105 1,105 809 3,458 16,686 3,017	46,800 2,300 700 13,000 39,700 0	15,045 473 672 3,673 0 1,843	N.A. N.A. N.A. N.A. N.A. N.A.	26,888 paper, metal, plastic and glass combined 32,231 11,620
Collection methods: <u>Curbside</u> Frequency Number of households Is program mandatory? How are materials collected: Program operated by: <u>Dropoff</u> Number of sites Program operated by: <u>Multifamily dwelling</u> Program operated by: <u>Other</u>	Yes Weekly 136,200 N.A. Commingled City crews No N.A. N.A. No N.A. None	Yes Biweekly 160,000 No Commingled Private haulers No N.A. N.A. Yes Private haulers None	Yes Weekly 110,000 Yes N.A. N.A. No N.A. N.A. No N.A. None	Yes Weekly 19,000 N.A. Commingled City crews Yes N.A. City crews, private haulers No N.A. Wood mulch, metal	Yes Weekly N.A. N.A. N.A. City crews No N.A. N.A. Yes City crews, private haulers None
Commercial recycling program offered:	Limited to small business	N.A.	N.A.	N.A.	N.A.
Recycling goals: Mandated goal Nonmandated goal Goals met	No 40% No	No 60% by 2006 N.A.	45% by 2000 No No	No 25% diversion by 2004 N.A.	No 40% diversion by 2001 N.A.
Financial information: Recycling budget Overall solid waste budget Recyclables revenue Amount spent per resident on recycling: Recycling budget percentage of solid waste budget:	\$3,431,487 \$47,900,000 \$1,677,960 \$6.21 7.2%	\$6,200,000 \$88,500,000 N.A. \$11.55 7.0%	\$4,000,000 \$40,000,000 N.A. \$7.65 10.0%	\$1,969,947 \$26,330,021 49,375 \$3.86 7.5%	N.A. \$29,000,000 N.A. N.A. N.A.
Recycling contact: Title Telephone number Fax number Web site	William Rhodes Director of Solid Waste Services (512) 499-1943 (512) 499-1999 www.austinrecycles.com	Ed Steyh SPU Contract Manager, Solid Waste and Recycling (206) 684-5851 (206) 684-4631 www.ci.seattle.wa.us	William Easley Program Monitor (202) 727-1000 (202) 645-5066 www.publicworks.co.washington.dc.us	Chace Anderson Director of Division of Waste Management (615) 862-8727 (615) 862-8727 www.nashville.org	Walter Abernathy Division Manager (704) 336-4213 (704) 336-8015 www.ci.charlotte.nc.us/ciswaste

NOTES: The recycling rate is not a diversion rate and does not include methods such as incineration. Population is based on 1998 figures from the Bureau of the Census, U.S. Commerce Department. N.A. — Not available or not applicable.

MATERIALS KEY: NP—newsprint; OCC—old corrugated containers; MG—magazines; TB—telephone books; MP—mixed paper; OP—office paper; ALC—aluminum cans; TC—tin cans; APP—appliances; PET—polyethylene terephthalate; HDPE—high density polyethylene; PB—plastic bags; BVC—beverage cartons, drink boxes; GCON—glass containers; TEX—textiles; WOOD—wood waste; CND—construction debris; FRN—furniture; AUTO—automobiles; ABAT—automobile batteries; TIRE—tires; OIL—oil, oil filters, grease; FLP—Fluorescent lamps; HH—household hazardous waste; ESRP—electronic scrap; FOOD—food waste; YARD—yard trimmings

MUNICIPAL RECYCLING SURVEY

Report comes from information supplied by the largest 30 municipalities in the United States, based on city population, not metropolitan areas

	PORTLAND	DENVER	CLEVELAND	FORT WORTH	OKLAHOMA CITY
Population	503,891	499,055	495,817	491,801	472,221
Recycling rate (%)	53.6%	7.5%	2.0%	7.2%	23.6%
Calculated for year ended:	December 1999		December 2000	September 2000	June 2000
Rate includes:					
Residential	✓	✓	✓	✓	✓
Commercial	✓				
Other					
Rates by category:					
Residential	52.2%	7.5%	2.0%	7.2%	23.6%
Commercial	53.9%				
Materials included: (See key below)					
Paper	NP,OCC,MG,TB,MP,OP	NP	NP,OCC,TB	NP,OCC,MG,TB,OP	NP,MG
Metal	ALC,TC	ALC,TC	ALC,TC	ALC,TC	ALC,TC
Plastic	PET,HDPE,PB,BVC	PET,HDPE	PET,HDPE	PET,HDPE	PET,HDPE
Glass	GCON	GCON	GCON	GCON	GCON
Bulk	WOOD				
Automotive	OIL				
Hazardous					
Organic	YARD	YARD			
Other					
Total tonnage collected:					
By city	571,000	17,511	6,000	19,511	10,000
By contracted haulers	0	17,511	6,000	0	0
	571,000	0	0	19,511	10,000
Tonnage collected per material:					
Paper	N.A.	12,909	N.A.	13,635	7,400
Metal	N.A.	511	N.A.	1,405	600
Plastic	N.A.	339	N.A.	1,405	1,000
Glass	N.A.	3,227	N.A.	3,066	1,000
Yard trimmings	N.A.	270	N.A.	0	0
Other	N.A.	255	N.A.	0	0
Collection methods:					
<u>Curbside</u>	Yes	Yes	Yes	Yes	Yes
Frequency	Weekly	Biweekly	Weekly	Weekly	Weekly
Number of households	134,000	148,000	151,000	142,000	144,000
Is program mandatory?	N.A.	No	No	No	No
How are materials collected:	Commingled	Single source	Commingled	Commingled	Commingled
Program operated by:	Private haulers	City crews	City crews	Private haulers	Private haulers
<u>Dropoff</u>	Yes	Yes	Yes	Yes	Yes
Number of sites	10	N.A.	13	1	2
Program operated by:	Private haulers	Private haulers	City crews	City crews	City crews, private haulers
<u>Multifamily dwelling</u>	Yes	Yes	No	No	No
Program operated by:	Private haulers	Private haulers	N.A.	N.A.	N.A.
<u>Other</u>	Multimaterial nonresidential	Leaf, Xmas tree, household hazardous waste, composting	None	None	None
Commercial recycling program offered:	N.A.	N.A.	N.A.	N.A.	N.A.
Recycling goals:					
Mandated goal	54% by 2000	No	No	No	No
Nonmandated goal	No	No	10% annual tonnage increase	N.A.	25% by 2001
Goals met	N.A.	N.A.	No	N.A.	N.A.
Financial information:					
Recycling budget	\$3,200,000	\$1,900,000	\$175,983	N.A.	\$2,699,706
Overall solid waste budget	N.A.	\$18,000,000	\$27,800,000	\$23,227,496	\$26,187,000
Recyclables revenue	\$624,000	\$780,981	\$1.16	N.A.	0
Amount spent per resident on recycling:	\$6.35	\$3.81	\$0.35	N.A.	\$5.72
Recycling budget percentage of solid waste budget:	N.A.	10.6%	0.6%	N.A.	10.3%
Recycling contact:					
Title	Bruce Walker, Lee Barrett Recycling Program Managers	Sue Cobb Recycling Coordinator	Ken Johnson Assistant Commissioner	Sandra Barba Public Education, Program Coordinator	Charles Lombardy Unit Operations Leader
Telephone number	(503) 823-7772	(303) 640-1675	(216) 664-3711	(817) 871-5150	(405) 749-3092
Fax number	(503) 823-4562	(303) 640-3616	(216) 664-2655	(817) 871-5193	(405) 755-8946
Web site	wasteinfo@bes.ci.portland.or.us	www.denvergov.org/ DenverRecycles	www.cityofcleveland.org	www.ci.fort-worth.tx.us	www.okc-cityhall.org

NOTES: The recycling rate is not a diversion rate and does not include methods such as incineration. Population is based on 1998 figures from the Bureau of the Census, U.S. Commerce Department. N.A. — Not available or not applicable.

MATERIALS KEY: NP—newspaper; OCC—old corrugated containers; MG—magazines; TB—telephone books; MP—mixed paper; OP—office paper; ALC—aluminum cans; TC—tin cans; APP—appliances; PET—polyethylene terephthalate; HDPE—high density polyethylene; PB—plastic bags; BVC—beverage cartons, drink boxes; GCON—glass containers; TEX—textiles; WOOD—wood waste; CND—construction debris; FRN—furniture; AUTO—automobiles; ABAT—automobile batteries; TIRE—tires; OIL—oil, oil filters, grease; FLP—Fluorescent lamps; HH—household hazardous waste; ESRP—electronic scrap; FOOD—food waste; YARD—yard trimmings

Title 16 Sanitation

Chapter 2 Solid Waste Management

§ 16-201 Facility assignment.

a. The commissioner is authorized and empowered to promulgate regulations and procedures for the management on a city-wide basis of all solid waste generated or disposed of within the city and to supervise and regulate the transportation and disposition of all solid waste generated or disposed of within the city pursuant to the standards established herein, provided that no regulations shall abridge, impair or restrict any bona fide firm contracts for the purchase or delivery of solid waste for resource recovery entered into between private parties prior to the date at which final notice of regulations is filed with the city clerk, and that any such regulations are accompanied by a justification of such regulations that demonstrates either:

(1) That regulating privately collected solid waste or a portion of such waste, whether by waste origin, destination, type or by any other reasonable basis will, in the opinion of the commissioner, help facilitate the construction, expansion, rehabilitation or operation, by or for the city, of a solid waste recovery and management facility, or will help the city discharge its responsibilities with respect to the management, including transportation and disposition, on a city-wide basis, of all solid waste generated or disposed of within the city, or

(2) That a declaration of imminent peril to the public health has been authorized by the board of health and such situation can be addressed or prevented by regulating the disposal of privately collected waste.

b. The commissioner may assign to persons who collect or dispose of solid waste a solid waste recovery and management facility or facilities at which such persons shall deliver such waste. The commissioner may assign days and hours when such persons shall use such facilities, and may limit or prohibit collection truck traffic on particular streets or limit such traffic to certain hours of the day.

c. The commissioner shall weigh as one critical consideration in his ultimate determination of specific site assignments for disposal, the minimization of solid waste disposal vehicle traffic and transportation cost on city streets and roadways.

d. The commissioner shall further consider the following objectives in determining facility assignments:

(1) meeting the daily operating capacity requirements of each resource recovery facility and minimizing overloading of facilities;

(2) extending the useful life of existing municipal landfills;

(3) ensuring the economic viability of resource recovery facilities processing waste generated within the city;

(4) ensuring that unacceptable wastes do not enter facilities;

(5) meeting any contractual obligations required under any resolution or resolutions authorizing the issuance of bonds for solid waste recovery and management facilities, or entered into pursuant to chapter five hundred sixty of the laws of nineteen hundred eighty;

(6) achieving uniform deliveries and minimizing congestion and dumping delays at facilities.

e. The commissioner shall exercise due diligence in notifying each person assigned to a facility of a scheduled closing of such facility by certified mail at least seventy-two hours prior to such closing. Such notification shall include the expected duration of the closing and assignments to alternative facilities and days and times of such assignments.

f. The commissioner shall exercise due diligence in notifying persons assigned to a facility of an emergency closing of a facility or any emergency during which facilities are not available. Unless the commissioner provides alternative facilities persons assigned to a closed or unavailable facility may arrange alternative means of disposal during the closing or unavailability of such facilities.

§ 16-202 Waste acceptability.

a. The commissioner shall promulgate a list of facilities and solid wastes accepted and not accepted at each such facility.

(b) Solid wastes not acceptable at certain or all facilities may include, but need not be limited to, the following:

(1) solid wastes that may adversely affect the health or safety of facility employees or damage facility equipment;

(2) wastes designated as hazardous wastes pursuant to the federal resource conservation and recovery act of 1976, as amended, and regulations promulgated pursuant thereto and titles seven and nine of article twenty-seven of the New York environmental conservation law and regulations promulgated pursuant thereto;

(3) wastes designated as hazardous air pollutants pursuant to section one hundred twelve of the federal clean air act, as amended, and regulations promulgated pursuant to such act;

(4) sewage sludge or containerized or free liquids;

(5) bulk wastes of a size or dimension too cumbersome for efficient burning at incinerators or resource recovery facilities;

(6) any and all classes of regulated medical waste or other medical waste as defined in section 16 - 120.1 provided that such list be consistent with such section.

§ 16-203 Charges.

a. The rates for use of facilities provided by or for the department shall be fixed by the board of estimate upon the recommendation of the commissioner, who shall require persons assigned to such facilities to pay such rates.

b. The rates shall be sufficient, when added to other waste disposal and resource recovery revenues and to the value to the department of its proportionate use of all facilities comprising the solid waste management system of the city, as determined by the commissioner, to provide for all expenses of transportation, land acquisition, construction, equipment, operations including enforcement, administrative and insurance costs, maintenance, expansion, replacement, financing and reasonable reserves therefore and any other costs that may be required for the financing or completion of facilities, equipment or land to be used for furnishing solid waste management services. The commissioner may from time to time recommend and the board of estimate may prescribe changes in rates, provided that such changes shall be based on changes in the cost of furnishing solid waste management services.

c. The rate for each facility may be fixed so as to vary according to volume, location of facility assignment, or weight, type, character or difficulty of storing, processing or disposing of the solid waste, or other factors relating to economic efficiency or allocation of resources and may not

discriminate between classes of users. The commissioner shall state the basis for establishing such varying rates in the commissioner's recommendations to the board of estimate.

d. The commissioner shall notify by mail all persons assigned to use facilities of the first meeting of the board of estimate at which any resolution fixing or changing such rates is scheduled to be considered. Such notice shall be mailed at least thirty days prior to such board of estimate meeting and shall include the proposed rates or rate changes. Failure to provide such notice shall not affect the validity of such rates.

e. The commissioner may collect charges in such manner as he determines shall minimize burdens and costs of the department, provided that the commissioner shall also consider burdens and costs of persons assigned to facilities.

§ 16-204 Recordkeeping and filing requirements.

Each person assigned to a facility or facilities shall submit to the commissioner an annual report on such date as the commissioner shall determine, in a form established by the commissioner, which provides information required by the commissioner to plan, develop, maintain and operate facilities and provide waste management services. Such information shall include but not be limited to daily solid waste volumes and general composition or character of wastes by each vehicle route to and from facilities.

§ 16-205 Variances.

a. There shall be in the department a solid waste management board consisting of the commissioner, the commissioner of consumer affairs and the executive director of the office for economic development, all of whom shall serve on the board without compensation and all of whom shall have the power to exercise or delegate any of their functions, powers and duties as members of the board. Such board may grant variances from a regulation or modify assignments or rates of the commissioner involving the transportation, storage, processing or disposal of solid waste when such board finds that such regulation or order would impose unreasonable economic hardship. The specific terms of any variance granted shall be determined by such board on a case by case basis. Any person seeking a variance shall do so by filing with such board a petition for variance in a form prescribed by such board. Such forms shall document the need for a variance.

b. Exemptions from formal variance request procedures may be made for day-to-day operational hardships such as equipment failure. The commissioner may grant temporary facility and time assignment variances to persons who report such hardships to the commissioner. Proof of hardship must be submitted to the commissioner within the time frame set by the commissioner. Subsequent exemptions may be withheld for failing to submit proof of hardship for any prior request.

§ 16-206 Enforcement proceedings.

a. The commissioner shall issue a notice of violation returnable to the environmental control board to any person violating a provision of this chapter or any regulation promulgated by the commissioner pursuant to this chapter.

b. The environmental control board shall impose penalties as provided in subdivisions c and d.

c. Each violation, whether committed on the same or a subsequent date, shall be deemed a separate violation and be punishable by a penalty.

SCHEDULE OF PENALTIES FOR SPECIFIC VIOLATIONS

Failure to submit accurate and timely annual report pursuant to section 16-204 up to \$ 1,000.00

Use of restricted streets or use of streets during restricted time periods as established pursuant to section 16-201 up to \$ 100.00

Delivery of waste to an unauthorized facility in violation of assignments made pursuant to section 16-201 up to \$ 300.00

Delivery to a specific facility of waste classified as unacceptable for that facility in violation of regulations promulgated pursuant to section 16-202 up to \$ 300.00

Delivery to a specific facility of waste classified as unacceptable which may have an adverse effect on the health and safety of facility employees or which may damage equipment in violation of regulations promulgated pursuant to section 16-202 up to \$ 10,000.00

Delivery of waste classified as hazardous in violation of regulations promulgated pursuant to section 16-202 up to \$ 10,000.00

Delivery of waste classified as regulated medical waste or other medical waste in violation of regulations promulgated pursuant to section 16-202 up to \$ 10,000.00

d. Violations not listed in subdivision c may be punishable as determined by the environmental control board by a penalty not to exceed ten thousand dollars.

e. Any person violating a provision of this chapter or any regulation promulgated by the commissioner pursuant to this chapter shall also be liable for any costs or expenses that may be incurred by the city as a result of such violation.

§ 16-207 Regulations.

a. The commissioner, upon the recommendation of the solid waste management board and upon the approval of the board of estimate, may exempt that portion of privately collected solid waste from all or some provisions of any regulations for such period of time as is necessary and appropriate up to forty years, if the regulation of that solid waste will materially and adversely interfere with the development, financing or operation of any resource recovery facility owned or operated or being developed privately. Any person seeking an exemption shall do so by filing with the solid waste management board a petition for exemption in a form prescribed by such board. Such form shall document the need for an exemption. The effective date of any exemptions granted may be withheld until a bona fide, firm, long-term contract has been executed for delivery

of such solid waste to a safe and reliable facility and copy of such contract has been received by the solid waste management board.

b. In the event that any resource recovery facility owned or operated privately fails to adequately process or dispose of solid waste and such facility does not provide for alternate storage, processing or disposal, the privately collected solid waste exempted from regulation and not disposed by the facility may be made subject to any regulation for which it had been exempted.

c.

(1) Nothing herein shall be construed to prohibit or limit private collectors from extracting from the waste they collect materials that have value to such collectors for the purposes of recycling, reuse or resale.

(2) Any regulations promulgated shall not limit the amount or type of solid waste utilized by any person for the purposes of composting, materials recovery from solid waste, or operation of a recycling center.

d. Such regulations shall make reasonable accommodation to permit persons to deliver solid waste to recycling facilities or permitted transfer facilities for the sole purpose of materials reclamation or volume reduction, provided, however, that nothing contained herein shall materially impair the authority of the commissioner to enforce the regulation of the residual solid waste resulting from such reclamation or volume reduction activities in accordance with this chapter.

§ 16-208 Publication of regulations.

Notwithstanding any inconsistent provisions of section eleven hundred five of the charter, the regulations promulgated pursuant to this chapter shall be promulgated pursuant to the procedures set forth in this section. The commissioner shall:

a. publish notice of the proposed regulations in at least two newspapers of general circulation, the city record, and at least one industry journal:

b. allow a sixty day period to receive comments on such proposed regulations and an additional ten days to review such comments before publishing a final notice of such regulations:

c. at least one hundred eighty days prior to the effective date of such regulations, submit to the city clerk final notice of such regulations, together with a set of the comments filed pursuant to this section, findings related to material substantive elements in such comments, and a justification for the necessity of such regulations; and

d. amend such regulations pursuant to section eleven hundred five of the charter.

§ 16-209 Definitions. As used in this title:

a. "Solid waste" means all materials or substances discarded or rejected as being spent, useless, or worthless, including but not limited to garbage, refuse, industrial and commercial waste, sludges from air or water pollution control facilities or water supply treatment facilities, rubbish, ashes, contained gaseous material, incinerator residue, demolition and construction debris and offal, but not including sewage and other highly diluted water-carried materials or substances and those in gaseous forms.

b. "Solid waste recovery and management facility" or "facility" means any facility, plant, works, system, building, structure, improvement, machinery, equipment, fixture or other real or personal property which is to be used, occupied or employed beyond the initial solid waste collection process for the storage, processing, or disposal of solid waste or the recovery by any means of any material or energy product or resource therefrom including but not limited to recycling

centers, transfer stations, baling facilities, rail haul or barge haul facilities, processing systems, resource recovery facilities or other facilities for reducing solid waste volume, sanitary landfills, plants and facilities for compacting, composting or pyrolyzation of solid wastes, incinerators, and other solid waste disposal, reduction or conversion facilities. For the purpose of this title, solid waste recovery and management facilities include solid waste recovery and management projects as defined in subdivision two of section 51-0903 of the environmental conservation law.

c. "Person" means any governmental body, except the city of New York, public corporation or authority, private corporation, partnership or individual engaged in the business of removing, disposing of, conveying or transporting upon the streets, public places or bridges, or over the ferries in the city of solid waste.

Chapter 3

Solid Waste Recycling

Subchapter 1

Short Title, Policy and Definitions

§ 16-301 Short title.

This chapter shall be known and may be cited as the “New York City Recycling Law.”

§ 16-302 Declaration of policy.

It is hereby declared to be the public policy of the city to reduce environmental pollution and dangers to health, to decrease the demand for scarce landfill space, to minimize the size and cost of the proposed resource recovery program, and to encourage the conservation of valuable natural resources and energy. It is the policy of the city to promote the recovery of materials from the New York city solid waste stream for the purpose of recycling such materials and returning them to the economy. This chapter shall be liberally construed in order to effectuate the purposes set forth in this section.

§ 16-303 Definitions.

When used in this chapter:

- a. “Buy-back center” means a recycling center that purchases and may otherwise accept recyclable materials from the public for the purpose of recycling such materials.
- b. “Department-collected solid waste” means all solid waste that the department and its contractors collect and all solid waste that the department receives for free disposal.
- c. “Department-disposed of solid waste” means all solid waste, including department-collected solid waste, disposed of at a department landfill, incinerator, resource recovery facility or other waste disposal facility owned, operated or used by the department.
- d. “Drop-off center” means a recycling center that accepts and may otherwise purchase recyclable materials from the public for the purpose of recycling such materials.
- e. “Household” means a single dwelling or a residential unit within a multiple dwelling, hotel, motel, campsite, ranger station, public or private recreation area, or other residence.
- f. “Post-collection separation” means the dividing of solid waste into some or all of its component parts after the point of collection.
- g. “Post-consumer material” means only those products generated by a business or a consumer which have served their intended end uses, and which have been separated or diverted from solid waste for the purposes of collection, recycling and disposition.
- h. “Private carter” means any person required to be licensed or permitted pursuant to subchapter eighteen of chapter two of title twenty of this code.
- i. “Recyclable materials” means solid waste that may be separated, collected, processed, marketed and returned to the economy in the form of raw materials or products, including but not limited to types of metal, glass, paper, plastic, food waste, tires and yard waste.
- j. “Recycled” or “recycling” means any process by which recyclable materials are separated, collected, processed, marketed and returned to the economy in the form of raw materials or products.
- k. “Recycling center” means any facility operated to facilitate the separation, collection, processing or marketing of recyclable materials for reuse or sale.

- l. “Recycling district” means any borough or smaller geographic area the commissioner deems appropriate for the purpose of implementing this chapter.
- m. “Secondary material” means any material recovered from or otherwise destined for the waste stream, including but not limited to, postconsumer material, industrial scrap material and overstock or obsolete inventories from distributors, wholesalers and other companies, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process.
- n. “Solid waste” means all putrescible and non-putrescible materials or substances, except as described in paragraph three of this subdivision, that are discarded or rejected as being spent, useless, worthless or in excess to the owners at the time of such discard or rejection, including but not limited to garbage, refuse, industrial and commercial waste, rubbish, tires, ashes, contained gaseous material, incinerator residue, construction and demolition debris, discarded automobiles and offal.

1. A material is discarded if it is abandoned by being:
 - i. disposed of;
 - ii. burned or incinerated, including being burned as a fuel for the purpose of recovering useable energy; or
 - iii. accumulated, stored, or physically, chemically or biologically treated (other than burned or incinerated) instead of or before being disposed of.
2. A material is disposed of if it is discharged, deposited, injected, dumped, spilled, leaked, or placed into or on any land or water so that such material or any constituent thereof may enter the environment or be emitted into the air or discharged into groundwater or surface water.
3. The following are not solid waste for the purpose of this chapter:
 - i. domestic sewage;
 - ii. any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly owned treatment works for treatment, except any material that is introduced into such system in order to avoid the provisions of this chapter or the state regulations promulgated to regulate solid waste management facilities pursuant to 6 NYCRR Part 360;
 - iii. industrial wastewater discharges that are actual point source discharges subject to permits under article seventeen of the environmental conservation law; industrial wastewaters while they are being collected, stored, or treated before discharge and sludges that are generated by industrial wastewater treatment are solid wastes;
 - iv. irrigation return flows;
 - v. radioactive materials that are source, special nuclear, or by-product material as defined by the Atomic Energy Act of 1954, as amended, 42 U.S.C. § 2011 et seq.
 - vi. materials subject to in-situ mining techniques which are not removed from the ground as part of the extraction process;
 - vii. hazardous waste as defined in section 27-0901 of the environmental conservation law; and
 - viii. regulated medical waste or other medical waste as described in section 16-120.1 of this title.
- o. “Source separation” means the dividing of solid waste into some or all of its component parts at the point of generation.
- p. “Yard waste” means leaves, grass clippings, garden debris, vegetative residue that is recognizable as part of a plant or vegetable, small or chipped branches, and similar material.

Subchapter 2

Citywide Recycling Program

§ 16-304 Department-disposed of solid waste.

The commissioner shall within nine months of the effective date of this chapter establish and implement programs to ensure that the amount of department-disposed of solid waste is reduced or recycled by at least:

- a. one thousand four hundred thirty tons per day by the end of the first year following the enactment date of this chapter and during the year thereafter;
- b. two thousand eight hundred seventy tons per day by the end of the second year following the enactment date of this chapter and during the year thereafter;
- c. four thousand three hundred tons per day by the end of the third year following the enactment date of this chapter and during the year thereafter;
- d. five thousand seven hundred forty tons per day by the end of the fourth year following the enactment date of this chapter and during the year thereafter; and
- e. seven thousand one hundred eighty tons per day by the end of the fifth year following the enactment date of this chapter and during the year thereafter.

These programs may be designed to increase private sector or residential recycling, to increase the return and recycling of containers under the New York State returnable container law, to implement waste reduction or reuse measures, or to export waste for the purpose of recycling. The waste reduction and recycling requirements of this section shall include all the solid waste that is recycled pursuant to the recycling requirements of section 16-305 of this chapter, but shall not include the reduction or recycling of ash or residue from resource recovery facilities, or the reduction or recycling of sludges from air or water treatment facilities. For the purpose of this section, "day" shall mean each working day in a three hundred sixty-five day calendar year. Should the level of recycling exceed the minimum quantities required in this section, the council may review the original mandate and increase the minimum requirements.

§ 16-305 Department-collected solid waste.

- a. The commissioner shall, within nine months of the effective date of this chapter, adopt and implement regulations designating at least six recyclable materials, including yard waste to the extent required in section 16-308 of this chapter, contained in department-collected solid waste and requiring households to source separate the designated materials to ensure that the department and its contractors recycle at least:
 1. seven hundred tons per day by the end of the first year following the enactment date of this chapter and during the year thereafter;
 2. one thousand four hundred tons per day by the end of the second year following the enactment date of this chapter and during the year thereafter;
 3. two thousand one hundred tons per day by the end of the third year following the enactment date of this chapter and during the year thereafter;
 4. three thousand four hundred tons per day by the end of the fourth year following the enactment date of this chapter and during the year thereafter; and
 5. four thousand two hundred fifty tons per day by the end of the fifth year following the enactment date of this chapter and during the year thereafter.

At the start of the second, third, fourth and fifth years following the enactment date of this chapter, the tonnage requirements of this section shall be increased by the average annual percentage increase in solid waste that the department and its contractors collected from households and institutions and solid waste that the department received for free disposal in the two previous consecutive fiscal years. The solid waste that the department and its contractors are required to recycle pursuant to this subdivision shall include department -collected solid waste recycled pursuant to this subdivision, city agency waste recycled pursuant to section 16-307, yard waste collected by the department and composted pursuant to section 16-308, Christmas trees collected by the department and composted or recycled pursuant to section 16-309, and batteries and tires collected pursuant to section 16-310 that are recycled, but shall not include containers returned pursuant to the New York State returnable container law, commercial solid waste removed and recycled by private carters, reduction or recycling of ash or residue from resource recovery facilities, or reduction or recycling of sludges from air or water treatment facilities. For the purpose of this subdivision, "day" shall mean each working day in a three hundred sixty -five day calendar year. Should the level of recycling exceed the minimum quantities r equired in this subdivision, the council may review the original mandate and increase the minimum requirements.

b. The commissioner shall, within nine months of the effective date of this chapter, adopt and implement regulations establishing procedures requiring the placement of the designated materials at the curbside, in specialized containers, or in any other manner the commissioner determines, to facilitate the collection of such materials in a manner that enables them to be recycled.

c. The commissioner may stagger the source separation and collection of the designated recyclable materials, with the exception of yard waste, provided that the recycling of the materials that are source separated and collected shall be sufficient to achieve the recycling levels required in this section, and that all the designated materials shall be source separated and collected within four and one-half years of the effective date of this chapter.

d. In establishing the schedule by which residential source separation shall commence, the commissioner may stagger the commencement dates for different recycling districts. Any such staggered schedule shall provide that at least one-third of all households shall be subject to source separation within one year of the effective date of this chapter; at least two-thirds of all households shall be subject to source separation within three years of the effective date of this chapter; and all households shall be subject to source separation within four and one -half years of the effective date of this chapter.

e. Within any recycling district, the commissioner may exempt residential generators from the source separation requirement of this section if the department employs alternative recycling methods, including but not limited to the use of buy-back centers, drop-off centers, or post-collection separation devices, provided that participation in any alternative methods is sufficient to achieve for the recycling district a percentage of the recycling requirement in this section at least equal to the percent of the citywide department -collected solid waste that is collected within the district. The commissioner shall not exempt residential generators from the source separation requirement of this section unless he or she determines that for the recycling district source separation cannot otherwise achieve the recycling levels required in this section.

f. Where the department provides solid waste collection services to a building containing nine or more dwelling units, the commissioner shall, within nine months of the effective date of this chapter, adopt and implement regulations requiring the owner, net lessee or person in charge of such building to:

1. provide for the residents a designated area and, where appropriate, containers in which to accumulate the source separated or other designated recyclable materials to be collected by the department;
2. notify all residents of the requirements of this chapter and the regulations promulgated pursuant thereto; and
3. remove non-designated materials from the containers of designated source separated recyclable materials before such containers are placed at the curbside for collection and ensure that the designated materials are placed at the curbside in the manner prescribed by the department.

With respect to solid waste generated by households in the aforesaid buildings, the obligations of an owner or a net lessee under this local law shall be limited to those set forth in this subdivision and subdivisions b and g of this section.

g. Eighteen months from the enactment date of this chapter, the commissioner shall adopt and implement regulations for any building containing nine or more dwelling units in which the amount of designated materials placed out for collection is significantly less than what can reasonably be expected from such building. These regulations shall require residential generators, including tenants, owners, net lessees or persons in charge of such building to use transparent bags or such other means of disposal the commissioner deems appropriate to dispose of solid waste other than the designated recyclable materials. Upon request of the owner, net lessee or person in charge of such building, and if the commissioner determines that such owner, net lessee or person in charge has complied with this subdivision and subdivision f of this section and that the amount of designated materials placed out for collection remains significantly less than what can reasonably be expected from such building, the department shall develop a schedule to conduct random inspections to facilitate compliance with the provisions of this chapter by tenants of such building, provided that lawful inspections may occur at reasonable times without notice to ensure compliance by the tenants, owner, net lessee or person in charge of such building.

§ 16-305 .1 Weekly collection of designated recyclable materials.

- a. Weekly collection of designated recyclable materials shall be maintained in all local service delivery districts in which such weekly collection was provided as of October thirty-first, nineteen hundred ninety-eight.
- b. Weekly collection of designated recyclable materials shall be implemented and maintained, in accordance with the schedule set forth in this subdivision, in all local service delivery districts in which such weekly collection was not provided as of October thirty-first, nineteen hundred ninety-eight:
 1. one district not receiving weekly collection as of October thirty-first, nineteen hundred ninety-eight shall receive such collection by March thirty-first, nineteen hundred ninety-nine;
 2. one district not receiving weekly collection as of March thirty-first, nineteen hundred ninety-nine shall receive such collection by April thirtieth, nineteen hundred ninety-nine;
 3. one district not receiving weekly collection as of April thirtieth, nineteen hundred ninety-nine shall receive such collection by May thirty-first, nineteen hundred ninety-nine;
 4. eighteen districts not receiving weekly collection as of May thirty-first, nineteen hundred ninety-nine shall receive such collection by June thirtieth, nineteen hundred ninety-nine; and

5. twenty districts not receiving weekly collection as of June thirtieth, nineteen hundred ninety-nine shall begin to receive such collection during the period from October thirty-first, nineteen hundred ninety-nine to April fifteenth, two thousand.

c. For purposes of this section “designated recyclable materials” shall mean solid waste that has been designated by the commissioner as recyclable pursuant to section 16-305 or section 16-307 of this chapter.

d. Nothing in this section shall be construed to require weekly collection of designated recyclable materials in such parts of the city or during such times of the year that such materials are not otherwise collected.

§ 16-306 Private carter-collected waste.

a. The commissioner shall adopt and implement rules designating recyclable materials that constitute in the aggregate at least one-half of all solid waste collected by private carters, and additional materials if the commissioner determines that economic markets exist for them. Pursuant to subdivision b of this section, such rules shall require generators of private carter -collected waste to source separate some or all of the designated materials and to arrange for lawful collection for recycling, reuse or sale for reuse by private carters or persons other than private carters of such source separated materials. With regard to designated materials that are not required by such rules to be source separated, generators of private carter-collected waste may source separate these designated materials and, in any event, shall arrange for their lawful collection for recycling, reuse or sale for reuse by private carters or persons other than private carters. If a generator of private carter-collected waste has source separated the designated materials in accordance with the rules and arranged for the lawful collection for recycling, reuse or sale for reuse by private carters or persons other than private carters of such source separated materials and, with regard to designated materials that are not required by such rules to be source separated, arranged for lawful collection for recycling, reuse or sale for reuse by private carters or persons other than private carters, such arrangement shall constitute an affirmative defense to any proceeding brought against the generator pursuant to section 16-324 of this chapter.

b. The rules promulgated pursuant to subdivision a of this section shall require that generators of waste collected by businesses required to be licensed pursuant to section 16-505 of this code source separate the designated materials in such manner and to such extent as the commissioner determines to be necessary to minimize contamination and maximize the marketability of such materials. However, in promulgating such rules the commissioner shall not require source separation of a material unless the commissioner has determined that an economic market exists for such material. For the purpose of this section, the term “economic market” refers to instances in which the full avoided costs of proper collection, transportation and disposal of source separated materials are equal to or greater than the cost of collection, transportation and sale of said materials less the amount received from the sale of said materials. The New York city trade waste commission shall adopt and implement rules requiring businesses licensed to remove, collect or dispose of trade waste to provide for the collection of, and ensure the continued separation of, designated materials that have been source separated, provide for the separation of all other designated materials, and provide for recycling of all the designated materials. Rules promulgated by the trade waste commission pursuant to this subdivision shall be enforced in the manner provided in section 16-517 of this code and violations of such rules shall be subject to the

penalties provided in subdivision a of section 16-515 of this code for violation of the provisions of chapter 16-A. In addition, the commissioner shall have the authority to issue notices of violation for any violation of such rule and such notices of violation shall be returnable in a civil action brought in the name of the commissioner before the environmental control board which shall impose a penalty not to exceed ten thousand dollars for each such violation.

§ 16-307 City agency waste.

The commissioner shall, within six months of the effective date of this chapter, adopt and implement regulations requiring the source separation or post-collection separation, collection, processing, marketing, and sale of designated recyclable materials generated by city mayoral and non-mayoral agencies, including the council and the board of estimate.

§ 16-308 Yard waste.

- a. Within eighteen months of the effective date of this chapter, the commissioner shall provide for the source separation, collection and composting of department-collected yard waste, with the exception of yard waste generated by the department of parks and recreation, any other city agency that generates a substantial amount of yard waste, or any person under contract with the department of parks and recreation or any other city agency, generated within designated areas of the city in which a substantial amount of yard waste is generated from October 15 to November 30 of each year, unless the generator otherwise provides for recycling or storage for composting or mulching. The commissioner may construct and operate one or more composting facilities, or utilize the services of other facilities.
- b. Within thirty-six months of the effective date of this chapter, the commissioner shall provide for the source separation, collection and composting of department-collected yard waste generated within designated areas of the city in which a substantial amount of yard waste is generated from March 1 to July 31 and September 1 to November 30 of each year, unless the generator otherwise provides for recycling or storage for composting or mulching. The commissioner may construct and operate one or more composting facilities, or utilize the services of other facilities.
- c. Within eighteen months of the effective date of this chapter, the department of parks and recreation or any other city agency that generates a substantial amount of yard waste shall provide for the source separation, collection and composting of yard waste generated by the department of parks and recreation, any other city agency that generates a substantial amount of yard waste, or any person under contract with the department of parks and recreation or any other city agency.
- d. Within eighteen months of the effective date of this chapter, no landfill, incinerator or resource recovery facility owned, operated or used by the department shall accept for final disposal from October 15 to November 30 of each year truckloads primarily composed of yard waste, except that composted yard waste may be used as part of the final vegetative cover for a department landfill.
- e. Within thirty-six months of the effective date of this chapter, no landfill, incinerator or resource recovery facility owned, operated or used by the department shall accept for final disposal from March 1 to July 31 and September 1 to November 30 of each year truckloads primarily composed of yard waste, except that composted yard waste may be used as part of the final vegetative cover for a department landfill.

f. All city agencies responsible for the maintenance of public lands shall to the maximum extent practicable and feasible give preference to the use of compost materials derived from the city's solid waste in all land maintenance activities.

§ 16-309 Christmas trees.

Within eighteen months of the effective date of this chapter, the commissioner shall designate areas and within these designated areas establish and implement a collection system for Christmas trees during the first three weeks of January of each year and provide for the composting or recycling of the Christmas trees the department collects or receives for disposal.

§ 16-310 Batteries and tires.

If within eighteen months of the effective date of this chapter, no state or federal legislation has been enacted requiring the collection of or imposing deposits on dry cell batteries or tires, the commissioner shall establish and implement citywide deposit or reclamation programs, that provide separate collection systems or convenient drop-off locations for dry cell batteries and tires to ensure that they are not incinerated or disposed of in an unlined landfill. The commissioner may establish a reasonable battery deposit charge and a reasonable tire deposit charge pursuant to this section.

§ 16-311 Recycling centers.

a. The commissioner shall, within eighteen months of the effective date of this chapter, develop and establish or support the development and establishment of not less than ten recycling centers. Such recycling centers shall be strategically sited and of sufficient size and number to provide for the recycling of all recyclable materials required to be recycled by the department and its contractors pursuant to section 16-305 of this chapter. The commissioner may utilize and include among the required number of recycling centers, recycling centers in existence before the effective date of this chapter, and where necessary the commissioner may provide for the expansion of such existing centers. The commissioner shall evaluate the feasibility of utilizing existing recycling centers in determining the need to establish city owned or operated centers. Notwithstanding the requirement for not less than ten recycling centers, the commissioner may utilize less than ten recycling centers if the recycling centers have the combined capacity to process all the material required to be recycled pursuant to section 16-305 of this chapter.

b. The commissioner shall establish or ensure that there exists at least one buy-back center in each borough. For economic development purposes, these buy-back centers shall be sited so that they are accessible to all residents, including residents of low income neighborhoods. The commissioner may include these buy-back centers among the recycling centers required under this section. The commissioner shall not include material from commercial generators which is processed for recycling at these and all other buy-back centers in the solid waste required to be reduced or recycled pursuant to section 16-305.

c. Recycling centers may be owned, operated, or funded by the city, any agency of the city, any person, or a public-private joint venture.

d. The commissioner may provide financial or other assistance to recycling centers in existence before and after the effective date of this chapter, upon a determination that such assistance will further the purposes of this chapter.

e. To the extent feasible, the commissioner shall ensure that all recycling centers established after the effective date of this chapter shall be sited to encourage the use of existing rail or shipping facilities, upon a determination that such siting will further the purposes of this chapter.

§ 16-312 Processing recyclable materials.

The commissioner shall establish procedures and standards for processing recyclable materials in city owned or operated recycling centers, city owned or operated transfer stations or any city owned or operated facility that renders recyclable materials suitable for reuse or marketing and sale. The commissioner shall review the procedures and standards at least annually and make any changes necessary to conform to the requirements of the marketplace.

§ 16-313 Marketing recyclable materials.

- a. The department shall establish procedures, standards and strategies to market the department - collected recyclable materials designated pursuant to section 16-305 of this chapter, including but not limited to maintaining a list of prospective buyers, establishing contact with prospective buyers, entering into contracts with buyers, and reviewing and making any necessary changes in collecting or processing the materials to improve their marketability.
- b. Within eighteen months of the effective date of this chapter, the commissioner in conjunction with the office for economic development shall submit to the mayor, the council, the board of estimate, each citizens' board created under section 16-317 of this chapter and the citywide board created under section 16-319 of this chapter a study of existing markets for processing and purchasing recyclable materials, and the potential and the steps necessary to expand these markets. Such study shall also include a proposal developed in conjunction with the department of finance to use, where feasible, the city's tax and finance authority to stimulate recycling and the demand for recycled materials.

§ 16-314 Recycling program revisions.

- a. The commissioner shall annually review the recycling program and all rules and regulations promulgated therefore, and shall make the necessary revisions to improve the efficiency of collecting, processing, marketing and selling the materials recycled pursuant to this chapter. These revisions may include designating additional recyclable materials. The commissioner shall not delete designated materials without designating additional materials so that the total quantity, by weight, of all designated recyclable materials collected, processed, marketed and sold does not decrease.
- b. By the end of the fifth year following the enactment date of this chapter, the commissioner shall designate two additional recyclable materials contained in residential or commercial solid waste and provide for the recycling of these materials in accordance with the provisions of this chapter.

§ 16-315 Notice, education and research programs.

- a. In addition to the notice requirements of section one thousand forty-three of chapter forty-five of the charter, within thirty days of the effective date of any regulations promulgated pursuant to this chapter, and as frequently thereafter as the commissioner deems necessary, the department shall notify all community boards and persons occupying residential, commercial and industrial premises affected by the regulations, of the requirements of the regulations, by placing

advertisements in newspapers of citywide, borough-wide and community circulation, posting notices in public places where such notices are customarily placed, and, in the commissioner's discretion, employing any other means of notification deemed necessary and appropriate.

b. Within twelve months of the effective date of this chapter, the department shall develop and implement an educational program, in conjunction with the board of education, private schools, labor organizations, businesses, neighborhood organizations, community boards, and other interested and affected parties, and using flyers, print and electronic advertising, public events, promotional activities, public service announcements, and such other techniques as the commissioner determines to be useful, to assure the greatest possible level of compliance with the provisions of this chapter. The educational program shall encourage waste reduction, the reuse of materials, the purchase of recyclable products, and participation in city and private recycling activities.

c. The department shall perform such research and development activities, in cooperation with other city agencies, and public and private institutions, as the commissioner determines to be helpful in implementing the city's recycling program. Such research shall include, but not be limited to, investigation into the use of cooperative marketing programs, material recovery facilities, recycling as an economic development tool, export promotion, tax credits and exemptions for market promotion.

Subchapter 3 Recycling Plan

§ 16-316 Recycling plan.

a. The commissioner shall, within twelve months of the effective date of this chapter, prepare and submit to the mayor, the council and the citywide board created under section 16-319 of this chapter a preliminary citywide recycling plan. The commissioner shall, within eighteen months of the effective date of this chapter, prepare and submit to the mayor, the council and the citywide board a citywide recycling plan and each year thereafter the commissioner shall submit to such parties an updated plan. The preliminary plan, the plan and each updated plan shall include, but need not be limited to:

1. a waste composition analysis that identifies the quantity and composition of the city's solid waste by recycling district;
2. annual recycling and reduction goals equal to or exceeding the mandatory minimum levels of sections 16-304 and 16-305, including the quantity and composition of recyclable materials to be collected, processed, marketed and sold by recycling district;
3. a five-year strategy for collecting, processing, marketing and selling the designated recyclable materials, and disposing of residual, non-recyclable solid waste, taking into account persons engaged in the business of recycling or persons otherwise providing recycling services before the effective date of this chapter. Such strategy may be based upon the results of the waste composition analysis performed pursuant to paragraph one of this subdivision or information obtained in the course of past collection of solid waste by the department, and may include recommendations with respect to increasing the number of materials designated for recycling pursuant to sections 16-305, 16-306 or 16-307 of this chapter;
4. comprehensive and up-to-date lists of large-scale generators of recyclable materials within the city and potential purchasers of recyclable waste material both within the city and in other locations;

5. a comprehensive analysis of all appropriate department properties and facilities to determine their feasibility as recycling centers;
6. proposed methods and programs to achieve a reduction in the city's solid waste stream, including but not limited to identifying materials the use of which should be regulated or limited based upon their incompatibility with recycling;
7. recommended revisions and an evaluation of the feasibility and effectiveness of such revisions to the building code of the city of New York, chapter one of title twenty-seven of this code, prepared in conjunction with the department of buildings, requiring newly constructed buildings and buildings undergoing specified alterations to contain storage space, devices or mechanisms that facilitate source separation and storage of the recyclable materials designated pursuant to sections 16-305 and 16-306 and that enable the department efficiently to collect, process, market and sell the designated materials; in preparing such recommendations, the commissioner and the commissioner of buildings shall evaluate the feasibility and effectiveness of requiring separate chutes to facilitate source separation in multi-family dwellings, storage areas that conform to fire and safety code regulations, and specialized storage containers;
8. to the extent feasible, proposals developed in consultation with the metropolitan transportation authority, the port authority of New York and New Jersey, the department of transportation, and the department of ports, international trade and commerce, to separate, collect and recycle recyclable materials, including but not limited to newspaper, that are discarded at transportation facilities, including subway, bus, railroad and ferry stations;
9. proposals developed in consultation with the board of education, the department of correction, health and hospitals corporation and other appropriate entities to separate, collect and recycle materials that are discarded at schools, jails, hospitals and other similar institutions throughout the city;
10. recommended product labeling requirements that would facilitate source separation and recycling of recyclable materials;
11. a proposal for an incentive program, including cash incentives, to encourage recycling participation;
12. an analysis of whether providing a reduced tipping fee for the disposal of residue that results from recycling activity in the private sector will enhance or increase private sector recycling;
13. an evaluation of economic development benefits of alternative recycling methods and strategies;
14. a comparison of the economic costs of recycling to the economic costs of other disposal and waste management strategies, including but not limited to resource recovery incineration and export; such comparison shall include but not be limited to expense, capital and external costs;
15. a review of all regulations pertaining to solid waste collection and disposal to determine their compatibility with the provisions and goals of this chapter;
16. a report on and evaluation of any pending federal and state legislation on recycling, waste reduction or any other solid waste management issues;
17. a detailed report on the recycling activities of the department during the preceding year;
18. specific and detailed objectives for the activities and programs conducted and assisted under this chapter;
19. the commissioner's conclusions as to the effectiveness of such activities and programs in achieving these objectives and the purposes of this chapter;

20. a summary of outstanding recycling problems confronting the department in the order of priority;
 21. recommendations with respect to legislation the commissioner deems necessary or desirable to assist in solving these recycling problems;
 22. the commissioner's plans for recycling and reduction activities and programs during the next year; and
 23. all other information required to be submitted to the council pursuant to any other provision of this chapter.
- b. Within four years of the effective date of this chapter, the commissioner shall prepare and submit to the mayor, the council, each citizens' board and the citywide board, a detailed and comprehensive plan to achieve for New York city the New York State goal of forty percent recycling and eight to ten percent waste reduction by 1997.

Subchapter 4

Recycling Advisory Boards

§ 16-317 Citizens' solid waste advisory boards; membership.

Within six months of the effective date of this chapter, each borough shall establish a citizens' solid waste advisory board (the "citizens' board"), consisting of no fewer than twenty members who for the first term shall be comprised of the members of the borough's citizens' advisory committee on resource recovery and other persons appointed jointly by the borough president and the council members elected from the council districts included in any part of the borough. For each subsequent term, all members shall be appointed jointly by the borough president and the council members elected from the council districts included in any part of the borough. The membership of each citizens' board shall represent community boards, recycling industries, carting industries, environmental organizations, government agencies, labor organizations, business organizations, property owners, tenant organizations and members of the general public. Members shall serve for a term of two years without compensation and shall designate one member to serve as chairperson and one as vice-chairperson.

§ 16-318 Functions of the citizens' board.

- a. The department shall submit to each borough president the recycling plans prepared pursuant to section 16-316 of this chapter simultaneous with their submission to the mayor and the council. Each borough president shall distribute copies of the plans to each member of the citizens' board in his or her borough. Within ninety days thereafter, each citizens' board shall review the plans, conduct a public hearing on the plans and make written recommendations to its borough president, the department and the council with respect to the recycling program within its borough. Each citizens' board shall also annually advise its borough president and the department with respect to the development, promotion and operation of the recycling program in its borough and pursuant to this function shall formulate and recommend:
1. annual recycling and reduction goals equal to or greater than those set forth in sections 16-304 and 16-305 of this chapter and the methods proposed to achieve such goals;
 2. means to encourage community participation in the recycling program; and
 3. means to promote the recycling program and educate the public with regard to the program.
- b. In each borough, the citizens' board shall assume all the responsibilities and functions of the borough's citizens' advisory committee on resource recovery.

§ 16-319 Citywide recycling advisory board; membership.

Within nine months of the effective date of this chapter, a citywide recycling advisory board (the “citywide board”) shall be formed, consisting of at least one representative from each citizens' board, five members appointed by the council, and five members appointed by the mayor. The membership of the citywide board shall represent community boards, recycling industries, carting industries, environmental organizations, government agencies, labor organizations, business organizations, property owners, tenant organizations and members of the general public. Members shall serve for a term of one year without compensation and shall designate one member to serve as chairperson and one as vice-chairperson.

§ 16-320 Functions of the citywide board.

The citywide board shall meet at least four times a year to discuss citywide recycling issues, including but not limited to budgetary issues. The citywide board shall annually review the department's recycling program and make recommendations to the mayor and the council concerning improvements to and changes in the program.

§ 16-321 Disclosure requirements.

a. Whenever a person, other than a public servant, appointed to any advisory board created pursuant to this subchapter, engages in any business dealings with the department, or engages in business dealings with any other agency which relate to processing or disposal of solid waste or of waste described in paragraph three of subdivision m of section 16-303 of this chapter or to recycling, or has an interest in a firm which is engaged in such business dealings with the department or with such other agency, such person shall, prior to appointment, disclose the nature of such business dealings to the commissioner and to the body or officer appointing such person, and, after appointment, disclose the nature of such business dealings to the commissioner and to all other members of such board; provided that such person need not disclose the amount of such business dealings.

b. When used in this section:

1. “Advisory committee” means a committee, council, board or similar entity that is constituted to provide advice or recommendations to the city and which has no authority to take a final action on behalf of the city, to take any action that would have the effect of conditioning, limiting or requiring any final action by any other agency, or to take any action that is authorized by law.

2. “Agency” means a city, county, borough or other office, position, administration, department, division, bureau, board, commission, authority, corporation, advisory committee or other agency of government, the expenses of which are paid in whole or in part from the city treasury, and shall include but not be limited to, the council, the offices of each elected official, the board of education, community school boards, community boards, the financial services corporation, the health and hospitals corporation, the public development corporation and the New York city housing authority, but shall not include any court or any corporation or institution maintaining or operating a public library, museum, botanical garden, arboretum, tomb, memorial building, aquarium, zoological garden or similar facility.

3. “Blind trust” means a trust in which a candidate for any advisory board created pursuant to this subchapter or a member of such board, or the spouse or unemancipated child of such candidate or member, has a beneficial interest, the holdings and sources of income of which such

candidate or member and such spouse and unemancipated child have no knowledge, and the trustee of which shall have independent authority and discretion.

4. "Business dealings" means any transaction involving the sale, purchase, rental, disposition or exchange of any goods, services or property, and any performance of or litigation with respect to any of the foregoing, but shall not include any transaction involving the residence of any candidate for any advisory board created pursuant to this subchapter or of any member of such board, or any ministerial matter.

5. "City" means the city of New York and includes any agency of the city.

6. "Elected official" means a person holding office as mayor, comptroller, public advocate, borough president or member of the council.

7. "Firm" means a sole proprietorship, joint venture, partnership, corporation or any other form of enterprise, but shall not include a public benefit corporation or local development corporation.

8. "Interest" means an ownership interest in a firm or a position with a firm.

9. "Ministerial matter" means an administrative act that is carried out in a prescribed manner and which does not involve substantial personal discretion.

(10) "Ownership interest" means an interest in a firm that is held by a candidate for any advisory board created pursuant to this subchapter, or by a member of such board, or by the spouse, domestic partner, or unemancipated child of such candidate or member, which exceeds five percent of the firm or an investment of twenty-five thousand dollars in cash or other form of commitment, whichever is less, or five percent or twenty-five thousand dollars of the firm's indebtedness, whichever is less, and any lesser interest in a firm when such candidate or member, or such spouse, domestic partner, or unemancipated child, exercises managerial control or responsibility regarding any such firm, but shall not include interests held in any pension plan, deferred compensation plan or mutual fund, the investments of which are not controlled by such candidate or member, or by such spouse, domestic partner, or unemancipated child, or in any blind trust that holds or acquires an ownership interest.

11. "Position" means a position in a firm, such as an officer, director, trustee, employee or any management position, or as an attorney, agent, broker or consultant to the firm, which does not constitute an ownership interest in the firm.

12. "Public servant" means all officials, officers and employees of the city, including members of community boards and members of advisory committees, except unpaid members of advisory committees shall not be public servants.

13. "Spouse" means a husband or wife of a candidate for any advisory board created pursuant to this subchapter or of a member of such board who is not legally separated from such candidate or member.

14. "Unemancipated child" means any son, daughter, step-son or stepdaughter who is under the age of eighteen, unmarried and living in the household of a candidate for any advisory board created pursuant to this subchapter or of the member of such board.

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Subchapter 5

City Purchase of Recycled Products

§ 16-322 City purchase of products made from secondary materials.

a. The department of citywide administrative services, upon consultation with the department, shall review the procurement specifications and practices it currently uses to determine whether

such require that products be manufactured from virgin materials or exclude products manufactured from secondary materials and shall make such changes as may be necessary to ensure that:

1. where such specifications and practices exclude the use of products manufactured from secondary materials or require that products be manufactured from virgin materials only, such exclusions or requirements be eliminated; provided, however, that specifications need not be revised if the department of citywide administrative services determines that for a particular end use a product containing secondary materials would not meet necessary performance standards;
2. performance standards, specifications and a product's intended end use are related, and clearly identified when feasible;
3. specifications are not overly stringent for a particular end use or performance standard; and
4. specifications incorporate or require the use of secondary materials to the maximum extent practicable without jeopardizing the performance or intended end use of the product; provided, however, where the department of citywide administrative services determines that for a particular end use a product containing secondary materials would not meet necessary performance standards, such specifications need not incorporate or require the use of secondary materials.

When used in this subdivision "practicable" means capable of being used without violating the following criteria: performance, availability at a reasonable price, availability within a reasonable period of time and maintenance of a satisfactory level of competition.

b. In purchasing paper products made with and without significant recycled content, recovered from materials otherwise destined for disposal, the department of citywide administrative services shall, wherever the price is reasonably competitive and the quality adequate for the purpose intended, purchase the recycled product. For the purpose of this section, "recycled paper" shall mean any paper products that have been manufactured from materials otherwise destined for the waste stream including, but not limited to, old newspapers, magazines, paperboard boxes, tabulating cards, mixed waste, used fibrous material such as rags and overstock or obsolete inventories from distributors, wholesalers, printers and other companies as defined in rules and regulations promulgated by the state commissioner of general services pursuant to section 104-a of the general municipal law, provided that such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process, and "reasonably competitive" shall mean a comparable recycled product with a cost premium of no greater than ten percent.

c. After January 1, 1991, with contracts for the purchase of products, other than paper products, for use by city agencies and departments, which are subject to public letting under sealed bids pursuant to chapter thirteen of the charter, when the lowest responsible bidder is not supplying products that are manufactured from a minimum amount of secondary material, and another bidder who will supply such products has submitted a bid within five percent of the lowest responsible bid for a contract to supply products that are adequate for the purposes intended, the department of citywide administrative services shall refer such bids to the mayor, who in accordance with paragraph two of subdivision b of section three hundred thirteen of the charter, may determine that it is in the best interest of the city that the contract shall be awarded to other than the lowest responsible bidder. For the purpose of this subdivision, the department of citywide administrative services shall promulgate regulations establishing standards for the "minimum amount of secondary material" from which a product shall be manufactured. If, however, a bid is submitted for a product that is manufactured from secondary material but the department of

citywide administrative services has not established a standard for the minimum amount of secondary material in such product the bid shall be submitted to the mayor in accordance with the requirements of this subdivision regardless of the amount of secondary material from which such product is manufactured. Notwithstanding the above, the department of citywide administrative services may amend an existing standard or promulgate a new standard for the minimum amount of secondary material from which a product shall be manufactured.

d. When purchasing paper products and other products pursuant to this section, the department of citywide administrative services shall utilize the United States environmental protection agency minimum content standards for recycled materials content promulgated pursuant to 42 U.S.C. § 6901 et seq.

e. Should the state authorize the city's use of a price preference for the purchase of any products manufactured from secondary materials, the commissioner shall propose appropriate legislation to mandate the use of this price preference.

f. Whenever the department of citywide administrative services purchases or causes the purchase of printing on recycled paper, the printed material shall include a printed statement or symbol indicating that the document is printed on recycled paper.

g. The department of citywide administrative services shall prepare and submit to the mayor, the council, each citizens' board created under section 16-317 of this chapter and the citywide board created under section 16-319 of this chapter, an annual report on its activities to increase the city's purchase of products manufactured from secondary materials.

h. The department of citywide administrative services, in consultation with the department, shall promulgate regulations necessary to effectuate the purposes of this section.

Subchapter 6

Regulations Submitted To Council And Enforcement

§ 16-323 Regulations submitted to council.

In addition to the requirements of section one thousand forty-three of chapter forty-five of the charter, no regulations promulgated by the commissioner pursuant to this chapter shall be effective until such regulations are submitted to the council and within thirty days of receipt thereof the council has not voted to disapprove such regulations. If the council votes to disapprove the regulations, it shall forward its reasons for such disapproval to the commissioner and the commissioner shall either amend the regulations or withdraw them from consideration. The amended regulations shall not be effective until the commissioner submits them to the council and within thirty days of receipt thereof the council has not voted to disapprove such amended regulations.

§ 16-324 Enforcement.

a. Any person who violates this chapter or any rule or regulation promulgated pursuant thereto shall be liable for a civil penalty recoverable in a civil action brought in the name of the commissioner or in a proceeding returnable before the environmental control board in an amount of twenty-five dollars for the first violation, fifty dollars for the second violation and one hundred dollars for the third and each subsequent violation, provided that the court before which such civil action is brought or such board may waive the penalty for the first violation upon a showing of good cause. A person committing a fourth and any subsequent violation within a period of six months shall be classified as a persistent violator and shall be liable for a civil penalty of five

hundred dollars for each violation. For a persistent violation only, except where such violation occurs at a building of less than nine dwelling units, each container or bag containing solid waste that has not been source separated or placed out for collection in accordance with the regulations promulgated by the commissioner pursuant to this chapter shall constitute a separate violation, provided that no more than twenty separate violations are issued on a per bag or per container basis during any twenty-four hour period. Before issuing any further notice of violations to a persistent violator after the fourth violation within a period of six months, the commissioner shall give such violator a reasonable opportunity to correct the condition constituting the violation.

b. Any notice of violation or notice of hearing for a violation issued to the owner or agent of a premises at which a violation of this chapter or any regulation promulgated pursuant thereto is alleged to have occurred shall be served by delivering a copy of the notice to the owner or agent at both the address maintained in the records of the department of buildings and the department of finance. The notice of violation or notice of hearing may be served by regular mail.

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Title 16-A

[Trade Waste]

Chapter 1

New York City Trade Waste Commission

§ 16-501 Definitions.

a. “Applicant” shall mean, if a business entity submitting an application for a license or registration pursuant to this chapter, the entity and each principal thereof.

b. “Commission” shall mean the New York city trade waste commission as established by section 16-502 of this chapter.

c. “Position” in a trade association shall mean an officer, member of the board of directors, partner, trustee, shareholder holding ten percent or more of the outstanding shares of stock in such association, or administrator, business agent or other status involving participation directly or indirectly in the management or control of such association.

d. “Principal” shall mean, of a sole proprietorship, the proprietor; of a corporation, every officer and director and every stockholder holding ten percent or more of the outstanding shares of the corporation; of a partnership, all the partners; if another type of business entity, the chief operating officer or chief executive officer, irrespective of organizational title, and all persons or entities having an ownership interest of ten percent or more; and with respect to all business entities, all other persons participating directly or indirectly in the control of such business entity. Where a partner or stockholder holding ten percent or more of the outstanding shares of a corporation is itself a partnership, or a corporation, a “principal” shall also include the partners of such partnership or the officers, directors and stockholders holding ten percent or more of the outstanding shares of such corporation, as is appropriate. For the purposes of this chapter (1) an individual shall be considered to hold stock in a corporation where such stock is owned directly or indirectly by or for (i) such individual; (ii) the spouse or domestic partner of such individual (other than a spouse who is legally separated from such individual pursuant to a judicial decree or an agreement cognizable under the laws of the state in which such individual is domiciled); (iii) the children, grandchildren and parents of such individual; and (iv) a corporation in which any of such individual, the spouse, domestic partner, children, grandchildren or parents of such individual in

the aggregate own fifty percent or more in value of the stock of such corporation; (2) a partnership shall be considered to hold stock in a corporation where such stock is owned, directly or indirectly, by or for a partner in such partnership; and (3) a corporation shall be considered to hold stock in a corporation that is an applicant as defined in this section where such corporation holds fifty percent or more in value of the stock of a third corporation that holds stock in the applicant corporation.

e. "Trade association" shall mean an entity having as a primary purpose the promotion, advancement or self-regulation of businesses that remove, collect or dispose of trade waste, including but not limited to a corporation, unincorporated association, partnership, trust or limited liability company, whether or not such entity is organized for profit, not-for-profit, business or non-business purposes.

f. "Trade waste" or "waste" shall mean:

(1) all putrescible and non-putrescible materials or substances, except as described in paragraph (2) of this subdivision, that are discarded or rejected by a commercial establishment required to provide for the removal of its waste pursuant to section 16-116 of this code as being spent, useless, worthless or in excess to the owners at the time of such discard or rejection, including but not limited to garbage, refuse, street sweepings, rubbish, tires, ashes, contained gaseous material, incinerator residue, construction and demolition debris, medical waste, offal and any other offensive or noxious material. Such term shall also include recyclable materials as defined in subdivision i of section 16-303 of this code that are generated by such commercial establishments.

(2) The following are not "trade waste" or "waste" for the purposes of this chapter: sewage; industrial wastewater discharges; irrigation return flows; radioactive materials that are source, special nuclear or by-product material as defined by the Atomic Energy Act of 1954, as amended, 41 U.S.C. §2011 et seq.; materials subject to in-situ mining techniques which are not removed from the ground as part of the extraction process; and hazardous waste as defined in section 27-0901 of the environmental conservation law.

g. "Trade waste broker" shall mean a person or entity who, for a fee, brokers agreements between commercial establishments and providers of trade waste removal, collection or disposal services or conducts evaluations or analyses of the waste generated by such commercial establishments in order to recommend cost efficient means of waste disposal or other changes in related business practices.

§ 16-502 New York city trade waste commission.

There is hereby created a New York city trade waste commission. Such commission shall consist of the commissioner of investigation, the commissioner of business services, the commissioner of consumer affairs, the commissioner of sanitation, and one member who shall be appointed by the mayor and shall serve as chair with compensation therefor; provided that if the chair holds other city office or employment, no additional compensation shall be received. The chair shall have charge of the organization of the commission and have authority to employ, assign and superintend the duties of such officers and employees as may be necessary to carry out the provisions of this chapter.

§ 16-503 Functions.

The commission shall be responsible for the licensing, registration and regulation of businesses that remove, collect or dispose of trade waste and trade waste brokers.

§ 16-504 Powers and duties.

The powers and duties of the commission shall include but not be limited to:

- a. To issue and establish standards for the issuance, suspension and revocation of licenses and registrations authorizing the operation of businesses engaged in the collection, removal or disposal of waste within the city and trade waste broker businesses, provided that unless otherwise provided herein, the commission may by resolution delegate to the chair the authority to make individual determinations regarding: issuance, suspension and revocation of such licenses and registrations; investigations of background and determinations of fitness in regard to employees of licensees; and the appointment of independent auditors and monitors in accordance with the provisions of this chapter;
- b. To establish maximum and minimum rates for the collection, removal, or disposal of such waste;
- c. To investigate any matter within the jurisdiction conferred by this chapter and to have full power to compel the attendance, examine and take testimony under oath of such persons as it may deem necessary in relation to such investigation, and to require the production of books, accounts, papers and other evidence relevant to such investigation;
- d. To establish standards for service and for the regulation and conduct of businesses licensed or registered pursuant to this chapter, including but not limited to requirements governing the level of service to be provided by licensees, contracts for trade waste removal, billing form and procedures, the maintenance and inspection of records, the maintenance of appropriate insurance, and compliance with safety and health measures;
- e. To appoint, within the appropriations available therefore, such employees as may be required for the performance of the duties prescribed herein. In addition to such employees appointed by the commission, the commissioners of business services, investigation, consumer affairs, transportation, sanitation, health, finance, environmental protection and police may, at the request of the chair, provide staff and other assistance to the commission in all matters under its jurisdiction;
- f. To conduct studies or investigations into the needs of commercial and other enterprises for waste removal and the trade waste industry in the city and other jurisdictions in order to assist the city in formulating policies to provide for orderly and efficient trade waste removal at a fair and reasonable cost to businesses;
- g. To establish programs for the education of customers, including but not limited to education of customers in the accurate assessment of the types and volume of waste and the rights of such customers in relationship to contracting, service and customer complaint procedures established pursuant to this chapter;
- h. To establish special trade waste removal districts pursuant to section 16-523 of this chapter; and
- i. To establish fees and promulgate rules as the commission may deem necessary and appropriate to effect the purposes and provisions of this chapter.

§ 16-505 Licenses and registration required.

- a. It shall be unlawful for any person to operate a business for the purpose of the collection of trade waste from the premises of a commercial establishment required to provide for the removal of such waste pursuant to the provisions of section 16-116 of this code, or the removal or disposal of trade waste from such premises, or to engage in, conduct or cause the operation of such a business, without having first obtained a license therefore from the commission pursuant to

the provisions of this chapter. Notwithstanding the provisions of this subdivision, a business solely engaged in the removal of waste materials resulting from building demolition, construction, alteration or excavation shall be exempt from the licensing provisions of this subdivision where, except in regard to the principals of a business solely in either or both of the class seven or the class three category of licensees as defined in rules previously promulgated by the commissioner of consumer affairs pursuant to subchapter eighteen of chapter two of title twenty of this code, no principal of such applicant is a principal of a business or a former business required to be licensed pursuant to this chapter or such former subchapter eighteen. Grant of such exemption shall be made by the commission upon its review of an exemption application, which shall be in the form and contain the information prescribed by rule of the commission and shall be accompanied by a statement by the applicant describing the nature of the applicant's business and listing all principals of such business.

b. It shall be unlawful for any person to remove, collect or dispose of trade waste that is generated in the course of operation of such person's business, or to operate as a trade waste broker, without first having registered with the commission. Nothing in this subdivision shall be construed to require registration with the commission of (i) a commercial establishment required to provide for the removal of waste pursuant to section 16-116 of this code in order for such establishment to remove recyclable materials generated in the course of its own business to a location owned or leased by such establishment for the purpose of collecting or storing such materials for sale or further distribution; (ii) an owner or managing agent of a building in order to remove recyclable materials generated by commercial tenants within such building to a central location within such building for the purpose of collecting or storing such materials for sale or further distribution; or (iii) an owner of an establishment required to provide for the removal of waste pursuant to section 16-116 of this code in order to transport beverage containers, as such term is defined in section 27-1003 of the environmental conservation law, or any other recyclable material generated in the course of operation of its own business, to a redemption center, as such term is defined in section 27-1003 of such law, or to any other place where payment will be received by the commercial establishment for such materials. Notwithstanding any other provision of this subdivision, a business granted an exemption from the requirement for a license pursuant to subdivision a of this section shall be thereupon issued a registration pursuant to this subdivision.

c. A license or registration issued pursuant to this chapter or any rule promulgated hereunder shall not be transferred or assigned to any person or used by any person other than the licensee or registrant to whom it was issued.

§ 16-506 Term and fee for license or registration.

a. A license or registration issued pursuant to this chapter shall be valid for a period of two years.

b. The commission shall promulgate rules establishing the fee for any license or registration required by this chapter. Such rules may provide for a fee to be charged for each vehicle in excess of one that will transport waste pursuant to such license and for each such vehicle operated pursuant to such registration.

§ 16-507 Registration application.

a. Except in the case of a business issued a registration by reason of the grant of an exemption from the requirement for a license pursuant to section 16-505 of this chapter, an applicant for registration shall submit an application on a form prescribed by the commission and containing

such information as the commission determines will adequately identify the business of such applicant. An applicant for registration to remove trade waste generated in the course of such applicant's business shall identify, in a manner to be prescribed by the commission, each vehicle that will transport waste pursuant to such registration. An application for registration as a trade waste broker shall contain information regarding any financial, contractual or employment relationship between such broker and a trade waste business. Any such relationship shall be indicated on the registration issued to such broker.

b. A registrant shall, in accordance with rules promulgated by the commission pursuant to section 16-504 of this chapter, inform the commission of any changes in the ownership composition of the registrant, the addition or deletion of any principal at any time subsequent to the issuance of the registration, the arrest or criminal conviction of any principal of the business, or any other material change in the information submitted on the application for registration.

c. (i) Notwithstanding any provision of this chapter, the commission may, when there is reasonable cause to believe that a trade waste broker who is an applicant for registration lacks good character, honesty and integrity, require that such applicant be fingerprinted and provide to the commission the information set forth in subdivision b of section 16-508 of this chapter and may, after notice and the opportunity to be heard, refuse to register such applicant for the reasons set forth in paragraphs (i) through (xi) of subdivision a of section 16-509 of this chapter.

(ii) If at any time subsequent to the registration of a trade waste broker or the issuance of a registration issued by reason of the grant of an exemption from the requirement for a license pursuant to section 16-505 of this chapter, the commission has reasonable cause to believe that any or all of the principals of such broker or such exempt business do not possess good character, honesty and integrity, the commission may require that such principal(s) be fingerprinted and provide the background information required by subdivision b of section 16-508 of this chapter and may, after notice and the opportunity to be heard, revoke the registration of such trade waste broker or such exempt business for the reasons set forth in paragraphs (i) through (x) of subdivision a of section 16-509 of this chapter.

§ 16-508 License application.

a. An applicant for a license pursuant to this chapter shall submit an application in the form and containing the information prescribed by the commission. An application shall include, without limitation: (i) a list of the names and addresses of all principals of the applicant business, including any manager or other person who has policy or financial decision-making authority in the business; and (ii) a list of the names and job titles of all employees and prospective employees of the applicant business who are or will be engaged in the operation of the trade waste business; and (iii) such other information as the commission shall determine by rule will properly identify such employees and prospective employees.

b. An applicant shall: (i) be fingerprinted by a person designated for such purpose by the commission and pay a fee to be submitted by the commission to the division of criminal justice services for the purposes of obtaining criminal history records; and (ii) provide to the commission, upon a form prescribed by the commission and subject to such minimum dollar thresholds and other reporting requirements established on such form, information for the purpose of enabling the commission to determine the good character, honesty and integrity of the applicant, including but not limited to: (a) a listing of the names and addresses of any person having a beneficial interest in the applicant, and the amount and nature of such interest; (b) a listing of the amounts in

which such applicant is indebted, including mortgages on real property, and the names and addresses of all persons to whom such debts are owned; (c) a listing of such applicant's real property holdings or mortgage or other interest in real property held by such applicant other than a primary residence and the names and addresses of all co-owners of such interest; (d) a listing of mortgages, loans and instruments of indebtedness held by such applicant, the amount of such debt, and the names and addresses of all such debtors; (e) the name and address of any business in which such applicant holds an equity or debt interest, excluding any interest in publicly traded stocks or bonds; (f) the names and addresses of all persons or entities from whom such applicant has received gifts valued at more than one thousand dollars in any of the past three years, and the name of all persons or entities (excluding any organization recognized by the Internal Revenue Service under section 501(c)(3) of the Internal Revenue Code) to whom such applicant has given such gifts; (g) a listing of all criminal convictions, in any jurisdiction, of the applicant; (h) a listing of all pending civil or criminal actions to which such applicant is a party; (i) a listing of any determination by a federal, state or city regulatory agency of a violation by such applicant of laws or regulations relating to the conduct of the applicant's business where such violation has resulted in the suspension or revocation of a permit, license or other permission required in connection with the operation of such business or in a civil fine, penalty, settlement or injunctive relief in excess of threshold amounts or of a type set forth in the rules of the commission; (j) a listing of any criminal or civil investigation by a federal, state, or local prosecutorial agency, investigative agency or regulatory agency, in the five year period preceding the application, wherein such applicant has: (A) been the subject of such investigation, or (B) received a subpoena requiring the production of documents or information in connection with such investigation; (k) a certification that the applicant has paid all federal, state, and local income taxes related to the applicant's business for which the applicant is responsible for the three tax years preceding the date of the application or documentation that the applicant is contesting such taxes in a pending judicial or administrative proceeding; (l) the name of any trade association in which the applicant is or has been a member or held a position and the time period during which such membership or position was held; (m) the names and addresses of the principals of any predecessor trade waste business of the applicant; and (n) such additional information concerning good character, honesty and integrity that the commission may deem appropriate and reasonable. An applicant may submit to the commission any material or explanation which the applicant believes demonstrates that any information submitted pursuant to subparagraphs (g), (h), (i) or (j) of this paragraph does not reflect adversely upon the applicant's good character, honesty and integrity. The commission may require that such applicants pay such fees to cover the expenses of fingerprinting and background investigations provided for in this subdivision as are set forth in the rules promulgated pursuant to section 16-504 of this chapter. Notwithstanding any other provision of this chapter, for purposes of this section: (A) in the case of an applicant which is a regional subsidiary of or otherwise owned, managed by or affiliated with a business that has national or international operations: (aa) (i) fingerprinting and disclosure under this section shall also be required of any persons not employed by the applicant who has direct management supervisory responsibility for the operations or performance of the applicant; and (ii) the chief executive officer, chief operating officer and chief financial officer, or any person exercising comparable responsibilities and functions, of any regional subsidiary or similar entity of such business over which any person subject to fingerprinting and disclosure under item (i) of this clause exercises similar responsibilities shall be fingerprinted and shall submit the information required pursuant to

subparagraphs g and h of this paragraph, as well as such additional information pursuant to this paragraph as the commission may find necessary; and (bb) the listing specified under subparagraph (j) of this paragraph shall also be provided for any regional subsidiary or similar entity of the national or international business for which fingerprinting and disclosure by principals thereof is made pursuant to (aa) of this paragraph; and (B) “predecessor trade waste business” shall mean any business engaged in the removal, collection or disposal of trade waste in which one or more principals of the applicant were principals in the five year period preceding the application. For purposes of determining the good character, honesty and integrity of a business that removes, collects or disposes of trade waste, a trade waste broker or a business issued a registration by reason of the grant pursuant to section 16-505 of this chapter of an exemption from the requirement for a license, the term “applicant” shall apply to the business of such trade waste business, trade waste broker or exempt business and, except as specified by the commission, all the principals thereof; for purposes of investigations of employees or agents pursuant to section 16-510 of this chapter, the term “applicant” as used herein shall be deemed to apply to employees, agents or prospective employees or agents of an applicant for a license or a licensee. Notwithstanding any provision of this subdivision, the commission may accept, in lieu of submissions required pursuant to this subdivision, information, such as copies of submissions to any federal, state or local regulatory entity, where and to the extent that the commission finds that the contents of such submissions are sufficient or comparable to that required by this subdivision.

c. A licensee shall, in accordance with rules promulgated by the commission pursuant to section 16-504 of this chapter, inform the commission of any changes in the ownership composition of the licensee, the addition or deletion of any principal at any time subsequent to the issuance of the license, membership in a trade association in addition to an association identified in the application submitted pursuant to this section, the arrest or criminal conviction of any principal of the business, or any other material change in the information submitted on the application for a license. A licensee shall provide the commission with notice of at least ten business days of the proposed addition of a new principal to the business of such licensee. The commission may waive or shorten such period upon a showing that there exists a bona fide business requirement therefore. Except where the commission determines within such period, based upon information available to it, that the addition of such new principal may have a result inimical to the purposes of this chapter, the licensee may add such new principal pending the completion of review by the commission. The licensee shall be afforded an opportunity to demonstrate to the commission that the addition of such new principal pending completion of such review would not have a result inimical to the purposes of this chapter. If upon the completion of such review, the commission determines that such principal lacks good character, honesty and integrity, the license shall cease to be valid unless such principal divests his or her interest, or discontinues his or her involvement in the business of such license, as the case may be, within the time period prescribed by the commission.

d. Each applicant shall provide the commission with a business address in New York city where notices may be delivered and legal process served.

§ 16-509 Refusal to issue a license.

a. The commission may, by majority vote of its entire membership and after notice and the opportunity to be heard, refuse to issue a license to an applicant who lacks good character, honesty and integrity. Such notice shall specify the reasons for such refusal. In making such

determination, the commission may consider, but is not limited to: (i) failure by such applicant to provide truthful information in connection with the application; (ii) a pending indictment or criminal action against such applicant for a crime which under this subdivision would provide a basis for the refusal of such license, or a pending civil or administrative action to which such applicant is a party and which directly relates to the fitness to conduct the business or perform the work for which the license is sought, in which cases the commission may defer consideration of an application until a decision has been reached by the court or administrative tribunal before which such action is pending; (iii) conviction of such applicant for a crime which, considering the factors set forth in section seven hundred fifty-three of the correction law, would provide a basis under such law for the refusal of such license; (iv) a finding of liability in a civil or administrative action that bears a direct relationship to the fitness of the applicant to conduct the business for which the license is sought; (v) commission of a racketeering activity or knowing association with a person who has been convicted of a racketeering activity, including but not limited to the offenses listed in subdivision one of section nineteen hundred sixty-one of the Racketeer Influenced and Corrupt Organizations statute (18 U.S.C. §1961 et seq.) or of an offense listed in subdivision one of section 460.10 of the penal law, as such statutes may be amended from time to time, or the equivalent offense under the laws of any other jurisdiction; (vi) association with any member or associate of an organized crime group as identified by a federal, state or city law enforcement or investigative agency when the applicant knew or should have known of the organized crime associations of such person; (vii) having been a principal in a predecessor trade waste business as such term is defined in subdivision a of section 16-508 of this chapter where the commission would be authorized to deny a license to such predecessor business pursuant to this subdivision; (viii) current membership in a trade association where such membership would be prohibited to a licensee pursuant to subdivision j of section 16-520 of this chapter unless the commission has determined, pursuant to such subdivision, that such association does not operate in a manner inconsistent with the purposes of this chapter; (ix) the holding of a position in a trade association where membership or the holding of such position would be prohibited to a licensee pursuant to subdivision j of section 16-520 of this chapter; (x) failure to pay any tax, fine, penalty, fee related to the applicant's business for which liability has been admitted by the person liable therefore, or for which judgment has been entered by a court or administrative tribunal of competent jurisdiction. For purposes of determination of the character, honesty and integrity of a trade waste broker pursuant to subdivision c or subdivision d of section 16-507 of this chapter, the term "applicant" shall refer to the business of such trade waste broker and all the principals thereof; for purposes of determining the good character, honesty and integrity of employees or agents pursuant to section 16-510 of this chapter, the term "applicant" as used herein shall be deemed to apply to employees, agents or prospective employees or agents of an applicant for a license or a licensee.

b. The commission may refuse to issue a license or registration to an applicant for such license or an applicant for registration who has knowingly failed to provide the information and/or documentation required by the commission pursuant to this chapter or any rules promulgated pursuant hereto or who has otherwise failed to demonstrate eligibility for such license under this chapter or any rules promulgated pursuant hereto.

c. The commission may refuse to issue a license to an applicant when such applicant: (i) was previously issued a license or a trade waste permit pursuant to this chapter or former subchapter eighteen of chapter two of title twenty of this code and such license was revoked pursuant to the

provisions of this chapter or revoked or not renewed pursuant to the provisions of such former subchapter eighteen or any rules promulgated thereto; or (ii) has been determined to have committed any of the acts which would be a basis for the suspension or revocation of a license pursuant to this chapter or any rules promulgated hereto.

d. The commission may refuse to issue a license pursuant to this chapter to any applicant, where such applicant or any of the principals of such applicant have been principals of a licensee whose license has been revoked pursuant to paragraph two of subdivision b of section 16-513 of this chapter.

§ 16-510 Investigation of employees.

a. (i) Each person who is not otherwise a principal as defined in section 16-501 of this chapter and who is employed or proposed to be employed by a licensee in a managerial capacity, or in a job category specified in rules promulgated by the commission pursuant to section 16-504 of this chapter, and each person who acts or is proposed to act in such a capacity or in such a category as an agent of a licensee, shall: (i) be fingerprinted by a person designated for such purpose by the commission and pay a fee to be submitted by the commission to the division of criminal justice services for the purposes of obtaining criminal history records, and (ii) submit to the commission the information set forth in subparagraphs (b) through (n) of paragraph (ii) of subdivision b of section 16-508 of this chapter and pay the fee for the investigation of such information set forth in the rules promulgated pursuant to section 16-504 of this chapter. Where, at any time subsequent to an investigation of an employee subject to the provisions of this subdivision, the commission has reasonable cause to believe that such employee lacks good character, honesty and integrity, the commission may conduct an additional investigation of such employee and may require, if necessary, that such employee provide information updating, supplementing or explaining information previously submitted. The job categories specified in rules of the commission for purposes of such fingerprinting and disclosure shall not include personnel engaged solely in operating vehicles or handling waste or clerical personnel who have no contact with customers. (ii) Notwithstanding any other provision of this chapter, a licensee shall provide the commission with notice of at least ten business days of the proposed addition to the business of the licensee of any person subject to the provisions of this subdivision. The commission may waive or shorten such ten day period upon a showing that there exists a bona fide business requirement therefor. Except where the commission determines within such period, based on information available to it, that the addition of such new person may have a result inimical to the purposes of this chapter, the licensee may add such person pending the completion of an investigation by the commission. The licensee shall be afforded an opportunity to demonstrate to the commission that the addition of such new person pending completion of the investigation would not have a result inimical to the purposes of this chapter. If upon the completion of such investigation, the commission makes a final determination that such person lacks good character, honesty and integrity, the license shall cease to be valid unless the employment of such person in the business of such licensee is discontinued within the time period prescribed by the commission.

b. (i) Where the commission has reasonable cause to believe that an employee or agent or prospective employee or agent of a licensee or an applicant for a license not subject to the provisions of subdivision a of this section lacks good character, honesty and integrity, the commission shall notify such employee or agent or prospective employee or agent that he or she

shall be required to be fingerprinted and submit the information required by subdivision a of this section.

c. Where, following a background investigation conducted pursuant to this section, the official designated by the commission to review the findings of such investigation concludes that an employee or agent or prospective employee or agent of a licensee lacks good character, honesty and integrity, such person shall be provided with notice of such conclusion and the reasons therefor and may contest the conclusion in person or in writing to such official. Such official shall review such response and, in the event that he or she continues to find that such person lacks good character, honesty and integrity, shall submit such final conclusion to the commission. The commission shall provide such person with notice of the conclusion of the official and an opportunity to be heard to appeal such conclusion before the commission makes a final determination.

d. A licensee shall not employ or engage as an agent any person with respect to whom the commission has made a final determination, following a background investigation conducted pursuant to this section, that such person lacks good character, honesty and integrity.

§ 16-511 Independent auditing or monitoring required.

a. The commission may, in the event the background investigation conducted pursuant to section 16-508 of this chapter produces adverse information, require as a condition of a license that the licensee enter into a contract with an independent auditor approved or selected by the commission. Such contract, the cost of which shall be paid by the licensee, shall provide that the auditor investigate the activities of the licensee with respect to the licensee's compliance with the provisions of this chapter, other applicable federal, state and local laws and such other matters as the commission shall determine by rule. The contract shall provide further that the auditor report the findings of such monitoring and investigation to the commission on a periodic basis, no less than four times a year.

b. In the case of an applicant or licensee who is the subject of a pending indictment or criminal action for a crime that would provide a basis for the refusal to issue a license under this chapter, the commission, in its discretion, may, in the case of an applicant, refrain from making a licensing determination until final disposition of the criminal case, and may also require as a condition of the license that an applicant or licensee enter into a contract with an independent monitor approved or selected by the commission. The cost of such contract shall be paid by the applicant or licensee, and such contract shall require that the monitor review and either approve or disapprove certain actions proposed to be taken by the licensee, where such actions fall within a category identified by rule of the commission as having a particular bearing on the fitness of an applicant or a licensee to hold a license to conduct a trade waste removal business under this chapter. Such actions shall include, without limitation, any decision to assign contracts for the removal, collection or disposal of trade waste, any decision to transfer an ownership interest or substantial assets to another person or entity where such interests or assets exceed a threshold established in such rule, any significant expenditure by the business as defined in such rule, and the initiation of any litigation against a customer or another trade waste removal business or its customer. The monitor shall report promptly to the commission concerning the disposition of any such actions in the manner set forth in rules of the commission.

c. The commission shall be authorized to prescribe, in any contract required by the commission pursuant to this section, such reasonable terms and conditions as the commission deems necessary to effectuate the purposes hereof.

§ 16-512 Investigations by the department of investigation.

In additions to any other investigation authorized pursuant to law, the commissioner of the department of investigation shall, at the request of the commission, conduct a study or investigation of any matter arising under the provisions of this chapter, including but not limited to investigation of the information required to be submitted by applicants for licenses and employees and the ongoing conduct of licensees.

§ 16-513 Revocation or suspension of license or registration.

a. In addition to the penalties provided in section 16-515 of this chapter, the commission may, after due notice and opportunity to be heard, revoke or suspend a license or registration issued pursuant to the provisions of this chapter when the registrant or licensee and/or its principals, employees and/or agents: (i) have been found to be in violation of this chapter or any rules promulgated pursuant thereto; (ii) have been found by a court or administrative tribunal of competent jurisdiction to have violated: (A) any provision of section 16-119 of this code, or any rule promulgated pursuant thereto, relating to illegal dumping, (B) any provision of section 16-120.1 of this code, or any rule promulgated pursuant thereto, relating to the disposal of regulated medical waste and other medial waste or (C) any provision of section 16-117.1 of this code, or any rule promulgated pursuant thereto, relating to the transportation and disposal of waste containing asbestos; (iii) has repeatedly failed to obey lawful orders of any person authorized by section 16-517 of this chapter to enforce the provisions hereof; (iv) has failed to pay, within the time specified by a court, the department of consumer affairs or an administrative tribunal of competent jurisdiction, any fines or civil penalties imposed pursuant to this chapter or the rules promulgated pursuant thereto; (v) has been found in persistent or substantial violation of any rule promulgated by the commission pursuant to section 16-306 of this code or by the commissioner of consumer affairs pursuant to section 16-306 or former subchapter eighteen of title twenty of this code; (vi) has been found in persistent or substantial violation of any city, state, or federal law, rule or regulation regarding the handling of trade waste, or any laws prohibiting deceptive, unfair, or unconscionable trade practices; (vii) whenever, in relation to an investigation conducted pursuant to this chapter, the commission determines, after consideration of the factors set forth in subdivision a of section 16-509 of this code, that the licensee or registrant as a trade waste broker lacks good character, honesty and integrity; (viii) whenever there has been any false statement or any misrepresentation as to a material fact in the application or accompanying papers upon which the issuance of such license or registration was based; or (ix) whenever the licensee or registrant has failed to notify the commission as required by subdivision b of section 16-507 or subdivision c of section 16-508 of this chapter of any change in the ownership interest of the business or other material change in the information required on the application for such license or registration, or of the arrest or criminal conviction of such licensee or registrant or any of his or her principals, employees and/or agents of which the licensee had knowledge or should have known.

b. The commission shall, in addition: (1) suspend a license issued pursuant to this chapter for thirty days following determination that the licensee, or any of its principals, employees or agents

has violated subdivision a of section 16-524 of this chapter; and (2) revoke a license issued pursuant to this chapter upon determination that the licensee, or any of its principals, employees or agents has violated subdivision a of section 16-524 of this chapter two times within a period of three years.

§ 16-514 Emergency suspension of license or registration.

Notwithstanding any other provision of this chapter or rules promulgated thereto, the commission may, upon a determination that the operation of the business of a licensee or the removal of waste by a business required by this chapter to be registered creates an imminent danger to life or property, or upon a finding that there has likely been false or fraudulent information submitted in an application pursuant to section 16-507 or section 16-508 of this chapter, immediately suspend such license or registration without a prior hearing, provided that provision shall be made for an immediate appeal of such suspension to the chair of the commission who shall determine such appeal forthwith. In the event that the chair upholds the suspension, an opportunity for a hearing shall be provided on an expedited basis, within a period not to exceed four business days and the commission shall issue a final determination no later than four days following the conclusion of such hearing.

§ 16-515 Penalties.

In addition to any other penalty provided by law:

a. Except as otherwise provided in subdivision b or subdivision c of this section, any person who violates any provision of this chapter or any of the rules promulgated thereto shall be liable for a civil penalty which shall not exceed ten thousand dollars for each such violation. Such civil penalty may be recovered in a civil action or may be returnable to the department of consumer affairs or other administrative tribunal of competent jurisdiction;

b.

(i) Any person who violates subdivision a of section 16-505 or section 16-524 of this chapter shall, upon conviction thereof, be punished for each violation by a criminal fine of not more than ten thousand dollars for each day of such violation or by imprisonment not exceeding six months, or both; and any such person shall be subject to a civil penalty of not more than five thousand dollars for each day of such violation to be recovered in a civil action or returnable to the department of consumer affairs or other administrative tribunal of competent jurisdiction; and

c. Any person who violates subdivision b of section 16-505 of this chapter or any rule pertaining thereto shall, upon conviction thereof, be punished by a civil penalty not to exceed one thousand dollars for each such violation to be recovered in a civil action or returnable to the department of consumer affairs or other administrative tribunal of competent jurisdiction.

d. The corporation counsel is authorized to commence a civil action on behalf of the city for injunctive relief to restrain or enjoin any activity in violation of this chapter and for civil penalties.

e.

(i) In addition to any other penalty prescribed in this section for the violation of subdivisions a or b of section 16-505 or subdivision a of section 16-524 of this chapter, or when there have been three or more violations within a three year period of the provisions herein, the commission shall, after notice and the opportunity to be heard, be authorized: to order any person in violation of such provisions immediately to discontinue the operation of such activity at the premises from which such activity is operated; to order that any premises from which activity in violation of such

provisions is operated shall be sealed, provided that such premises are used primarily for such activity; and to order that any vehicles or other devices or instrumentalities utilized in the violation of such provisions shall be removed, sealed, or otherwise made inoperable. An order pursuant to this paragraph shall be posted at the premises from which activity in violation of such provisions occurs.

(ii) Ten days after the posting of an order issued pursuant to paragraph (i) of this subdivision, this order may be enforced by any person so authorized by section 16-517 of this chapter.

(iii) Any vehicle or other device or instrumentality removed pursuant to the provisions of this section shall be stored in a garage, pound or other place of safety and the owner or other person lawfully entitled to the possession of such item may be charged with reasonable costs for removal and storage payable prior to the release of such item.

(iv) A premise ordered sealed or a vehicle or other device or instrumentality removed pursuant to this section shall be unsealed or released upon payment of all outstanding fines and all reasonable costs for removal and storage and, where the underlying violation is for unlicensed or unregistered activity or unauthorized activity in a special trade waste district, demonstration that a license has been obtained or a business registered or proof satisfactory to the commission that such premise or item will not be used in violation of subdivision a or b of section 16-505 or subdivision a of section 16-524 of this chapter.

(v) It shall be a misdemeanor for any person to remove the seal from any premises or remove the seal from or make operable any vehicle or other device or instrumentality sealed or otherwise made inoperable in accordance with an order of the commission.

(vi) A vehicle or other device or instrumentality removed pursuant to this section that is not reclaimed within ninety days of such removal by the owner or other person lawfully entitled to reclaim such item shall be subject to forfeiture upon notice and judicial determination in accordance with provisions of law. Upon forfeiture, the commission shall, upon a public notice of at least five days, sell such item at public sale. The net proceeds of such sale, after deduction of the lawful expenses incurred, shall be paid into the general fund of the city.

§ 16-516 Liability for violations.

A business required by this chapter to be licensed or registered shall be liable for violations of any of the provisions of this chapter or any rules promulgated pursuant hereto committed by any of its employees and/or agents.

§ 16-517 Enforcement.

Notices of violation for violations of any provision of this chapter or any rule promulgated hereunder may be issued by authorized employees or agents of the commission. In addition, such notices of violation may be issued by the police department, and, at the request of the commission and the consent of the appropriate commissioner, by authorized employees and agents of the department of consumer affairs, the department of business services, the department of transportation, and the department of sanitation.

§ 16-518 Hearings.

a. A hearing pursuant to this chapter may be conducted by the commission, or, in the discretion of the commission, by an administrative law judge employed by the office of administrative trials and hearings or other administrative tribunal of competent jurisdiction. Where a hearing pursuant

to a provision of this chapter is conducted by an administrative law judge, such judge shall submit recommended findings of fact and a recommended decision to the commission, which shall make the final determination.

b. Notwithstanding the provisions of subdivision a of this section, the commission may provide by rule that hearings or specified categories of hearings pursuant to this chapter may be conducted by the department of consumer affairs. Where the department of consumer affairs conducts such hearings, the commissioner of consumer affairs shall make the final determination.

§ 16-519 Rate fixing; hearings and production of records.

The commission shall have the power to fix by rule and from time to time the maximum and minimum rates, fixed according to weight or volume of trade waste, for the removal of waste by a licensee, which rates shall be based upon a fair and reasonable return to the licensees and shall protect those using the services of such licensees from excessive or unreasonable charges. The commission may compel the attendance at a public hearing held pursuant to a rate-fixing rule-making of licensees and other persons having information in their possession in regard to the subject matter of such hearing and may compel the production of books and records in relation thereto, and may require licensees to file with the commission schedules of rates.

§ 16-520 Conduct by licensees of trade waste collection, removal or disposal.

a. Every licensee pursuant to this chapter shall provide to every recipient of its services a sign which the licensee shall obtain from the commission. In addition to the information printed on the sign by the commission, the licensee shall print the day and approximate time of pickup clearly and legibly on the sign. Such sign shall be conspicuously posted as prescribed in section 16-116(b) of this code by the owner, lessee or person in control of the commercial establishment which receives the licensee's services.

b. Except as otherwise provided in subdivision d of section 16-523, a licensee shall not charge, exact or accept rates for the collection, removal or disposal of trade waste any amount greater than any maximum rates or less than any minimum rates that the commission may fix pursuant to section 16-519 of this chapter.

c. All licensees shall maintain audited financial statements, records, ledgers, receipts, bills and such other written records as the commission determines are necessary or useful for carrying out the purposes of this chapter. Such records shall be maintained for a period of time not to exceed five years to be determined by rule by the commission, provided however, that such rule may provide that the commission may, in specific instances at its discretion, require that records be retained for a period of time exceeding five years. Such records shall be made available for inspection and audit by the commission at its request at either the licensee's place of business or at the offices of the commission.

d. A licensee shall be in compliance with all applicable state, federal and local laws, ordinances, rules and regulations pertaining to the collection, removal and disposal of trade waste.

e.

(i) A contract for the collection, removal or disposal of trade waste shall not exceed two years in duration. All such contracts shall be approved as to form by the commission.

(ii) An assignee of contracts for the removal, collection or disposal of trade waste shall notify each party to a contract so assigned of such assignment and of the right of such party to terminate such contract within three months of receiving notice of such assignment upon thirty days notice.

Such notification shall be by certified mail with the receipt of delivery thereof retained by the assignee and shall be upon a form prescribed by the commission. Where no written contract exists with a customer for the removal, collection or disposal of trade waste, a company that assumes such trade waste removal from another company shall provide such customer with notice that a new company will be providing such trade waste removal and that the customer has the right to terminate such service. Such notice shall be by certified mail with the receipt of delivery thereof retained by the assignee.

f. A licensee shall bill commercial establishments for removal, collection or disposal of trade waste in a form and manner to be prescribed by the commission.

g. A licensee shall not refuse to provide service to a commercial establishment that is located within an area of ten blocks from an establishment served by such licensee unless such licensee has demonstrated to the commission a lack of capacity or other business justification for the licensee's refusal to service such establishment. For the purposes of this subdivision, the term "block" shall mean the area of a street spanning from one intersection to the next.

h. A licensee shall provide to the commission the names of any employees proposed to be hired or hired subsequent to the issuance of a license and such information regarding such employees as is required in regard to employees and prospective employees pursuant to subdivision a of section 16-508 of this chapter.

i. A licensee who provides services for a commercial establishment shall keep the sidewalk, flagging, curbstone and roadway abutting such establishment free from obstruction, garbage, refuse, litter, debris and other offensive material resulting from the removal by the licensee of trade waste.

j.

(i) No licensee or principal thereof shall be a member or hold a position in any trade association: (aa) where such association, or a predecessor thereof as determined by the commission, has violated state or federal antitrust statutes or regulations, or has been convicted of a racketeering activity or similar crime, including but not limited to the offenses listed in subdivision one of section nineteen hundred sixty-one of the Racketeer Influenced and Corrupt Organizations statute (18 U.S.C. §1961 et seq.) or an offense listed in subdivision one of section 460.10 of the penal law, as such statutes may be amended from time to time; (bb) where a person holding a position in such trade association, or a predecessor thereof as determined by the commission, has violated state or federal antitrust statutes or regulations, or has been convicted of a racketeering activity or similar crime, including but not limited to the offenses listed in subdivision one of section nineteen hundred sixty-one of the Racketeer Influenced and Corrupt Organizations statute (18 U.S.C. §1961 et seq.) or an offense listed in subdivision one of section 460.10 of the penal law, as such statutes may be amended from time to time; (cc) where a person holding a position in such trade association, or a predecessor thereof as determined by the commission, is a member or associate of an organized crime group as identified by a federal, state or city law enforcement or investigative agency; or (dd) where the trade association has failed to cooperate fully with the commission in connection with any investigation conducted pursuant to this chapter. The commission may determine, for purposes of this subdivision, that a trade association is a predecessor of another such trade association by finding that transfers of assets have been made between them or that all or substantially all of the persons holding positions in the two associations are the same. A licensee shall be in violation of this paragraph when the licensee

knows or should know of a violation, conviction, association with organized crime or failure to cooperate set forth herein.

(ii) Notwithstanding the provisions of paragraph (i) of this subdivision, the commission may permit a licensee to be a member of such a trade association upon a determination by the commission that such association does not operate in a manner inconsistent with the purposes of this chapter.

§ 16-521 Conduct of trade waste brokers.

a. A trade waste broker shall not conduct an evaluation or analysis of the trade waste generated by a commercial establishment in order to recommend cost efficient means of waste disposal or other changes in related business practices, or broker a transaction between a commercial establishment which seeks trade waste removal, collection or disposal services and a trade waste business required to be licensed pursuant to this chapter, unless such broker has first presented a copy of his or her registration to such consumer.

b. A trade waste broker who conducts an evaluation or analysis of a trade waste generated by a commercial establishment in order to recommend cost efficient means of waste disposal or other changes in related business practices shall not request or accept any payment in regard to such evaluation or analysis from a party other than the commercial establishment for whom such services are performed unless such broker has first disclosed to such establishment that he or she proposes to request or accept such payment.

c. A trade waste broker who brokers a transaction between a commercial establishment seeking trade waste removal, collection or disposal services and a trade waste business required to be licensed pursuant to this chapter shall not request or accept payment from such trade waste business.

d. A trade waste broker shall not engage in the collection of fees from commercial establishments for trade waste removal by a trade waste business required to be licensed pursuant to this chapter except where: (i) the contract for such fee collection complies with standards set forth in rules promulgated by the commission; (ii) such fee collection is upon the request of the customer; and (iii) such fee collection is part of an agreement providing for other services such as periodic waste evaluation and consulting with respect to source separation, recycling or other business practices relating to trade waste.

e. A trade waste broker shall maintain such financial statements, records, ledgers, receipts, bills and other written records as the commission determines are necessary or useful for carrying out the purposes of this chapter. Such records shall be maintained for a period of time not to exceed five years to be determined by rule by the commission, provided however, that such rule may provide that the commission may, in specific instances at its discretion, require that records be retained for a period of time exceeding five years. Such records shall be made available for inspection and audit by the commission at its request at either the place of business of the trade waste broker or at the offices of the commission.

§ 16-522 Investigation of customer complaints.

The commission shall by rule establish a procedure for the investigation and resolution of complaints by commercial establishments regarding overcharging and other problems relating to the collection, removal or disposal of waste.

§ 16-523 Special trade waste removal districts; designation; agreement.

a. The commission shall by rule designate no more than two areas of the city in commercial areas within different boroughs to participate in a pilot project as special trade waste removal districts. In making any such designation, the commission shall consider:

1. the number and types of commercial establishments within the proposed district;
2. the amount and types of waste generated by commercial establishments within the proposed district;
3. existing service patterns within the proposed district;
4. the types and estimated amounts of recyclable materials generated by commercial establishments within the proposed district that are required to be recycled, reused or sold for reuse pursuant to section 16-306 of this code and any rules promulgated pursuant thereto;
5. the rates being charged by persons licensed pursuant to this subchapter to commercial establishments within the proposed district; and
6. the history of complaints from commercial establishments within the district regarding overcharging for the removal of trade waste or the inability to change providers of trade waste removal services.

b. For each area designated as a special trade waste removal district by the commission pursuant to subdivision a of this section, the commission shall be authorized to enter into agreements with one or more specified licensee[s] permitting such licensee[s] to provide for the removal of trade waste within such district. The term of any such agreement, inclusive of any period by which the original term is extended at the option of the commission, shall not exceed two years. No such agreement[s] shall be entered into until a public hearing has been held with respect thereto after publication in the City Record at least thirty days in advance of such hearing and the commission has solicited as part of the record of such hearing whether there is support for the establishment of such special trade waste removal district from local business organizations or business improvement districts.

c. The commission shall issue requests for proposals to conduct trade waste removal in a special trade waste removal district and, based upon the review and evaluation of responses thereto, may negotiate and enter into such agreement[s] pursuant to subdivision b of this section, as the commission, in its discretion, determines will best provide for the efficient and orderly removal of trade waste in such district. Such request for proposals shall solicit information regarding the qualifications of proposers, the nature and frequency of the trade waste removal services to be provided, the rate or rates to be charged to establishments for such services, the nature and extent of recycling services and waste audit services, if any, to be provided, and any other information relating to performance standards, customer service and security of performance the commission deems appropriate. The commission shall enter into one or more such agreement[s] if it finds, on the basis of the proposals, that such agreement[s] will likely result in improved customer service and lower rates.

d. Any agreement[s] entered into pursuant to subdivision b of this section shall:

- (1) specify the area within which services will be provided under such agreement;
- (2) specify the frequency with which trade waste will be removed;
- (3) specify the maximum rate or rates to be charged to establishments in such area for the removal of trade waste generated by such establishments;
- (4) specify any recycling services and any waste audit programs to be provided to establishments within such area;

(5) establish a procedure to determine the type and volume of waste removed from establishments in order to ensure adequate assessment of the charges for such removal, and prescribe any other appropriate requirements relating to performance standards, customer service, security of performance, or such other matters as the commission deems necessary to effectuate the purposes of this section; and

(6) require that the licensee shall enter into a contract with an independent auditor approved or selected by the commission, and that such contract, the cost of which shall be paid by the licensee, shall provide: that the auditor shall investigate the activities of the licensee with respect to the licensee's compliance with the provision of this chapter, other applicable federal, state and local laws and such other matters as the commission shall determine by rule; and that the auditor shall report the findings of such monitoring and investigation to the commission on a periodic basis, no less than four times a year. The commission shall be authorized to prescribe such reasonable terms and conditions in such contract as the commission deems necessary to effectuate the purposes of this section.

e. No service provided pursuant to an agreement entered into pursuant to subdivision b of this section shall be subcontracted, nor shall the right to provide service pursuant to such an agreement be assigned or otherwise delegated, whether upon an emergency or any other basis, unless the commission has provided specific written authorization therefore.

f. The commission shall be authorized, upon due notice and hearing, to terminate an agreement entered into pursuant to subdivision b of this section based upon a determination that there has been a default in the performance of the terms and conditions of such agreement. In the event of termination, if the remaining licensees authorized to remove trade waste in the special trade waste district lack the capacity to adequately service the commercial establishments in such districts the commission may, as appropriate: (i) enter into an additional agreement with a licensee who responded to the request for proposals previously issued for the special trade waste removal district pursuant to subdivision c of this section; or (ii) issue a new request for proposals pursuant to subdivision c of such section.

g. The provisions of this section and agreements concluded pursuant to subdivision b of this section shall not apply to:

(1) the collection and disposal of recyclable materials as such term is defined in subdivision i of section 16-303 of this code where a commercial establishment wishes to contract separately for the sale of any such materials;

(2) the collection and disposal of regulated medical waste pursuant to section 16-120.1 of this code;

(3) the collection and disposal of waste containing asbestos pursuant to section 16-117.1 of this code;

(4) the collection and disposal of demolition and construction debris or waste;

(5) the collection and disposal of hazardous waste pursuant to section 27-0901 of the environmental conservation law, including material containing hazardous waste;

(6) the removal and disposal of waste by the owner, lessee or person in control of a commercial establishment;

(7) the removal and disposal of trade waste from a building with a floor area of two hundred thousand square feet or more, when the owner or managing agent of such building elects to arrange for the removal and disposal of all the trade waste from such building by a licensee other

than a licensee with whom the commission has entered into agreement pursuant to subdivision b of this section; and

(8) the removal and disposal of trade waste from a building located within the special trade waste removal district owned or controlled by an individual or an entity that owns or controls a building or buildings within the city of New York which, in the aggregate, occupy a floor area of one million square feet or more, where the contract for the collection, removal or disposal of trade waste for the building located within the special trade waste removal district is with a licensee who also provides trade waste removal services for other buildings within the city of New York that are owned or controlled by such individual or entity. For the purpose of this paragraph: an entity shall be defined as a sole proprietorship, partnership, corporation, net lessee, mortgagee or vendee in possession, a trustee in bankruptcy or a receiver; and an individual shall be defined as a sole proprietor, the managing or general partner of one or more partnerships or the chief operating officer or executive officer of one or more corporations. An individual's aggregate ownership or controlling interest shall be computed by adding the square footage of all buildings within the city of New York owned by partnerships and corporations in which the individual serves as the managing or general partner of the partnerships and/or the chief operating officer or executive officer of the corporations, including those buildings where the managing or general partner is a corporation in which the individual is the chief operating officer or executive officer.

h. Except for a licensee who has entered into an agreement with the commission pursuant to subdivision b of this section, a trade waste business required to be licensed pursuant to this chapter shall notify the commission of any agreement to provide a service described in subdivision g of this section within a special trade waste district. The commission may provide by rule for the visual identification of vehicles providing such services in a special trade waste district.

i. Nothing in subdivision g of this section shall be construed to prohibit a commercial establishment in a special trade waste district from contracting for the services described in such subdivision with a licensee who has concluded an agreement pursuant to subdivision b of this section.

§ 16-524 Special trade waste removal districts; violations; enforcement.

a. Upon the date of commencement of service pursuant to agreements entered into pursuant to subdivision b of section 16-523 of this chapter permitting specified licensees to provide for the removal of trade waste generated by commercial establishments within a special trade waste district designated by the commission, (i) any contract for trade waste removal, except for services set forth in subdivision g of section 16-523 of this chapter, with a business other than a licensee who has entered into an agreement pursuant to subdivision b of section 16-513 of this chapter shall be considered terminated, and (ii) it shall be unlawful for any person not party to such an agreement, other than a person who is performing a contract for services set forth in subdivision g of section 16-523, whether or not licensed pursuant to this chapter, to provide for the removal of trade waste within such district, or to solicit commercial establishments located within such district for such purpose, or to make false, falsely disparaging or misleading oral or written statements or other representations to the owners or operators of such commercial establishments which have the capacity, tendency or effect of misleading such owners or operators, for the purpose of interfering with performance of terms of such an agreement.

b. Whenever a person interferes or attempts to interfere by threats, intimidation, or coercion, or by destruction or damage of property or equipment, with performance of the terms of an

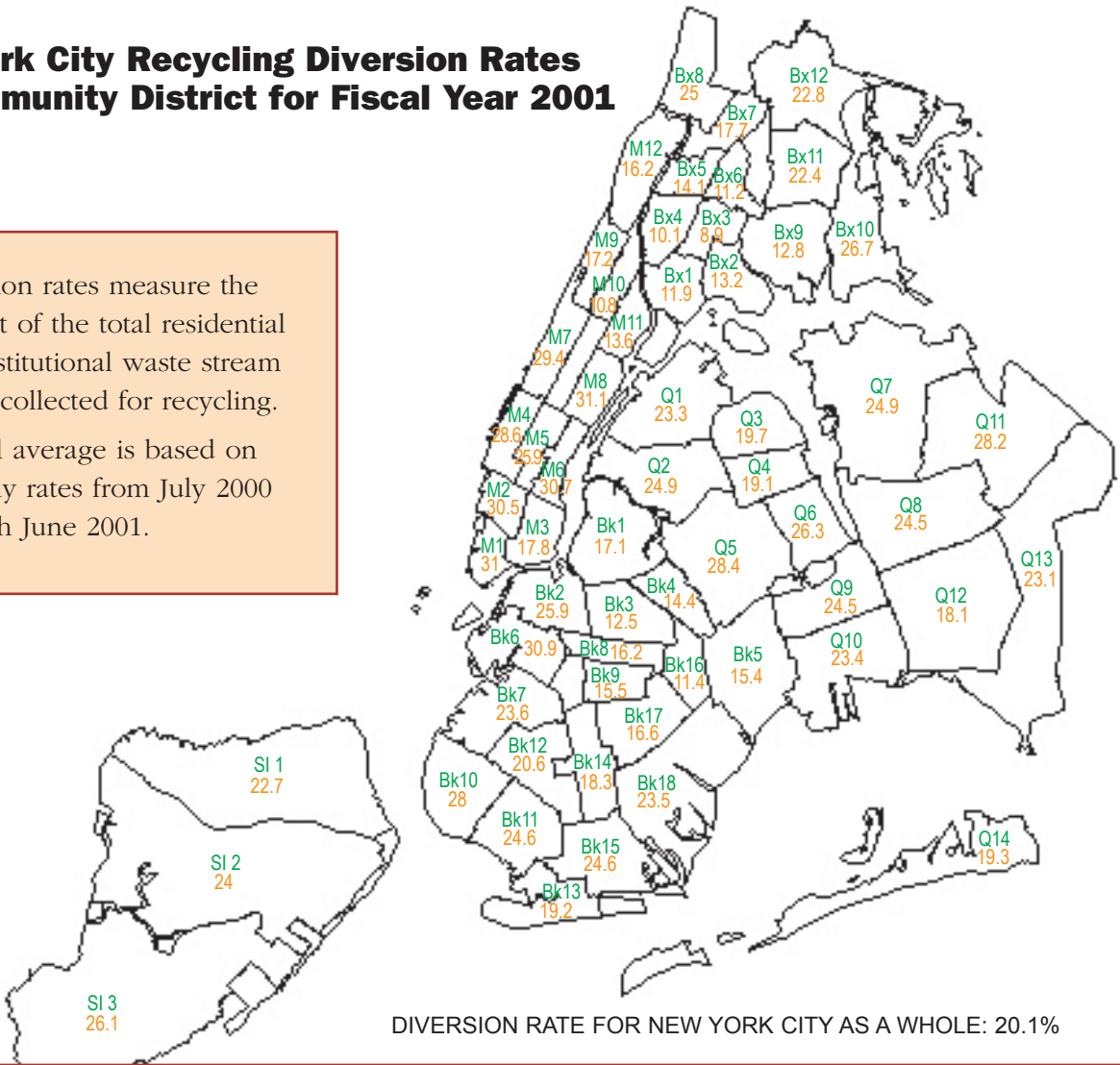
agreement entered into pursuant to subdivision b of section 16-523 of this code, the corporation counsel, at the request of the commission, may bring a civil action on behalf of the city for injunctive and other appropriate relief in order to permit the uninterrupted and unimpeded delivery of such services. Violations of an order issued pursuant to this subdivision may be punished by a proceeding for contempt brought pursuant to article nineteen of the judiciary law and, in addition to any relief thereunder, a civil penalty may be imposed not exceeding ten thousand dollars for each day that the violation continues.

§ 16-525 Displaced employee list.

The commission shall maintain a list containing the names and contact addresses or telephone numbers of persons formerly employed by a business engaged in the collection, removal or disposal of trade waste whose employment ended following the denial or revocation of a license pursuant to this chapter. The addition or deletion of information on such list shall be made only upon the request of such a former employee. A copy of such list shall be made available upon request to an applicant for a license pursuant to this chapter. The provision of such list shall in no way be construed as a recommendation by the city regarding the employment of any person on such list, nor shall the city be responsible for the accuracy of the information set forth there in.

New York City Recycling Diversion Rates by Community District for Fiscal Year 2001

Diversion rates measure the percent of the total residential and institutional waste stream that is collected for recycling. Annual average is based on monthly rates from July 2000 through June 2001.



Appendix IV

Source Data

Source:	Waste News, February 18, 2001								DOS Calculations					
	Total recycling tons reported	Paper	Metal	Plastic	Glass	Yard	Other	Includes commercial?	Reported diversion rate	Implied base	Base without Yard & Other	Working adjusted diversion rate	Diversion without yard waste	
Austin	47,180	22,105	1,105	809	3,458	16,686	3,017		28.5%	165,544	145,841	18.8%	20.5%	
Baltimore	119,665	19,156	10,825	N/A	44	6,369	83,271	y	35.3%	338,994	249,354	8.8%	33.8%	
Boston	42,000	15,000	24,000 (MGP combined)			3,000	N/A		14.0%	300,000	297,000	13.0%	13.1%	
Charlotte	70,739	26,888	(paper & MGP combined)			32,231	11,620		24.0%	294,746	250,895	9.1%	14.7%	
Chicago	2,287,708	545,499	117,168	2,197	22,741	176,472	1,423,631	y	47.9%	4,776,008	3,175,905	21.7%	45.9%	
Cleveland	6,000	information not provided						N/A		2.0%	300,000	300,000	2.0%	0.0%
Columbus	34,211	8,581	1,944	1,038	2,189	20,316	143		9.7%	352,691	332,232	4.1%	4.2%	
Dallas	8,387	6,506	269	229	897	486	N/A		19.0%	44,142	43,656	18.1%	18.1%	
Denver	17,511	12,909	511	339	3,227	270	255		7.5%	233,480	232,955	7.3%	7.4%	
Detroit	42,649	162	35,578	32	10	6,826	41		7.2%	592,347	585,480	6.1%	6.1%	
El Paso	13,850	3,556	347	180	N/A	9,333	434	y	4.0%	346,250	336,483	1.2%	1.3%	
Fort Worth	19,511	13,635	1,405	1,405	3,066	N/A	N/A		7.2%	270,986	270,986	7.2%	7.2%	
Houston	66,000	15,000	2,450	1,350	350	30,500	16,350		16.0%	412,500	365,650	5.2%	9.3%	
Indianapolis	29,452	9,452	(paper & MGP combined)			6,000	14,000	y	24.0%	122,717	102,717	9.2%	20.1%	
Jacksonville	563,696	148,096	221,436	5,028	17,453	132,918	38,765	y	39.0%	1,445,374	1,273,691	30.8%	32.8%	
Los Angeles	691,870	137,499	8,112	2,900	19,224	454,803	69,332		40.9%	1,691,614	1,167,479	14.4%	19.2%	
Memphis	78,808	6,039	705	1,107	2,214	68,743	N/A		19.9%	396,020	327,277	3.1%	3.1%	
Milwaukee	58,128	23,418	1,501	1,490	4,727	23,119	3,873		28.0%	207,600	180,608	17.2%	19.0%	
Nashville	73,305	information not provided							8.0%			8.0%	8.0%	
New York	749,000	423,000	305,000	(MGP combined)		21,000	N/A		19.7%	3,802,030	3,781,030	19.2%	19.3%	
Oklahoma City	10,000	7,400	600	1,000	1,000	N/A	N/A		23.6%	42,373	42,373	23.6%	23.6%	
Philadelphia*	44,794	32,314	12,480	(MGP combined)		N/A	N/A	y	32.5%	137,828	137,828	6.2%	6.3%	
Phoenix	106,970	92,422	5,241	4,493	4,814	N/A	N/A		18.0%	594,278	594,278	18.0%	18.0%	
Portland**	not reported in Waste News, see Appendix V							y	53.6%			35.7%	39.9%	
San Antonio	45,408	17,953	945	1,877	2,672	N/A	21,961		26.3%	172,654	150,693	15.6%	26.3%	
San Diego	62,953	23,400	604	860	2,424	35,665	N/A		46.0%	136,854	101,189	27.0%	27.0%	
San Francisco	568,138	144,317	18,638	2,659	22,954	12,148	367,422	y	42.0%	1,352,710	973,140	19.4%	41.5%	
San Jose	214,260	62,919	N/A	N/A	9,813	123,277	18,251	y	47.0%	455,872	314,344	23.1%	27.4%	
Seattle	102,500	46,800	2,300	700	13,000	39,700	N/A	y	52.0%	197,115	157,415	39.9%	39.9%	
Washington	21,706	15,045	473	672	3,673	N/A	1,843		17.0%	127,682	125,839	15.8%	17.0%	

Notes: *Philadelphia's reported residential rate is used as its adjusted rate.
 **Portland's tonnages are from its own report, see Appendix V.

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Appendix IV (continued)

Source Data

Source:	2000 Census	DOS Calculation	1990 Census										
	Population 2000	Pounds yard waste per capita	Total household units	1, detached	1, attached	2	3 or 4	5 to 9	10 to 19	20 to 49	50 or more	mobile home or trailer	other
Austin	552,434	60	216,940	45.7%	6.1%	5.2%	4.6%	6.0%	10.5%	9.6%	9.7%	1.4%	1.1%
Baltimore	645,593	20	303,707	11.3%	52.9%	7.0%	7.3%	6.3%	5.5%	1.7%	7.0%	0.0%	1.0%
Boston	555,447	11	250,864	11.0%	4.6%	14.4%	25.9%	12.0%	10.6%	9.4%	11.0%	0.1%	1.1%
Charlotte	504,637	128	170,407	55.1%	4.7%	4.1%	6.2%	11.8%	10.0%	4.6%	1.7%	1.0%	0.8%
Chicago	2,802,079	126	1,133,040	23.3%	2.8%	18.8%	14.0%	11.0%	6.7%	7.1%	15.1%	0.1%	1.1%
Cleveland	495,817	0	224,312	41.5%	8.2%	19.8%	7.9%	5.6%	5.1%	3.0%	6.1%	0.5%	2.3%
Columbus	670,234	61	278,103	45.3%	8.1%	5.2%	10.3%	11.9%	9.3%	5.0%	3.3%	0.7%	0.8%
Dallas	1,075,894	1	465,580	44.1%	3.8%	2.2%	4.9%	10.2%	11.8%	9.1%	11.8%	1.0%	1.2%
Denver	499,055	1	239,637	47.4%	6.6%	3.5%	4.1%	5.1%	9.1%	11.5%	11.5%	0.3%	0.9%
Detroit	970,196	14	410,028	59.3%	6.6%	12.1%	3.3%	2.4%	3.8%	4.6%	6.2%	0.1%	1.7%
El Paso	615,032	30	168,626	60.1%	5.7%	2.5%	4.2%	6.7%	6.1%	4.1%	6.1%	3.2%	1.2%
Fort Worth	491,801	0	194,429	60.8%	3.2%	4.5%	4.6%	7.1%	8.3%	5.5%	3.7%	1.4%	1.1%
Houston	1,786,691	34	726,403	45.8%	5.1%	2.2%	4.0%	6.6%	10.8%	6.7%	16.6%	0.9%	1.4%
Indianapolis	741,304	16	319,959	55.2%	7.9%	2.9%	5.7%	9.7%	9.3%	4.2%	2.7%	1.6%	0.8%
Jacksonville	693,630	383	267,149	58.0%	4.5%	2.9%	5.1%	6.5%	6.4%	3.3%	4.4%	8.0%	0.9%
Los Angeles	3,597,556	253	1,299,964	39.2%	5.9%	3.2%	6.4%	9.6%	11.2%	13.5%	9.2%	0.6%	1.2%
Memphis	603,507	228	248,574	58.2%	4.9%	4.3%	5.6%	10.1%	7.9%	3.4%	3.7%	0.8%	1.0%
Milwaukee	578,364	80	254,205	37.0%	4.6%	25.7%	8.1%	5.8%	4.5%	6.7%	5.6%	0.2%	1.9%
Nashville	510,274	0	219,522	48.7%	6.5%	7.7%	4.1%	6.7%	11.5%	7.1%	5.2%	1.7%	0.9%
New York	8,000,000	5	2,992,170	8.4%	5.9%	12.8%	8.7%	6.8%	6.7%	17.2%	31.8%	0.0%	1.7%
Oklahoma City	472,221	0	212,391	62.6%	4.2%	2.7%	4.4%	8.2%	6.3%	3.3%	4.0%	3.1%	1.1%
Philadelphia	1,436,287	0	674,900	5.4%	62.1%	8.4%	6.5%	3.8%	2.7%	2.9%	7.4%	0.0%	0.9%
Phoenix	1,198,064	0	422,037	55.2%	5.4%	1.8%	4.5%	4.5%	7.0%	6.1%	9.8%	4.7%	1.1%
Portland	503,891	196	198,320	62.4%	1.9%	4.5%	4.8%	4.9%	7.6%	6.4%	5.9%	0.8%	0.7%
San Antonio	1,114,130	0	365,401	59.7%	3.3%	3.1%	5.6%	8.3%	7.3%	4.4%	5.5%	1.7%	1.2%
San Diego	1,220,666	58	431,723	46.6%	8.9%	3.1%	5.9%	10.3%	9.2%	7.0%	6.5%	1.3%	1.1%
San Francisco	745,774	33	328,472	16.7%	15.1%	11.7%	12.6%	11.1%	11.2%	9.7%	9.9%	0.0%	2.0%
San Jose	861,284	286	259,331	57.7%	9.6%	2.0%	6.0%	4.7%	5.6%	4.7%	4.1%	4.6%	1.0%
Seattle	536,978	148	249,033	51.5%	1.5%	4.3%	4.8%	6.8%	9.9%	12.2%	7.6%	0.3%	1.1%
Washington	523,124	0	278,490	12.4%	25.7%	3.1%	7.8%	7.4%	13.4%	7.3%	22.1%	0.0%	0.9%

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Appendix IV (continued)

Source Data

Source: 1990 Census

continued from preceding page

	Population 1990	Land Area (square mile), 1990	Density (people/ square mile)	Rank of population density	percent of housing units built							
					1989-March 1990	1985-1988	1980-1984	1970-1979	1960-1969	1950-1959	1940-1949	1939 or earlier
Austin	465,577	218	2,138	24	0.7%	10.7%	22.1%	28.8%	16.4%	10.6%	5.6%	5.0%
Baltimore	736,014	81	9,109	7	0.5%	1.6%	3.1%	7.6%	9.8%	17.5%	18.6%	41.2%
Boston	574,283	48	11,865	4	1.3%	3.1%	3.1%	8.5%	9.3%	7.4%	9.6%	57.6%
Charlotte	396,003	174	2,272	23	1.5%	11.8%	13.6%	22.1%	21.3%	15.6%	8.3%	5.9%
Chicago	2,783,726	227	12,252	3	0.6%	1.6%	2.7%	7.2%	13.1%	16.2%	13.9%	44.6%
Cleveland	505,616	77	6,566	10	0.3%	0.8%	1.7%	5.9%	8.7%	13.8%	16.2%	52.6%
Columbus	632,958	191	3,316	16	2.2%	9.8%	7.8%	20.0%	18.6%	14.6%	9.5%	17.5%
Dallas	1,006,831	342	2,941	19	0.6%	9.4%	14.8%	21.3%	19.8%	18.2%	9.1%	6.8%
Denver	467,610	153	3,050	17	0.4%	3.6%	7.1%	16.5%	15.6%	20.2%	11.0%	25.7%
Detroit	1,027,974	139	7,411	9	0.2%	0.5%	1.8%	4.8%	7.6%	22.3%	27.0%	35.8%
El Paso	515,342	245	2,100	25	1.5%	9.6%	12.8%	26.4%	18.7%	17.6%	6.0%	7.4%
Fort Worth	447,619	281	1,592	27	0.8%	11.5%	14.8%	14.8%	14.6%	20.5%	12.2%	10.9%
Houston	1,630,672	540	3,020	18	0.7%	2.6%	13.8%	31.0%	21.3%	16.7%	7.9%	6.0%
Indianapolis	731,321	362	2,022	26	1.5%	7.9%	7.2%	17.3%	20.2%	15.7%	10.0%	20.2%
Jacksonville	635,230	759	837	29	2.3%	14.7%	10.9%	20.3%	18.7%	17.4%	8.8%	6.9%
Los Angeles	3,485,398	469	7,427	8	2.3%	7.0%	6.2%	13.8%	17.8%	20.8%	14.7%	17.4%
Memphis	610,337	256	2,384	21	0.8%	3.4%	4.0%	19.8%	25.4%	23.6%	12.0%	11.0%
Milwaukee	628,088	96	6,536	11	0.5%	1.0%	2.3%	10.0%	13.6%	21.8%	12.3%	38.4%
Nashville	488,518	473	1,032	28	2.3%	14.0%	9.8%	21.7%	18.9%	16.3%	7.7%	9.3%
New York	7,322,564	309	23,705	1	0.7%	2.7%	2.9%	8.1%	15.0%	15.3%	14.4%	40.9%
Oklahoma City	444,730	608	731	30	0.7%	6.6%	16.1%	21.2%	18.5%	15.9%	10.5%	10.5%
Philadelphia	1,585,577	135	11,736	5	0.4%	1.5%	2.1%	6.1%	10.6%	14.1%	13.6%	51.6%
Phoenix	983,403	420	2,342	22	1.7%	13.5%	16.1%	28.3%	16.4%	15.8%	5.3%	2.9%
Portland	437,398	125	3,508	14	0.8%	2.2%	3.6%	11.0%	11.7%	16.1%	15.2%	39.4%
San Antonio	935,927	333	2,811	20	0.6%	8.4%	16.5%	22.2%	17.7%	16.6%	9.4%	8.6%
San Diego	1,110,549	324	3,428	15	2.5%	13.4%	10.5%	24.3%	17.0%	16.1%	7.5%	8.6%
San Francisco	723,959	47	15,502	2	0.7%	2.6%	3.0%	6.6%	9.0%	9.7%	13.3%	55.1%
San Jose	782,225	171	4,566	13	1.5%	7.9%	8.7%	32.1%	27.0%	13.3%	4.1%	5.5%
Seattle	516,259	84	6,153	12	1.9%	5.5%	4.5%	9.0%	13.2%	14.9%	14.8%	36.2%
Washington	606,900	61	9,884	6	0.6%	1.7%	3.2%	8.4%	14.9%	15.5%	18.1%	37.7%

Appendix V

**Supplementary Data for Portland, Oregon reported in
City of Portland, Office of Sustainable Development,
Solid Waste and Recycling Division, Management Report for 2000 Activities
August 2001**

<i>Residential Data</i>	<i>Tons per year</i>
curbside yard	19,900
self-hauled yard	12,000
home composting	17,500
yard total	49,400
curbside recycling	48,200
self-hauled recyclables	15,000
recycling total	63,200
bottle bill	12,100
"other" total	12,100
residential refuse	113,600
Diversion overall:	52.3%
Diversion without yard:	39.9%
Diversion without yard or "other":	35.7%