NYCitySen$e Project Summary

Prepared by:

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
221 Third Street
Newport, RI 02840

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Prepared for:

New York City Department of Sanitation
Bureau of Waste Prevention, Reuse and Recycling
44 Beaver Street
New York, New York 10004

BWPRR Overview

This report is one of a number of waste prevention reports prepared under a long-term contract by consultant Science Applications International Corporation, and issued at contract conclusion. The reports are listed below. The New York City Department of Sanitation (DOS, or the Department), Bureau of Waste Prevention, Reuse and Recycling (BWPRR), the sponsor, has issued a Foreword to the studies; it acknowledges the many contributors and frames a position based on its considerable efforts to review, practice, and measure waste prevention. The Foreword appears at the beginning of the first report in the series, *Measuring Waste Prevention in New York City*. Interested readers are strongly encouraged to access the material through the Department's web site at: www.ci.nyc.ny.us/strongest. Print or electronic versions are available through BWPRR. Release of the reports is not an endorsement of recommendations made by the consultant.

For the NYCitySen$e project that is the subject of this report, SAIC worked with staff at one or more sites of various City Agencies. SAIC performed a single-day snapshot review of recycling, and reviewed processes to identify waste prevention opportunities. These are itemized in Sections 2 and 3 of the report. Recycling figures considerably in these sections because so many waste elements are not preventable, but might be recyclable. A number of products are proposed for recycling, although they are not designated for collection under the City's curbside recycling program. Such products include printer toner cartridges from offices and oil filters from vehicle maintenance facilities. Section 2 also reports on site reviews of recycling participation under the *current* program, which designates for collection: most paper products; metal, glass, and plastic jars and bottles; and bulk metal. While these were single-day reviews only, BWPRR notes that with the exception of two sites, the implied recyclables capture rates were good to excellent, ranging from 40% to over 95%. The capture rate is the portion of all designated recyclables actually recycled. For the City agency sites, the capture rate can be calculated from the waste generation tables; it is the ratio of properly recycled materials to the sum of properly recycled materials and recyclable materials discarded in trash.

Sections 4 and 5 cover the difficulties, possibilities, and limitations of measuring the impacts of waste prevention programs and activities. BWPRR's experience with this project revealed that measuring many individual programs and aggregating measurements can present considerable difficulties. NYCitySen$e identified some problems that could be addressed to estimate citywide waste prevention. But it was not able to derive an overall estimate of waste preventable by city agencies, nor was it able to specify the labor hours and cost involved in making aggregate measurements.

A Note on Waste Management Costs: This study was undertaken over a period with changing waste management costs. In estimating net impacts of waste prevention, Section III of this report used $41.50/ton as the full cost of disposal at Fresh Kills landfill and $100/ton as

the cost of waste export. The latter is higher than the approximately $75/ton average export cost projection derived subsequently by the Department for its *Comprehensive Solid Waste Management Plan Draft Modification, May 2000* (Table 4.3-2). Sections IV and V of this report used the later *Solid Waste Management Plan* figures in presenting avoided waste disposal costs for general educational purposes.

Waste Prevention Reports:

- *Measuring Waste Prevention in New York City*
- *Survey of Waste Prevention Programs in Major Cities, States and Countries*
- *Procurement Strategies Pursued by Federal Agencies and Jurisdictions Beyond NYC for Waste Prevention and Recycled Products*
- *Inter-Agency Task Force Action Plan to Encourage the Use of Recycled-Content Building Materials*
- *Materials Exchange Research Report*
- *Characterization of NYC's Solid Waste Stream*
- *Life Span Costing Analysis Case Studies*
- *Packaging Restrictions Research: Targeting Packaging for Reduction, Reuse and Recycled Content*
- *NYCitySen$e Summary Report*
- *NYC WasteLe$$ Summary Report*

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Section I

I. Introduction

Historically, the Fresh Kills Landfill on Staten Island has provided an inexpensive solid waste disposal option for New York City. However, in November, 1996, a Task Force, established by New York State Governor George Pataki and New York City Mayor Rudolph Giuliani, issued *A Plan to Phase Out The Fresh Kills Landfill*. The *Plan* calls for closure of the Fresh Kills Landfill by December 31, 2001, with export of solid waste to privately-owned landfills outside of the City. Central to the Plan are strategies to maximize waste prevention, recycling and composting to reduce the volume of waste requiring export.

In addition, the 1996 *Mayoral Directive on Waste Prevention and Efficient Materials Management Policy* requires City Agencies to implement specific waste prevention measures to increase efficiency and reduce costs for City Agency operations, while decreasing the quantity of solid waste set out by those Agencies for collection by the NYCity Department of Sanitation (DOS). City Agencies were directed to initiate policies and implement a variety of waste prevention programs focused on office paper waste prevention and reuse, reduction in the purchase of single-use items, increased composting and other mechanisms to reduce the waste stream.

City Agencies also were instructed to seek opportunities to reduce waste through the procurement process by reviewing specifications, administering vendor surveys, and purchasing durable and concentrated products. The Directive required the Department of Citywide Administrative Services (DCAS) to develop a plan for incorporating waste prevention into its procurement of goods, and the Mayor's Office of Contracts to develop a plan to incorporate waste prevention into the procurement of City services.

The Mayoral Directive was distributed to all heads of Mayoral Agencies and Agency departments. Each City Agency was required to assign a Waste Prevention Coordinator, who is responsible for ongoing implementation of the Directive, and to submit its quantified progress in waste prevention to the Mayor's Office of Operations for inclusion in the *Mayor's Management Report*. Agencies that implement innovative, cost effective waste prevention strategies are eligible for an annual recognition award from the Mayor's Office.

The Department of Sanitation produced a waste prevention guide, *Finding Dollars in City Trash: The Budget-Stretching Guide to Preventing Waste in NYC Government Agencies*, which was distributed to all Mayoral Agency employees in the fall of 1996. The guide provided practical advice on how to avoid wasteful purchasing and how to reduce the use of paper and postage. The guide also included highlights of cost-saving initiatives successfully implemented by various City Agencies and tips for encouraging employee input and participation in a cost-saving waste prevention program.

II. Project Definition

In the fall of 1997, DOS and the Mayor's Office of Operations initiated *NYCitySen$e*, a project designed to provide waste prevention and recycling technical assistance to New York City Agencies. The project objectives specified review of the waste generation and waste management activities of representative operations within DOS and ten other City Agencies.

The DOS Bureau of Waste Prevention, Reuse and Recycling (BWPRR) recommended recruiting for participation in the project within the following City service areas represented in the Mayor's Management Report:

- Community Services
- Public Safety
- Infrastructure
- Economic Development
- Health Services
- Human Services and Education
- Regulatory Services
- Citywide Administration

DOS and the Mayor's Office of Operations selected operations within the following Agencies to participate in the waste prevention program:

Community Services	Department of Sanitation
Public Safety:	Fire Department
	Department of Juvenile Justice
Infrastructure:	Department of Transportation
	Department of Environmental Protection
Economic Development:	Department of Business Services
Health Services:	Department of Health
Human Services:	Human Resources Administration
Regulatory Services:	Taxi and Limousine Commission
Citywide Administration:	Department of Citywide Administrative Services
	Financial Information Services Agency

The scope of consultant services provided by Science Applications International Corporation (SAIC) included the following:

1. Conduct a "waste audit" to characterize/quantify wastes generated by the targeted City Agency operations.
2. Assess purchasing and operating procedures through completion of a questionnaire, staff interviews, and on-site observations to identify cost-effective waste prevention opportunities for each Agency operation, summarized in a report to each Agency.
3. With Agency staff and management, determine which strategies each Agency elects to implement, and develop an implementation plan.
4. Provide technical assistance to the implementation process and monitor progress in waste prevention and enhanced recycling. Document the quantities of waste reduced and cost savings resulting from the implementation of waste prevention strategies.

5. Develop a mechanism to project potential Citywide waste prevention if all Agencies implemented the strategies implemented by those participating in the study.
6. Develop a waste prevention guide highlighting the achievements of the participating Agencies.
7. Conduct a series of eight seminars to disseminate program findings and motivate and assist all City Agencies to enhance their waste prevention and recycling programs and measure the impacts on the City's waste steam.

III. Project Implementation

A. Agency Recruitment

To assist DOS in the recruitment process, former Deputy Mayor Mastro sent a letter to the Commissioner of each of the target Agencies, requesting that each Agency participate in the program and commit to the following support services:

- Assign a high-level staff person to oversee Agency participation in the project.
- Require appropriate staff to participate in meetings with DOS and the consultant, when requested by the Mayor's Office of Operations, DOS or when requested on their behalf by the consultant.
- Provide DOS and its consultant access to Agency staff, and to non-confidential operations, purchasing and waste management records.
- Provide DOS and its consultant access to collected waste and recyclables, and space to sort these materials.
- Review the Waste Prevention Opportunities Report and meet with DOS and its consultant to discuss the waste assessment findings and recommendations and develop a list of options targeted for implementation.
- Assign staff to review and approve the Agency Implementation Plan and to begin to implement all waste prevention options selected for implementation by the Agency.
- Track the progress and results of the waste prevention measures implemented by the Agency. Provide tracking data to the consultant at each 90-day interval subsequent to submission of the Agency Implementation Report.
- Allow DOS and its consultant to visit each Agency site and meet with appropriate staff four times, at 90-day intervals, for one calendar year to review progress in implementation, identify outstanding information needs and recommend additional Agency efforts.
- Review and approve the section(s) pertaining to the Agency included in the draft waste prevention guide.

Each Commissioner provided DOS with the name of the individual employee assigned to oversee the Agency's participation in the *NYCitySen$e* project.

DOS scheduled a series of teleconferences to select the Agency operation(s) that would participate in the program. Staff of DOS, SAIC, and the Agency participated in each teleconference. Following the teleconference, DOS and SAIC confirmed, through a site visit, the suitability of the operation for participation in the *NYCitySen$e* program.

In some cases, the location proposed by the Agency was not appropriate for the program. For example, the Department of Citywide Administrative Services (DCAS) initially proposed the City office building at One Centre Street. Because this building houses operations other than those overseen by DCAS, DOS and SAIC believed that implementation of waste prevention projects would be difficult to enforce and track. The Fire Department initially proposed the vehicle maintenance operations for fire trucks but, because of the size and complexity of those operations, DOS and SAIC determined an assessment and waste sort within the time constraints of the program were not possible. At both Agencies, alternative sites were selected and agreed upon.

The City Agencies and their operations were chosen so that the program examined a cross-section of functions performed by or at City Agencies. The sampling of representative operations assessed will allow the results to be transferred to similar operations throughout the City. Based on input from the Mayor's Office of Operations, DOS, the target Agencies and SAIC, Agency locations/operations were selected to participate in the *NYCitySen$e* program. Each Agency provided an on-site point of contact (POC) who would oversee the actual implementation of the project. The following table presents the Agencies and their operations that participated in the *NYCitySen$e* project.

AGENCY	OPERATION
Department of Business Services (DBS)	Offices
Department of Citywide Administrative Services (DCAS)	Division of Municipal Supply Services
Department of Environmental Protection (DEP)	Stockroom, Reproduction Center, and Cafeteria at LeFrak City location
Fire Department (FDNY)	Emergency Medical Services Vehicle Maintenance
Financial Information Services Agency (FISA)	Warehouse and computer rooms
Department of Health (DOH)	Warehouse
Human Resources Administration (HRA)	Medical Assistance Programs
Department of Juvenile Justice (DJJ)	Admissions, Medical, and Cafeteria areas at the Bronx Juvenile Detention Center
Department of Sanitation (DOS)	BWPRR Offices Queens 5 Garage
Taxi and Limousine Commission (TLC)	Offices at Long Island City location
Department of Transportation (DOT)	Sign Shop

B. The *NYCitySen$e* Program

A program schedule was established as a timeframe in which to complete the first three stages of the program: the questionnaires, the waste sorts and the waste assessments. To analyze each Agency's waste generation and management practices, Agency staff completed a questionnaire requesting basic information about the operations participating in the program. After receipt of the completed questionnaire, an assessment of each specific Agency operation was performed. The assessment consisted of a site visit, walk-through, interviews with key staff, and general inspections of waste generating activities. Simultaneously, the Project Team conducted an audit of the waste generated. The audit consisted of a physical sort of all waste and recyclables generated by the operation(s) during a specified 24-hour period. The assessment and waste sort activities were completed within one or two days, depending on the complexity of the operation(s).

1. Questionnaire

Description

Each participating Agency operation completed a pre-site visit questionnaire to identify:

- the size of the location and the organizational structure;
- the primary activities performed at the target location and the wastes generated;
- the current waste management policies and programs, including the extent of recycling activities;
- available, written waste management records, including custodial contracts, vendor invoices and hazardous waste manifests;
- baseline data on purchasing and waste quantities;
- other relevant information to identify and quantify waste prevention and recycling opportunities and reduction and cost savings impacts.

Also included in the questionnaire were specific data requests necessary for guiding the waste audit schedule and methodology. These included:

- number of employees in each facility;
- number of floors to be audited;
- time when trash is collected daily;
- time when recyclables are collected;
- person responsible for transporting recyclables (custodial staff or employees);
- number of custodial staff and their hours;
- days that deliveries are received;
- materials currently collected for recycling;

- estimate of the average quantity of trash and recyclables collected (number of bags or hampers) per day; and
- other relevant questions, as appropriate.

The questionnaire was developed and distributed to each Agency operation several weeks prior to the scheduled assessment and audit. Each Agency was asked to return the questionnaire within two weeks, so that the contractors could plan for the waste sort and waste assessment based on the questionnaire responses.

Challenges

It was challenging for each Agency POC to complete the questionnaire within the requested two-week time frame. In some cases, Agencies required additional details about the *NYCitySen$e* program prior to completing the questionnaire. At several locations, the POC passed the questionnaire on to a custodian, who did not have all of the information necessary to complete the forms. Effective communication of the need to have accurate, complete background information well in advance of the Project Team arriving on-site is key to soliciting the necessary support from each of the participants.

2. Waste Audit

Description

Following receipt of the questionnaire or, in some cases, without the questionnaire information, DOS and SAIC scheduled the on-site waste audit and assessment. The goal was to have each audit completed within one day. In some cases, the audit had to be extended to a second day because of the volume of material.

In addition to staff from DOS, SAIC, and the Mayor's Office of Operations, staff from the Council on the Environment of New York City (CENYC) assisted in conducting the waste sorts.

To improve the utility of the sort data, the sort team worked with the Agency to determine the most representative time period and days of the week, based on the project schedule constraints, to collect waste for sorting. The waste and recyclables were collected on Tuesday, Wednesday or Thursday. Collecting during the middle of a week avoided factors that might confound the sort data, such as employees taking three-day weekends, which results in fewer people generating waste on a Monday or a Friday. No audits were conducted on Mondays, since the waste would have had to be saved from the previous Thursday or Friday, creating an unsanitary condition. Agency employees were not told about the audit, to ensure that purposeful behavior changes did not alter the results of the waste audit.

At each facility, the waste generated during one working day was examined. The decision to sort only the waste generated over a 24-hour period was based on several factors: 1) the limited space available for secure storage, 2) the potential for odors and vectors if waste was stored for several days, 3) time limitations, and 4) budget limitations.

Each Agency agreed to provide a secure location, protected from the elements, where waste and recyclables would be stored and, later, sorted. Prior to each audit, the Project Team met with the Agency's custodial staff and their supervisor to explain the purpose and needs of the audit and to finalize the collection arrangements. The custodial staff was directed to empty all trash and recycling containers the day before the audit to ensure accurate measurement of one day's waste. Where appropriate, the Project Team scheduled the audits in coordination with the regular recycling collection. A few days prior to the audit, the custodial manager at each location was reminded, via telephone, to empty the containers prior to initiating collection of waste and recyclables for the sort.

Generally, the custodial staff was asked to collect the waste and recyclables as usual. The Project Team provided labels with which the custodians identified bags by floor or area and type of waste (*i.e.*, trash or specific type of recycling). The custodians brought the labeled bags to the secure area prior to the audit. If the waste was collected the day before the audit, the audit began early the next morning. In those few cases where the waste was collected the morning of the audit, the audit began after the materials became available for sorting.

DOS and its consultant established a standard list of sort categories for the *NYCitySen$e* waste audits. The categories appear in the Agency tables in Section II. The Project Team sorted four separate waste streams (if applicable) at each Agency operation:

- trash;
- white paper recycling;
- mixed paper recycling; and
- mixed container recycling.

Where appropriate, additional categories were added for a specific operation. For example, salvage items, scrap metal and pallets were added at some locations.

In designing the waste sort, the Project Team determined that there were four potential levels of detail for sorting the three recyclable streams. The table on the following page presents those options using White Paper as the stream being sorted. Contamination, in this context, refers to any material that is placed incorrectly within the stated category. The item may be a recyclable in another category, but in its current placement, it is a contaminant to the materials placed properly.

Options for Waste Sort Categories at City Agencies

Option 1	Option 2	Option 3	Option 4
4 sort categories 1) white paper 2) other recyclable paper (mixed paper, newspaper, etc.) as contamination 3) other recyclable materials (*e.g*, bottles, cans, etc.) as contamination 4) other contamination	**3 sort categories** 1) white paper 2) other recyclable materials (mixed paper, newspaper, cans, bottles, etc.) as contamination 3) other contamination	**2 sort categories** 1) white paper 2) other contamination	**multiple sort categories** 1) white paper 2+) each of the sort categories used for sorting the trash stream or a smaller subset of these categories as contamination

Option 1: Sorting into four categories allows the Project Team to separate different types of recyclables to determine which recyclables employees have the most difficulty recycling correctly. For example, Option 1 provided information necessary to determine whether employees have difficulty distinguishing white paper from mixed paper.

Option 2: Using three categories separates other recyclables from other contamination to determine whether or not employees are trying to recycle, while also providing more specific data for aggregating recyclables in the waste stream.

Option 3: Using two sort categories only provides information about whether the employee was right or wrong in recycling each item. It does not provide information on the types of material in the contamination category.

Option 4: Sorting for multiple categories provides the most detailed information, but it may be at the expense of practicality. Many of the categories will be empty, and it is not possible to determine if any categories could be combined into a miscellaneous category of less frequently occurring materials until the sort is almost complete.

DOS selected Option 1, since this option provided the most information without being impractical, considering the space, labor, and time allowed for each sort.

On-site, the Project Team established a sorting station for trash and all bags of trash were sorted, materials weighed, information recorded, and trash cleaned up before a sorting station for the white paper recycling stream was set up. After all of the bags or bins of white paper were sorted, weighed, and cleaned up, a station for the next waste stream, if any, was set up.

In developing the sort categories for trash, the Project Team applied its considerable experience in waste prevention audits and assessments. The categories were based on discussions with DOS and the potential recommendations for waste prevention and enhanced recycling as well as on the relevant data needed to support project findings.

In the sort area, the bags were emptied onto tables for sorting. Auditors pulled waste items from the trash and deposited them into appropriately labeled bags. After the waste and recyclables were sorted, all of the bags were individually weighed and recorded. Auditors recorded written descriptions of the contents in the miscellaneous category bag. Some categories were counted (*e.g.*, the quantity of beverage containers) as well as weighed. Bathroom waste was weighed, but not sorted, for health and safety reasons, as it contained mostly hand towel waste and sanitary products.

Separate data input sheets were used for the sorts of each of the four streams (*i.e.*, trash, white paper recycling, mixed paper recycling, mixed container recycling) at each Agency. Weights were recorded to the quarter pound. Auditors also recorded special observations and/or questionable practices so that potential waste prevention opportunities could be addressed with Agency management.

For reporting any volume data, the Project Team used standard weight to volume conversions compiled from sources such as U.S. EPA's *Business Guide for Reducing Solid Waste* (EPA/530- K-92-004). The Project Team physically measured the volume of any materials that did not have standard conversions from weight to volume.

At the end of the audit, bags of waste were consolidated and either picked up by the custodial staff or brought to the freight area for routine trash removal. Recyclables also were consolidated and placed at the recycling stations or left at the freight area for custodians to take to designated holding areas. Samples that were set aside were labeled and photographed.

The Project Team developed spread sheets listing the weights of each of the components found in the waste stream for each City Agency operation audited. These spread sheets also were converted to pie charts showing percentages by weight of each component in the waste stream. Each Agency received its respective waste prevention and enhanced recycling opportunities assessment report, which included the relevant audit data in both spread sheets and pie charts. Section II of this summary report includes the audit data by Agency in table form.

Challenges

City Agency staff provided support to the waste audits. In some Agency locations, such as the Fire Department, the waste was neatly segregated in an area amenable to the sort procedures. Fire Department staff was available to move heavy items. In another location, the sort location was not adequate for the number of team members and the quantity of waste to be sorted. In two cases, despite careful planning with the custodial manager, the waste and recyclables were not collected and set aside. The custodial staff was able to collect the waste during the morning and the waste sort went on as planned.

As stated earlier, the *NYCitySen$e* project schedule and budget provided resources to divert waste from only one 24-hour period for each audit. The schedule also reflected the perceptions of City Agency staff that the waste would develop offensive odors that would interfere with employees ability to perform their duties, if stored any longer. It should be noted that larger samples taken over a longer period of time might have produced more readily measurable results.

3. Facility Assessment

Description

During the on-site assessment, a team of experienced waste assessors performed a facility walk-through and conducted a series of interviews and informal discussions with key staff of the Agency operation. Items discussed and observed during the walk-through include:

- waste-generating activities and equipment;
- types and relative quantities of waste generated;
- opportunities to improve efficiencies in operations or in the way waste and recyclables move through the system; and
- the effectiveness of current waste reduction efforts.

The assessment provides an opportunity for City Agency staff to describe their activities and the waste generated and to note current efforts to reduce the quantity or toxicity of the waste generated. The assessment also allowed the assessors to discuss with facility staff the feasibility of certain waste prevention opportunities and/or perceived barriers to the implementation of those opportunities.

The walk-through and interviews were conducted during the part of the working day when the most typical facility activities could be observed. This ensured an opportunity to observe and discuss the primary sources of waste. The assessment included all areas of the chosen operation, unless a specific portion of the operation had been designated for assessment, based on the operation's size and complexity.

The waste sort team and the assessment team also met during the day to discuss their findings. If, for example, the sort team had questions about the quantity of a material or the source of a specific waste, the assessment team either provided the answer based on their observations and discussions with facility staff or the assessment team returned to the facility to determine the answer. By the same token, the assessment team could confirm with the sort team that a specific waste was being separated for recycling, as the staff of the facility indicated. Many of the questions asked during the assessment increased the sort validity by identifying waste generating activities, such as a retirement party, unique to the day of waste collection.

Challenges

It is difficult to consolidate all of the different pieces of information necessary to support the data and fact gathering activities associated with a waste assessment. Often Agencies maintain records in various offices and at multiple locations. This increases the difficulty City Agencies face when trying to provide information ranging from quantities of surplus items delivered to DCAS to obtaining purchasing records and information on how purchasing decisions evolve.

Further, City Agency operations are not designed to track collections of waste and recyclables, making it difficult to develop the baseline information needed for cost-benefit analysis. This baseline data is important when developing waste prevention case studies.

4. Assessment Reports

Description

Following completion of the waste audit and the assessment, the Project Team prepared the audit data and submitted it to DOS and the Mayor's Office of Operations. The Project Team also compiled a detailed report on the opportunities for waste prevention and enhanced recycling at each specific City Agency operation. The opportunities report for each facility includes a brief facility description, a description of the operations assessed, the results of the waste audit, the highlights of the findings of the assessment, available baseline data with which to measure program results, a brief description of current waste prevention and recycling initiatives, and the draft recommendations for preventing waste or improving recycling.

The sort results were used, in conjunction with data collected during the assessment, to predict the potential to reduce specific waste materials. The sort data alone could not be used to project the operation's actual annual waste generation, based on the lack of a statistically significant sample size, but the information gathered confirmed information collected during the assessment, providing a snapshot of the operation's waste generation and the opportunity for change.

Challenges

Many City Agencies do not track the data necessary to establish a baseline waste generation rate and from which the Agency could measure progress in implementing waste prevention. Information on quantities of products and materials purchased and used and monthly costs are not readily available.

5. Implementation Plan

Description

After each Agency had an opportunity to review the assessment report, DOS contacted the Agency to set up a meeting to review the recommended opportunities. DOS, SAIC, the Mayor's Office of Operations and Agency staff participated in the review meeting and discussed each recommendation in the Report. Agency staff agreed to consider implementing certain opportunities and to postpone or not to address other opportunities. Based on these discussions, an Agency Implementation Plan was developed.

The Implementation Plan includes the rationale for considering each opportunity, as well as the responsibilities of the Agency and the Project Team in the potential implementation process. The Implementation Plan also includes estimates of potential waste reduction and cost savings based, where possible, on both data gathered during the assessment and the waste audit

results. Cost savings due to purchasing reductions are calculated, to the extent possible, based on data provided by the Agency. The Implementation Plan provides the framework for tracking Agency implementation progress over the remainder of the project. For each Agency, SAIC received and incorporated comments from both DOS and the Mayor's Office of Operations and submitted a final draft Plan to DOS. DOS then provided the Implementation Plan to the Agency POC.

Challenges

Agency POCs and management may have underestimated the level of effort required to follow-through on the potential initiatives presented in the Implementation Plan for the *NYCitySen$e* project. City Agencies do not necessarily have staff available to coordinate implementation projects or the funding needed to purchase equipment or supplies to implement the waste prevention and enhanced recycling opportunities.

6. Review Meetings

Description

DOS and its consultant met with each Agency POC and appropriate staff 90 days following the Agency's receipt of their Implementation Plan. The purpose of the review meeting was to evaluate Agency progress in implementing the opportunities in the Implementation Plan. During the meeting, Agency staff provided information on program implementation, vendor research and other efforts to implement the agreed upon opportunities. DOS and SAIC contributed additional information and contacts, as appropriate. Following this meeting, SAIC prepared and submitted to DOS and the Mayor's Office of Operations, a report on the Agency's progress in initiating the opportunities. DOS and the Mayor's Office of Operations provided comments on the report. SAIC incorporated those comments and submitted a final draft of the report and DOS provided the report on implementation progress to the Agency POC.

Because of the limited time remaining to complete the project and concern that the Agencies needed additional technical assistance, DOS and the Mayor's Office of Operations agreed to reduce the time between review meetings to 45 days. A second review was conducted approximately 45 days following the first review and a third 45 days following the second. Following each meeting, SAIC prepared and submitted to DOS and the Mayor's Office of Operations a report on the Agency's progress in initiating the opportunities. DOS and the Mayor's Office of Operations provided comments on each report. SAIC incorporated those comments and submitted a final draft of the report. DOS then provided the report on implementation progress to the Agency POC.

Challenges

Implementation of opportunities, in many cases, required a longer timeframe than that offered by the *NYCitySen$e* program. For example, the Fire Department agreed to pursue the installation of an overhead delivery system for vehicle lubricants and obtained approval from OMB for the funding. However, the building in which the EMS vehicle maintenance operations

are housed developed structural problems and the City elected to replace the building. Although the Fire Department intends to include the overhead lubrication system in the design of the new facility, this opportunity, and additional opportunities for other Agencies, could not be implemented or measured within the timeframe of the project.

Scheduling the review meetings was difficult due to the demands on Agency staff. Staff of the participating agencies often did not have the resources necessary to follow up on commitments to provide data, contact vendors or hold internal meetings prior to the next review of Agency implementation efforts. One Agency was unable to commit staff and resources to any reviews. In an effort to reduce the burden on Agency staff, DOS agreed to perform final reviews via teleconference.

7. Seminars and Training Sessions

Description

In July and August 1999, DOS and SAIC conducted seminars on eight waste prevention topics for City Agency staff. The initial invitation to attend was generated by the Mayor's Office of Operations and delivered to the Commissioners of all Mayoral and non-Mayoral agencies. The invitation included a list of the eight seminars and requested that the Commissioners assign appropriate staff to attend each of the seminars. The seminar schedule and topics are listed below.

NYCitySen$e Seminars

DATE	TOPIC	SPEAKERS	ATTENDEES
July 28, 1999	Waste Prevention and Recycling Opportunities for Offices	Shazaad Ali, Director of Finance, DBS Alfred Miller, Facilities Management and Construction, DEP Lou Hines, DEP	43 persons 23 City Agencies
July 29, 1999	Waste Prevention and Recycling Opportunities in Food Service	Facilitated Discussion	16 persons 9 City Agencies
August 4. 1999	Environmentally Preferable Purchasing Decisions	Facilitated Discussion	21 persons 16 City Agencies
August 5, 1999	Waste Prevention and Recycling Opportunities for Vehicle Maintenance Operations	Ann Masters, Director, Support Operations, Bureau of Motor Equipment, DOS Doug Sutton, Supervisor, Fleet Services, DOT	29 persons 17 City Agencies
August 6, 1999	Waste Prevention and Recycling Opportunities in Facilities Management	Jerry Torres, Deputy Director of Building Services, DCAS Ray Graczyk, President, Northeast Lamp Recycling	32 persons 16 City Agencies

NYCitySen$e Seminars (continued)

DATE	TOPIC	SPEAKERS	ATTENDEES
August 11, 1999	Waste Prevention and Recycling Opportunities for Warehouses	Don Campbell, Acting Asst. Commissioner, DCAS Tom Andrews, Director, DOH Distribution Center David Sapphire, CENYC	33 persons 15 City Agencies
August 19, 1999	Building Managers Roundtable	Facilitated discussion for managers of private buildings leasing space to City Agencies and their tenants	23 persons 11 City Agencies 6 reps from building mgmt. companies
August 20, 1999	Environmentally Preferable Purchasing Decisions	Eun-Sook Goidel, EPP Program, U.S. EPA Marcia Deegler, Commonwealth of Massachusetts, Dept. of Government Services John Halenar, Buy Recycled Alliance of New York (BRANY)	21 persons 12 City Agencies

In May and June 2000, DOS and SAIC conducted five training sessions on waste prevention and environmentally preferable purchasing, for Agency Chief Contracting Officers, Agency pruchasing staff, Agency Waste Prevention Cooridnators, and SCAS staff at the Department of Municipal Supply Services.

8. Guidance

Case studies of successful waste prevention and enhanced recycling programs and projects initiated by a variety of City Agency operations throughout the five boroughs can be found on the web at www.nycwasteless.com/citysense.

Section II. City Agency Descriptions and Major Waste Prevention and Enhanced Recycling Recommendations

The following section provides a description of each of the operations assessed within the participating Mayoral Agencies. The types of operations assessed at each of the agencies differs in function, size, and activities. The descriptions provide context for the waste prevention and enhanced recycling initiatives and serve to further clarify the types and quantities of waste and recyclables identified during the one-day waste sort. Each participating City Agency selected waste prevention and enhanced recycling recommendations to consider for further review or for implementation. This section provides a brief description of the selected recommendations for each Agency.

A. DEPARTMENT OF BUSINESS SERVICES

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

The primary mission of DBS is to increase opportunities for all businesses located within New York City, with particular attention to small businesses, to improve the level and quality of services offered by the City to the business community and to enhance the business climate in the City by cutting "red tape" and intervening on behalf of business.

Department of Business Services—Programs

- Business Development Center
- Bid-Match Program
- Bonding Technical Assistance Program
- Business Improvement District
- Business Relocation Assistance Corp. (BRAC)
- City Business Assistance/Emergency Response Division
- Commercial Revitalization
- Division of Economic & Financial Opportunity
- Division of Labor Services
- Economic Development Zones
- Energy Cost Savings Program
- Fulton Fish Market and NYC Terminal Markets
- Locally Based Enterprise Program
- Lower Manhattan Energy Program
- Minority & Woman-Owned Business Enterprise Program
- Neighborhood Development
- Procurement Outreach Program
- Vendor Initiative

The assessment team worked with the following operational areas with DBS offices:

The ***Business Action Center*** works primarily with individuals wishing to start a new business in New York City. It provides general guidance to entrepreneurs in the City, assistance with City, State and Federal permit requirements, and resolves problems that businesses encounter with government agencies and utility companies. In addition, the Business Action Center works with individuals building new facilities, assisting them in interpreting blueprints, and building codes.

The ***Business Improvement District*** (BID) program is within the Division of Neighborhood Development. At present, there are 40 BIDs in the City, with a total budget of $54 million. BIDs are funded by fees collected from businesses within the BID. Money is collected by the City and then handed back over to the BIDs. BIDs are required to submit annual reports to DBS showing progress made toward the BID's district plan. In addition, most BIDs prepare newsletters for distribution to BID members. DBS works with the BIDs to include in the newsletters special information that the City wants to publicize, *e.g.*, tax-free weeks. In addition, the program sponsors *Getting Down to Business*, a conference attended by more than 1000 business owners and operators, every spring.

The ***Business Retention Program*** provides relocation grants for manufacturing firms, particularly firms wishing to move from Manhattan south of 96th Street to other boroughs. Through the *Industrial Relocation Grant Program* the grants are targeted to renovation of the new site.

The ***Lower Manhattan Energy Program*** offers Lower Manhattan landlords and certain tenants a 30 percent rebate on monthly electric bills over 12 years (eight years plus a four-year phaseout). The rebates are tied to submetering requirements and renovations, regardless of the energy impacts of those renovations, *i.e.*, no energy efficiency component is included with the rate reduction. Through the Lower Manhattan program, DBS is working to encourage the use of recovered steam to power air conditioning systems and provides a rebate to customers purchasing natural gas for cogeneration.

The ***Energy Cost Savings Program*** offers up to a 30 percent rebate for electricity and up to 20 percent for natural gas for industrial and commercial firms relocating, expanding or renovating. The targeted activity must be equivalent to 10 percent of the building's assessed value.

The ***Economic Development Zone*** (EDZ) program is a State-funded Commercial Revitalization program, overseen in New York City by DBS. There are nine EDZs in the City and 52 in the State as a whole. The EDZ program is designed to provide tax incentives and services in specific areas in the City that are undertaking revitalization efforts. Each zone has an administrative board that contracts with a Local Development Corporation (LDC) to provide assistance to businesses. DBS hosts Information Exchange seminars that present information on topics of interest to members of the Economic Development Commissions located in each zone.

The ***Commercial Revitalization Program*** funds 32 groups in the City. The basic premise of the program is to organize businesses in an area and then to improve storefronts, sidewalks, etc. and to make small infrastructure improvements in an area to attract business. DBS provides

grants to these groups and requires that all activities be completed within a discreet time period. After that, the groups may further organize to become BIDs, continue in another form, or disband.

Security and Enforcement is responsible for overseeing law enforcement at all of the City markets, including the Fulton Fish Market and the Hunts Point Terminal Market, with a staff of approximately 50 people. Security and Enforcement registers all wholesalers at the markets, assists in the negotiation of carting contracts at some of the markets, monitors fees charged by loaders at the markets, and monitors the quantity of product coming through the markets, among other things.

2. Waste Prevention Opportunities

Issue a waste prevention policy statement.

To demonstrate the Agency leadership's commitment to waste prevention and recycling, DBS staff agreed to develop a written policy statement that clearly communicates to all DBS staff their support for, as well as the specifics of, the waste prevention and recycling efforts at 110 William Street.

Enhance the use of the duplex copying and printing options.

Copiers and printers in DBS offices are duplex capable. However, the assessment team observed single-sided copies of multiple page documents throughout DBS operations. DBS agreed that staff should receive further instruction in the use of duplex and two-up functions for printing as well as the duplex function on the copiers. DBS agreed to contact their equipment vendors to determine whether training is available and to post new reminders to use the duplex function above each copy machine.

Designate a storage area for reusable office supplies.

The assessment team found office supplies in good, usable condition discarded as waste. DBS agreed to evaluate the feasibility of establishing a reuse cabinet for unwanted, but still usable, office supplies or to investigate creating a reuse area in the regular supply room. DBS also agreed that supply staff should make employees aware that they should check the reuse cabinet or the reuse area of the supply room prior to ordering new supplies.

Test rechargeable batteries for pagers.

DBS staff have approximately 50 pagers for which batteries must be issued periodically. Changing to rechargeable alkaline batteries would significantly reduce battery disposal, since each battery could be recharged up to ten times, prior to disposal. DBS staff agreed to initiate a pilot program using alkaline rechargeable batteries to determine whether purchases of single-use batteries could be eliminated.

DBS staff is aware that rechargeable nickel cadmium (NiCd) batteries also are available. Because of the heavy metal content, NiCd batteries must be recycled or managed as a hazardous waste. Once expired, rechargeable alkaline batteries can more safely be discarded as solid waste.

Encourage the purchase and use of recycled computer disks.

DBS agreed to purchase a supply of the recycled computer disks to test. If staff is satisfied with the performance of the disks, DBS agreed to consider changing the purchasing specification to require only recycled disks.

Coordinate with the telephone company to deliver fewer telephone books.

DBS staff told the assessment team that each employee receives a set of telephone books. DBS agreed that a review of the number of telephone books actually needed may be appropriate, as staff can share the books within a program or office area.

Enhance the relationship between DOS programs and DBS outreach activities.

All DBS personnel interviewed during the assessment expressed a strong understanding of the importance of waste prevention and recycling issues and suggested that they could disseminate waste prevention information to their staff and clients. For example, DBS staff assisted DOS in promoting the *NYC WasteLe$$* seminars through local Business Improvement Districts (BIDs).

3. Opportunities To Enhance Recycling

Enhance the effectiveness of the office paper recycling program.

DBS staff separate both white and mixed office paper and both programs appear to be effective. However, the significant amount of recyclable paper found in the trash suggests that DBS might benefit from additional containers and labels to encourage staff to increase participation in the recycling program. DBS agreed to ask managers to encourage employees to source separate paper in their offices.

Establish a recycling program for mixed containers.

DBS has not established a collection and recycling program for mixed containers. The Agency agreed to investigate the possibility of establishing mixed container recycling with the building management service.

4. Waste and Recyclables Generation Data

The following tables summarize the trash and recyclables data gathered during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Department of Business Services

Second Floor—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	11.3%	7.50
- *white paper*	11.3%	7.50
Recyclable Materials Discarded in Trash	14.3%	9.50
- *paper (white paper, newspaper)*	12.8%	8.50
- *corrugated cardboard*	1.5%	1.00
Properly Disposed Trash	74.4%	49.30
- *paper (mixed paper, paperboard)*	9.0%	6.00
- *food service items*	16.6%	11.00
- *mixed containers*	14.8%	9.80
- *food/liquid*	10.6%	7.00
- *other*	23.4%	15.50
Contaminants in Recyclables	0.0%	0.00
TOTAL TRASH AND RECYCLING	100.0%	66.30

TRASH		Description	
Paper	26.4%		15.50
- *white paper**	9.4%	single-sided copy paper	5.50
- *newspaper**	5.1%	newspapers	3.00
- *mixed paper*	7.7%	ream wrappers, junk mail, hanging folders, colored paper	4.50
- *paperboard*	2.6%	paper pad backing, 2 molded carriers, fruit snack pack holder	1.50
- *corrugated cardboard**	1.7%	pizza box	1.00
Food Service Items	18.7%		11.00
- *cups (paper and plastic)*	3.4%	35 paper cups; 13 foam cups	2.00
- *plastic food service items*	6.0%	clamshells, yogurt cups, plastic bags, cup lids, utensils	3.50
- *paper food service items*	9.4%	napkins, paper bags, plates	5.50
Mixed Containers	16.7%		9.80
- *recyclable glass bottles*	7.7%	7 juice bottles	4.50
- *recyclable plastic bottles*	2.6%	5 juice and water bottles	1.50
- *redeemable plastic bottles*	1.7%	3 bottles	1.00
- *redeemable aluminum cans*	2.6%	8 cans	1.50
- *aluminum foil/trays*	1.7%	1 tin tray, foil	1.00
- *steel cans*	0.4%	2 cans	0.25
- *juice boxes/gable top bev. cartons*	0.1%	1 juice container	0.05
Food/Liquid	11.9%	banana peels, rice, bread, lunch items	7.00
Other	26.4%		15.50
- *unsorted restroom waste*	20.4%	paper towels, newspaper	12.00
- *miscellaneous trash*	6.0%	rags, Tyvek envelopes, AA batteries, candle, feather, cigarette packs	3.5
TOTAL TRASH	100.0%		58.80

Category/Material	Percent of Total		Weight of Sample (Pounds)
RECYCLING		**Description**	
White Paper	100.0%	Copy paper, printer paper	7.50
TOTAL RECYCLING	100.0%		7.50

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Department of Business Services

Third Floor—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	36.1%	38.00
- *white paper*	15.2%	16.00
- *mixed paper*	19.0%	20.00
- *mixed containers*	1.9%	2.00
Recyclable Materials Discarded in Trash	13.3%	14.00
- *paper (white paper, newspaper, magazines)*	13.3%	14.00
Properly Disposed Trash	48.6%	51.06
- *paper (mixed paper, paperboard)*	7.1%	7.50
- *food service items*	15.7%	16.50
- *mixed containers*	13.4%	14.06
- *food/liquid*	6.7%	7.00
- *other*	5.7%	6.00
Contaminants in Recyclables	2.0%	2.08
TOTAL TRASH AND RECYCLING	100.0%	105.14

TRASH		Description	
Paper	32.9%		21.50
- *white paper**	12.2%	one-sided print-outs, two-sided bound reports	8.00
- *newspaper**	5.4%	newspaper	3.50
- *magazines**	3.8%	office journals	2.50
- *mixed paper*	7.7%	envelopes, file folders, ream wrappers, junk mail	5.00
- *paperboard*	3.8%	food boxes, disk boxes, mailing envelope	2.50
Food Service Items	25.3%		16.50
- *cups (paper and plastic)*	3.8%	45 paper cups, 14 foam cups	2.50
- *plastic food service items*	6.9%	plastic bags, utensils	4.50
- *paper food service items*	14.5%	napkins, bags	9.50
Mixed Containers	21.9%		14.31
- *recyclable glass bottles*	13.0%	12 bottles	8.50
- *recyclable plastic bottles/jugs*	2.3%	8 jugs & bottles—milk, water, juice	1.50
- *redeemable plastic bottles*	0.1%	1 bottle	0.06

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
Mixed Containers (continued)			
- *recyclable aluminum cans*	1.5%	5 cans	1.00
- *redeemable aluminum cans*	2.3%	12 cans	1.50
- *aluminum foil/trays*	2.3%	2 balls of foil, 1 aluminum perfume bottle	1.50
- *steel cans*	0.1%	1 orange juice can	0.08
- *juice boxes/gable top bev. cartons*	0.3%	4 juice and milk containers	0.17
Food/Liquid	10.7%		7.00
Other	9.2%		6.00
- *plastic film*	1.5%	dry cleaning bags, plastic wrap	1.00
- *miscellaneous trash*	7.7%	broken umbrella, Mylar balloons, carbon paper, Polaroid photos, label backing, blister packs	5.00
TOTAL TRASH	100.0%		65.31
RECYCLING		**Description**	
White Paper	39.9%	copy paper, printer paper	16.00
Mixed Paper	49.9%	pad of old newsprint, newspaper, junk mail	20.00
Mixed Containers	5.0%	1 glass bottle, 3 aluminum cans, 2 steel cans	2.00
Contaminants in Recycling	5.2%		2.08
- *in white paper*	5.0%	glossy poster, file folders, ream wrappers, catalog, manilla envelope, plastic report binder	2.00
- *in mixed paper*	0.2%	milk carton, paper towel	0.08
TOTAL RECYCLING	100.0%		40.08

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

B. DEPARTMENT OF CITYWIDE ADMINISTRATIVE SERVICES

1. Description of Operations Assessed

The Division of Municipal Supply Services (DMSS) is the procurement arm of City government. DMSS is responsible for annual purchases of $500 to $700 million in goods and services; testing and inspection for quality of certain categories of those goods; receipt and storage of goods; and distribution of materials to user Agencies throughout the City of New York. DMSS provides oversight to the operations of the DCAS Central Storehouse and the Office of Surplus Activities, which oversees vehicle auctions and the Surplus Warehouse. Specific duties of DMSS staff include product specification; product evaluation and inspection; competitive bidding; warehousing commonly used items; and reallocation of reusable goods.

The DMSS Bureau of Procurement develops specifications for bids and coordinates access to approximately 1,200 Requirements Contracts. DMSS establishes Requirements Contracts for

those products and materials routinely purchased by City Agencies in annual amounts of more than $25,000 and for construction and construction-related services valued at more than $50,000. Each Requirements Contract is a legal agreement between the City of New York and a vendor or vendors that includes the duration of the contract, the overall value, and a series of standard administrative clauses for termination, delivery and packaging. Information on Requirements Contracts is maintained in a database, the Commodity Line Item Purchasing System (CLIPS). Each month, DMSS distributes to every City Agency, two printouts listing all active Requirements Contracts: one organized alphabetically by vendor and the other alphabetically by commodity. New or amended contract information is disseminated through these lists.

DMSS staff includes four Purchase Directors, each responsible for a specific group of products and materials. Group 1 includes motorized equipment and repairs, fuel oil and gasoline. Group 2 is data processing equipment, office machinery, printing and paper supplies, office supplies, electronics, audiovisual, micrographics, communications and safety/security equipment, drugs and pharmaceuticals, and hospital and lab equipment. Group 3 is responsible for purchases of food; and Group 4 oversees machinery, tools and hardware, clothes and textiles, chemicals and paints, metal products and plumbing supplies.

Within each Group, buyers execute purchases. DMSS buyers procure the goods and services requested by the City Agencies in a process that ensures free and open competition and compliance with various statutory requirements. DMSS is responsible for providing price advantages based on quantity purchases and ensuring a timely flow of goods to allow each City Agency to perform its mission. Since 1991, DMSS has experienced significant downsizing and no longer has personnel assigned to work on waste prevention, life cycle and product performance analysis or recycled-product procurement.

The Central Storehouse

The CLIPS database does not include information on those products and materials available from the DCAS Central Storehouse; these are listed in the Central Storehouse Commodity Catalogue.

The Central Storehouse performs warehousing and distribution functions for Mayoral Agencies. The Storehouse maintains a $7 to $8 million inventory and employs 65 staff, including seven security officers. The products housed in the Central Storehouse are purchased by DMSS buyers using existing contracts. The Storehouse replenishes Agency supplies, including special items used by Corrections, Police, and Fire. The Storehouse uses its own trucks and contractors to service 2,200 delivery points. Some Agency operations, such as DEP's upstate Reservoirs, pick up their orders at the Storehouse.

The facilities in the storehouse building include 15,000 sq. ft. of office space and 400,000 sq. ft. of warehouse. An additional 140,000 sq. ft. is occupied by records storage for DCAS and the Department of Records and Information Storage (DORIS). The Storehouse also houses a special education program for disadvantaged high school students, conducted in cooperation with the Board of Education. The Storehouse provides the students with an on-site classroom and work experience.

The Surplus Warehouse

City Agencies can acquire free surplus computer equipment, office furniture and supplies at the B-53 Surplus Warehouse, located under the Brooklyn Bridge in Brooklyn. Agencies also may send their surplus supplies and products to the Warehouse for redistribution by completing a relinquishment form and delivering the materials to the Warehouse. In FY 97 and 98 combined, more than $5.2 million in furniture and equipment was transferred among City Agencies and sales of goods including computers, office supplies and machine tools generated an additional $213,000 in revenue.

The Warehouse also generates revenue through annual sales of unusable light and heavy scrap metal to a single contractor, selected through a competitive, sealed bid process. In addition, Warehouse staff sells valuable metals, such as aluminum from the DOT Sign Shop, via individual bids. Scrap metal sales generated revenue of $450,000 in FY97-98.

2. Waste Prevention Opportunities

Adopt the Federal Comprehensive Procurement Guideline standards for recycled-content products.

In 1992, DCAS, then the Department of General Services, promulgated regulations [Title 55, Chapter 8] defining minimum secondary material content standards to establish price preference eligibility. Section 8-03 (b) states "DMS shall utilize all minimum content standards for secondary materials subsequently promulgated or amended by either USEPA or the New York State Department of Environmental Conservation (DEC). . ." Section 8-03 (d) continues, "DMS may restrict bids solely to products composed of specified minimum secondary material content levels." To potentially increase the total dollar value of the City's purchases of recycled-content and environmentally preferable products and the variety of recycled-content products purchased, DCAS Division of Municipal Supply Services (DMSS) agreed to review the Federal Comprehensive Procurement Guideline (CPG) standards for recycled-content products and work with City Agencies to test and potentially establish contracts for additional products.

Work with City Agencies' procurement staff to document product performance.

The quality and performance of environmentally preferable and recycled-content products and programs is crucial both to the missions of City Agencies and to the expansion of the environmental purchasing program. City Agency satisfaction is a strong selling point. Contingent upon the availability of staff, DMSS agreed to initiate a pilot project with a City Agency to test the performance of a recycled-content or environmentally preferable product as a potential substitute for a product currently in use. DMSS also agreed to design and implement procedures to highlight City Agency successes with environmentally preferable and recycled-content products and services.

Label recycled-content and environmentally preferable products.

To make it easier for staff at City Agencies and Authorities to purchase recycled-content and environmentally preferable products, DMSS required that Staples provide City Agencies with

information about recycled-content and environmentally preferable products available through their catalogue. DMSS agreed to mark, label or otherwise highlight environmentally preferable and recycled-content items in the Storehouse Catalogue.

Enhance the wooden pallet recovery, reuse and recycling program.

The DCAS Central Storehouse uses standard Grocery Marketing Association (GMA) 48" x 40" and 48" x 48" wooden pallets for redistribution of products from the Storehouse to City Agencies. Each pallet delivered to an Agency bears a $8.00 deposit and, although Storehouse drivers are required to collect pallets and return them to the Storehouse, it appears that Storehouse drivers may not routinely collect pallets for backhaul. In addition, vendors making deliveries to the DCAS Central Storehouse are contractually obligated to take back the same number of pallets as they deliver, although not all comply.

Rather, pallets accumulate at individual City Agency locations and, eventually, when space becomes a premium, are discarded as solid waste. At the Storehouse, off-spec and broken pallets are stacked up near the dumpsters for collection by DOS as waste. Storehouse staff estimated that they discard 3,500 to 4,000 pallets per year as solid waste. The *NYCitySen$e* assessments found that all participating agency locations routinely discard usable, as well as broken, pallets as solid waste.

DMSS agreed to initiate a pilot pallet return/recycling program between one City Agency location and the Storehouse and to track the results. Based on the pilot program results, DMSS also may develop and initiate Citywide training on pallet management.

Enhance the drum recovery, reuse and recycling program.

The DCAS Central Storehouse distributes cleaning products and lubricants to City Agencies in standard 55-gallon metal drums. Each drum delivered to an agency carries a $20 deposit and Agency staff is responsible for contacting the vendor to collect the empty drums. City Agencies do not routinely return the drums to the vendor. Rather, drums accumulate at individual City Agency locations and, eventually, when space becomes a premium, are either recycled as scrap metal or discarded as solid waste. DMSS agreed to make an effort to quantify the number of drums in circulation in City Agencies. DMSS also agreed to re-educate City Agency staff concerning the procedures for return of empty drums to the vendor.

Reduce the purchase of industrial toxics.

U.S. EPA has published a list of 17 industrial toxic chemicals targeted for reduction or elimination. City Agency operations, including the DCAS shops, purchase and use paints, cleaners, solvents and other products containing these chemical constituents. Reduction in the purchase and use of products containing hazardous constituents reduces worker exposure to these constituents and may provide significant benefits for the health and safety of City employees.

DMSS agreed to work with DOS to initiate a dialogue with other Agencies and public officials concerning the potential to initiate training on this subject. The training would teach City Agency procurement and operations staff how to access information about less toxic substitutes for the chemical constituents of products currently purchased and used. Agency staff would learn about information sources such as the Joint Service Pollution Prevention Technical Library, procedures for testing less-toxic substitute products to determine whether they meet performance specifications, and specifying the less-toxic alternative in future procurements.

Initiate a packaging reduction program.

In 1995, DMSS awarded the New York City office products contract to Staples. Previously, office supplies were delivered in quantity directly to the DCAS Central Storehouse from multiple vendors. Staples now routinely delivers small orders of office supplies directly to City Agencies. Staples packaging presents an opportunity to review and evaluate the amount of packaging waste generated by City Agencies and the cost to the City to collect and manage that waste. DMSS met with Staples to review the packaging and discuss waste prevention efforts, the quantity of recycled-content in the packaging, and current and future opportunities to further reduce packaging waste associated with City purchases without endangering product quality.

Consider establishing Requirements Contracts for additional products.

During the assessments of City Agency operations conducted under the *NYCitySen$e* project, staff indicated that there were a number of waste preventing products that they purchase or would like to purchase routinely that are not readily available on City requirements contracts or from the Staples catalogue. To offer the most competitive pricing to City Agencies, DMSS agreed to review the status of these products and determine whether it is feasible to make them available from Staples or to establish Citywide contracts.

Two-way envelopes

Mechanical pencils

Refillable pens and refills

Electric hand dryers

Bulk dispensers for beverages

Bulk dispensers for condiments

Cartridgeless printers

Appointment book refills

Mulching lawnmowers

Rechargeable alkaline batteries

Water-based correction fluid

Ensure that the Lexmark requirements contract links the printer part number with the duplex option part number.

As a result of a review of the Lexmark requirements contract, it appears that Agency staff purchasing Lexmark Optra S series printers also need to purchase a separate piece of equipment to make the printers capable of duplex printing. Discussions with staff at various agencies regarding the inability to duplex print with the new Lexmark printers indicate that purchasing staff may not be aware that they must also purchase the Duplex Option part number 43H5103.

DCAS linked the two parts numbers in the purchasing system to ensure that City Agencies choosing to purchase Lexmark printers will order both a new printer and the necessary duplex option part.

Encourage Agencies to consider the purchase and use of recharged toner cartridges, where possible.

Agencies can purchase refurbished toner cartridges, which are of comparable quality to the new cartridges, make the same number of copies, and offer a price advantage. Several New York City companies provide recharged toner cartridges for a variety of brands of equipment, including Lexmark, to City Agencies. By purchasing recharged toner cartridges, the DOS BWPRR saves $50.25 per Lexmark cartridge and $15.25 per Hewlett Packard cartridge. DMSS agreed that Agencies should be encouraged to consider purchasing recharged toner cartridges.

Specify that all photocopiers delivered to City Agencies are set to default to the duplex mode.

It appears to be possible to require that most new photocopy machines delivered to City Agencies have duplex as the default setting. DCAS agreed to contact the contracted vendors to advise them of the City's wish to encourage City employees to use the duplex function and reduce the quantity and cost of paper purchasing for the City, by ensuring that all photocopy machines delivered to City Agencies default to duplex before or at the time of delivery.

Offer training opportunities for interested staff from each Agency to learn how to double-side photocopies and print jobs.

Interviews conducted during the *NYCitySen$e* facility assessments indicate that often Agency staff responsible for operating the photocopy machines, using the printers, and managing the service centers are not familiar with the duplex capabilities of the equipment. DCAS agreed to discuss initiating vendor training at the time of installation of new equipment.

Lease equipment whenever possible. Ensure that, when possible, equipment is returned to the manufacturer for proper disposal.

DCAS agreed to investigate additional opportunities to lease electronic equipment currently purchased by the City so that the equipment can be returned to the vendor at the end of its useful life. DCAS agreed to review the costs, including transportation, labor and disposal, of managing this equipment as waste to determine whether a lease that allows the equipment to be returned to the vendor actually will save money for the City.

DCAS agreed, contingent upon available staff, to consider reviewing opportunities to revise specifications to require that photocopiers and other electronic equipment purchased by City Agencies can be returned to the manufacturers for proper dismantling, recycling and/or disposal.

DMSS agreed to review New York State contracts for additional leasing opportunities. DMSS believes that a purchase analysis is required to implement this recommendation.

Specify energy-efficient and low-mercury lamps in future procurements.

DCAS agreed to considering specifying energy-efficient and low-mercury lamps in future procurements. DCAS agreed to refer this recommendation to their Office of Energy Conservation for consideration and potential development of specifications for energy efficient lighting options.

3. Opportunities to Enhance Recycling

Encourage City Agency toner cartridge recharging/recycling programs.

Used toner cartridges can be remanufactured and cartridge manufacturers including Xerox, Hewlett Packard and Canon take back their cartridges for refurbishment at no cost to the customer. In addition, there are private companies in New York City that specialize in toner cartridge recovery and recycling. DCAS, with assistance from DOS, agreed to develop and distribute a Procurement Bulletin urging City Agencies to collect their expired toner cartridges and return them to the manufacturer or to an independent organization for refurbishment.

C. DEPARTMENT OF ENVIRONMENTAL PROTECTION

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

Three operations participated in the assessment and waste sort at DEP: the photocopy/ reproduction room, the stockroom, and the employee cafeteria.

Photocopy/Reproduction

The photocopy/reproduction area is a full-service copy center that provides DEP staff with black and white and color copying services. The shop has four large copiers with collating, stapling and binding capabilities. In addition, the operation performs binding (GBC, heat and binders), hole punching, folding and cutting services. Reproduction jobs are ordered by completing a form that specifies the number of copies, and other reproduction services. DEP also has a photocopy machine capable of receiving jobs via computer request. DEP did not provide an estimate of how often DEP staff send a photocopy job directly to the machine.

Paper is delivered in shipments of 40 cartons per stretch-wrapped pallet. Several sources at DEP indicated that pallets are collected by the Department of Citywide Administrative Services

(DCAS) for reuse at the warehouse. However, other DEP staff indicated that DCAS does not collect the pallets for reuse. Corrugated cardboard boxes are used for job deliveries within the facility or are recycled.

The photocopy shop is the "official" operation that controls the ordering and distribution of paper used by all DEP operations in the facility. All paper is procured through DCAS. DEP estimated that the photocopy shop uses approximately 50 percent of the paper ordered. The other 50 percent is distributed to the bureaus for photocopiers in the office areas and for printers. The distribution of paper is typically limited to two boxes per request. The cost of paper obtained from the photocopy shop and copying performed in the photocopy shop is not charged back to the individual bureaus.

Although the photocopy shop is technically the only location authorized to perform paper procurement, DEP staff noted that a significant amount of paper is ordered by the individual bureaus, bypassing the normal paper supply system. DEP provided SAIC with data on the quantity of paper ordered directly by bureaus. A review of the data indicates that the majority of the paper purchases are for locations (*e.g.*, Wards Island, Gramsville, Valhalla etc.) other than the Junction Boulevard location. Paper also is ordered from DCAS by individual bureau staff who place the order directly and do not work within the system established by DEP to monitor paper purchases. Paper that is ordered by individual bureaus is charged back to the bureau's budget as opposed to the paper that is ordered through DEP's central order system.

Stock Room

The stockroom supplies all office supplies and non-paper products used by DEP staff. Supplies include everything from post-its and folders to batteries and computer diskettes. The stockroom procures a variety of items (*e.g.*, office supplies, alkaline batteries etc.) and distributes them on request. Supplies obtained from the stock room are not charged back to the bureaus that use them. No computer record of items used by each bureau is kept by the DEP stockroom. Usage is tracked as total purchases minus inventory. Inventories are performed monthly.

DEP orders supplies from the DCAS storehouse. Items not available from DCAS are purchased from Staples on a Citywide contract. Large orders are typically received packed in cardboard boxes stacked on stretch-wrapped pallets. Small orders are received in corrugated cartons. Several types of supplies, including paper and folders, were made with recycled material. Staff stated that they did not specifically order recycled-content products but that they order and use the products that DCAS carries in its warehouse.

Employee Cafeteria

The employee cafeteria is operated in space leased from DEP by Metropolitan Food Services, Inc. Water and electrical costs associated with the cafeteria are paid by DEP. The vendor provides all other supplies for the operation of the kitchen and cafeteria. The cafeteria serves approximately 250 meals per day. The number of people served varies throughout the year. During summer and winter seasons, sales are higher than in spring and fall. Although the food service contractor has not performed any formal studies or surveyed diners, one suggestion is

that nicer weather draws employees outside to eat lunches brought from home or for a walk to nearby restaurants. Another observation provided by the food service contractor, but not formally measured, indicates that 75 percent of food sold is consumed outside of the cafeteria.

The food service operation includes a grill area where hot food items (*e.g.*, hamburgers, sausages, etc.) are made to order, an area where hot meals/lunch specials are made to order, a deli counter where sandwiches are made to order, and a salad bar. There are additional areas for breakfast cereals, fresh fruit, bakery items and cakes. All food from the cafeteria is served either on paper plates or in plastic clamshell containers. Bulk milk, coffee, and soft drinks are served, as well as bottled and canned beverages.

All pots, pans, trays and other service items are cleaned by hand in the kitchen. A large dishwashing room is equipped but is not in operation. Based on conversations with the cafeteria vendor, the dishwasher was used briefly by the previous vendor. It appeared that the dishwasher may be operational; however, the costs associated with using the dishwasher must be evaluated. The cafeteria vendor was concerned that using the dishwasher may increase labor costs if a dishwasher operator is required.

Metropolitan Food Services, Inc. has one primary supplier for food items. These supplies are delivered once per week. Supplies are sometimes delivered on pallets and at times are stretch-wrapped. The vendor takes back pallets used for delivery. Most of the supplies are delivered in corrugated cartons.

Dairy products are delivered in reusable plastic crates three times per week. Produce and fish are delivered, in cardboard boxes, by separate vendors weekly or as needed. Bakery items also are ordered from a separate vendor and are delivered in paper bags. Bagels and muffins are then sliced and wrapped in plastic prior to sale by kitchen staff. Frozen bakery items (*e.g.*, cakes and pies) are delivered in plastic crates. Three main beverage distributors supply approximately 100 cases of beverages per week in corrugated cardboard trays.

2. Waste Prevention Opportunities

Develop a waste prevention and recycling outreach and awareness campaign including a "Waste Prevention and Recycling Day."

DEP agreed to raise the awareness of waste prevention and recycling initiatives as well as present training on certain waste prevention and recycling policies and success stories to its staff. Preliminary discussions included specific training to clerical staff on photocopying procedures and to all staff regarding recycling and reuse policies and initiatives. DEP agreed to hold a "Waste Prevention and Recycling Day" during which, speakers could provide training and presentations on waste prevention and recycling. This could also provide an opportunity to publicize new waste prevention programs being initiated. This event may include giveaways, such as reusable mugs, that would generate interest in long-term waste prevention and recycling at DEP.

Repair/replace photocopy machines that cannot readily produce double-sided copies. Reduce paper use by reducing and copying two to four pages per side for storage/reference.

Reduce paper use by setting photocopy machines to default to the duplex setting. Ensure signs are posted at all photocopy machines encouraging staff to use the duplex capability of the machine.

The implementation of these options should follow the paper path from the user printing documents through the use of photocopiers to make multiple copies. DEP agreed to identify all printers and copiers and document the capabilities of each. For each printer, document the location, number of users, printer type, the toner cartridge type and determine if it has duplex capabilities and two-up and four-up capabilities, a feature available on many Lexmark Printers.

Users of printers that have duplex capabilities should be trained in how to print duplex versions of documents and encouraged to use the duplex capabilities. Purchases of new printers with duplex capabilities should be considered, especially in areas where several people use a particular printer.

DEP agreed to encourage staff to format documents for multi-page printing. This will reduce full pages to fit two to four pages per side for those written materials that will be filed for reference only. This option is available on many Lexmark printers.

After documenting the duplex capabilities of the photocopiers, DEP agreed to target over time, the replacement or repair of existing copiers to facilitate the efficient production of duplex copies. For those photocopiers with duplex capabilities, DEP has agreed to change the default settings, where possible, to facilitate duplex printing throughout the building.

DEP agreed to ensure that signs are posted at all photocopy machines encouraging staff to make double-sided photocopies. These signs will provide clear instructions on how to perform single to duplex copying and double-sided copying if duplex is not the default setting. Signs advocating doubled-sided copying can be requested from the Department of Sanitation. Staff are encouraged to reduce printing format (*e.g.*, decrease margins, font size, reduce unnecessary graphics and borders, etc.) to increase the amount of information that can be included on one sheet of paper.

When sending a used photocopy machine from the facility, ensure that any remaining supplies, specific to the make and model, are delivered to the new user.

DEP agreed to establish a checklist of machines and an inventory of supplies specific to each make and model. They will assign the responsibility of ensuring that all excess supplies are removed and delivered with each machine as it is removed from service.

Further investigate the use of rechargeable batteries and products that can use rechargeable batteries (e.g., flashlights).

DEP agreed to study the potential to use rechargeable batteries for many of its current uses. Specifically, DEP wants to buy equipment that can charge numerous batteries at once. DEP has only been able to find chargers that charge four to eight batteries at a time. In addition, DEP has not been able to purchase chargers and rechargeable batteries from existing City

contracts and does not have permission to purchase from sources other than the City contracts. DEP has agreed to use rechargeable batteries if they can locate an acceptable vendor.

3. Opportunities to Enhance Recycling

Improve separation of paper and cardboard for recycling.

DEP agreed to take steps to limit contamination in the cardboard recycling and the paper diverted from the photocopy operation. DEP agreed to address the contamination issues by ensuring that staff understand the recycling program and that bins are placed conveniently to allow for easy access by all staff. DEP also agreed to improve signs posted throughout its operation to direct employees to recycle materials properly.

Establish a toner recharging program.

DEP has recycled toner cartridges in the past but it was an informal process. DEP agreed to establish a formal program to collect and return printer cartridges for recharging. DEP also agreed to consider purchasing recharged printer cartridges for use in printers throughout the facility.

Reduce the number of trash cans or redistribute labeled recycling bins and place them next to the trash cans.

DEP agreed to ensure that its employees have adequate recycling bins. DEP seeks to enhance the current white paper recycling program by removing all individual, desk-side waste containers and providing each employee with a designated recycling bin.

For each floor, DEP agreed to review the purchase of General Area Receptacles and place them in convenient locations. Employees will be informed that the container at their desk or work station is for recyclable white paper only. Food, food containers, tissues and other waste should be discarded in the centrally located trash containers. Custodians will collect white paper from each desk and deposit it into the collection hampers. Custodians then would empty the waste containers and take the waste to the compactor.

Investigate the feasibility of purchasing durable serviceware and repairing the dishwasher.

DEP and Metropolitan Food Service, Inc. agreed to review the potential to use durable food service items if the existing dishwasher can be activated.

Offer discounts on beverages to employees who bring/purchase reusable mugs.

DEP and Metropolitan Food Service agreed to consider offering a discount to employees who bring reusable mugs to the cafeteria for coffee and tea, as well as offering DEP mugs for sale.

Serve condiments in bulk dispensers instead of single-serve packages.

Per DEP's request, Metropolitan Food Service agreed to use bulk condiment dispensers for the DEP operation. They also committed to making more bulk sugar containers available at the coffee station and at the condiment bar. DEP would also like to have salt and pepper dispensers available on the tables. Metropolitan Foods raised a concern about the theft of the dispensers.

Request that bakery items and other food items be delivered in reusable containers.

Per DEP's request, Metropolitan Food Service agreed to query its vendors to determine if additional items can be delivered in reusable crates. They also agreed to request that all soda and other beverages be delivered using reusable trays. Both Coca-Cola and Pepsi-Cola distribute beverages in plastic molded crates. Specifically, Metropolitan Foods agreed to investigate the use of returnable crates for baked goods, since the breads are supplied through Fink Bakeries. Fink Bakeries delivers in returnable cardboard cartons to other customers.

Reduce portion sizes or offer smaller sizes on some food items.

Per DEP's request, Metropolitan Food Service agreed to consider reducing the portion sizes or offer diners an option of ordering a smaller portion of food at a reduced cost.

Eliminate contamination in the cardboard recycling program.

Metropolitan Foods and DEP agreed to post signs directing kitchen staff not to place waxed cardboard in the recycling bin for non-waxed cardboard. Metropolitan Food Service management will monitor the program and offer direction to the staff as necessary to ensure that all employees understand the recycling program.

Recycle cooking grease.

DEP requested that Metropolitan Food Service contract with a vendor to pick up the grease for recycling. Several companies in New York City offer the service with some paying for the grease.

4. Waste and Recyclables Generation Data

The following tables summarize the trash and recyclables data collected at DEP during the one-day waste sort. These data represent conditions ***before waste prevention and enhanced recycling recommendations were presented to the Agency.***

Department of Environmental Protection

Photocopy/Stockroom—Trash and Recycling

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	75.7%	38.25
- *white paper*	32.2%	16.25
- *corrugated cardboard*	43.6%	22.00
Recyclable Materials Discarded in Trash	13.4%	6.75
- *paper*	10.4%	5.25
- *containers*	3.0%	1.50
Properly Disposed Trash	5.4%	2.75
- *food service items*	0.5%	0.25
- *food/liquid*	0.0%	0.00
- *other*	5.0%	2.50
Contaminants in Recyclables	5.4%	2.75
TOTAL TRASH AND RECYCLING	100.0%	50.50

TRASH		Description	
Paper	55.3%		5.25
- *white paper**	23.7%	paper cuttings	2.25
- *mixed paper**	31.6%	ream wrappers	3.00
Mixed Containers	15.8%		1.50
- *redeemable aluminum cans**	5.3%	3 cans	0.50
- *recyclable glass containers**	10.5%	1 bottle	1.00
Food Service Items	2.6%		0.25
- *cups (paper and plastic)*	2.6%	all paper cups	0.25
Food/Liquid	0.00%		0.00
Other	26.3%		2.50
- *plastic film*	15.8%	stretch wrap	1.50
- *miscellaneous trash*	10.5%	strapping, soggy paper material	1.00
TOTAL TRASH	100.0%		9.50

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Department of Environmental Protection

Cafeteria Kitchen—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	28.8%	
- *corrugated cardboard*	28.8%	35.50
Recyclable Materials Discarded in Trash	6.7%	8.25
- *paper*	2.0%	2.50
- *containers*	4.7%	5.75

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING (continued)		
Properly Disposed Trash	60.5%	74.60
- *food service items*	4.5%	5.50
- *food/liquid*	48.3%	59.60
- *other*	7.7%	9.50
Contaminants in Recyclables	4.1%	5.00
TOTAL TRASH AND RECYCLING	100.0%	123.35

TRASH		Description	
Paper	2.9%		2.50
- *paperboard**	2.3%	food and other supply packaging	2.00
- *corrugated cardboard**	0.6%	cardboard boxes, some wet	0.50
Food Service Items	6.3%		5.50
- *cups*	0.3%	8 plastic cups, 6 paper cups	0.25
- *plates, bowls, clamshells*	2.6%	12 dessert cups, 2 clamshells, 14 paper plates	2.25
- *utensils*	0.6%	15 plastic utensils	0.50
- *napkins*	0.6%	paper napkins	0.50
- *other food service items*	2.3%	plastic food bags, paper doilies	2.00
Mixed Containers	12.0%		10.50
- *recyclable glass containers**	3.4%	3 containers — Parmesan cheese, preserves	3.00
- *recyclable plastic bottles/jugs**	1.1%	3 containers — cooking oil, honey, water	1.00
- *aluminum foil/trays**	0.9%	1 pie tin, foil	0.75
- *steel cans**	5.7%	8 cans — tomato, pudding, tuna, hash	5.00
- *juice boxes/gable top bev. cartons**	0.9%	8 containers — milk, juice	0.75
Food/Liquid	68.0%		59.60
- *food*	60.5%	rolls, desserts, garlic bread, pasta, rice	53.00
- *cooking oil*	7.5%	grease and oil from fryers and grills	6.60
Other	10.8%		9.50
- *plastic film*	3.4%	stretch wrap, disposable gloves	3.00
- *other plastic containers*	0.6%	2 containers — soup base, parsley tub	0.50
- *other paper*	5.7%	waxed paper, bread bags, potato bags	5.00
- *miscellaneous trash*	1.1%	string, bottle caps, pin-on button	1.00
TOTAL TRASH	100.0%		87.60

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Department of Environmental Protection

Cafeteria Dining Room—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	6.9%	5.50
- *glass containers*	5.0%	4.00
- *plastic bottles/jugs*	0.3%	0.25
- *aluminum cans*	1.6%	1.25

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING (continued)			
Recyclable Materials Discarded in Trash	25.0%		20.00
- *paper*	5.9%		4.75
- *containers*	19.1%		15.25
Properly Disposed Trash	68.1%		54.50
- *food service items*	35.9%		28.75
- *food/liquid*	30.0%		24.00
- *other*	2.2%		1.75
Contaminants in Recyclables	0.0%		0.00
TOTAL TRASH AND RECYCLING	100.0%		80.00
TRASH		**Description**	
Paper	6.4%		4.75
- *mixed paper**	4.7%	newspaper, magazine, colored and glossy paper	3.50
- *paperboard**	1.7%	food packaging boxes	1.25
Food Service Items	38.6%		28.75
- *cups*	3.4%	38 paper cups, 53 foam plastic cups	2.50
- *plates, bowls, clamshells*	13.1%	40 clamshells, paper plates, foam plates	9.75
- *utensils*	4.0%	124 forks, 85 knives, 38 spoons	3.00
- *napkins*	9.4%	paper napkins, mostly wet	7.00
- *other food service items*	8.7%	to-go bags, paper packaging, lids, 6-pack rings	6.50
Mixed Containers	20.5%		15.25
- *recyclable glass containers**	10.1%	13 bottles — juice, Snapple	7.50
- *recyclable plastic bottles/jugs**	2.0%	7 containers — water, orange juice	1.50
- *redeemable plastic bottles/jugs**	1.0%	4 containers — soda	0.75
- *recyclable aluminum cans**	1.3%	3 cans — juice	1.00
- *redeemable aluminum cans**	1.7%	11 cans — soda	1.25
- *aluminum foil/trays**	1.7%	2 tins, foil	1.25
- *steel cans**	0.7%	small juice cans	0.50
- *juice boxes/gable top bev. cartons**	2.0%	19 containers — milk, juice, half & half	1.50
Food/Liquid	32.2%	pasta, rice, uneaten food from salad bar	24.00
Other	2.3%		1.75
- *other plastic containers*	1.7%	6 yogurt cups, 2 deli tubs	1.25
- *plastic film*	0.7%	stretch wrap	0.50
TOTAL TRASH	100.0%		74.50

* Indicates required recyclable material found in trash.

Note: Percentages may not total 100% due to rounding.

D. DEPARTMENT OF HEALTH

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

The DOH Distribution Center's administrative area and offices and the warehouse operations participated in the waste sort and assessment. DOH employs a total of 14 staff at the Kingsland Avenue location; seven employees support the warehouse operation and seven staff provide administrative support. There also are four Work Experience Program (WEP) staff who refurbish furniture and office equipment for reuse.

The building is leased by the New York City Department of Administrative Services (DCAS) and DOH is responsible for maintenance of the facility. DOH occupies 70% of the facility and the NYC Police Department and the NYC Department of Transportation share the remaining 30% of the space. DOH has two 2-cubic yard containers used for trash and recycling. The trash is collected from the container by the NYC Department of Sanitation (DOS) every Tuesday. DOH places a call for special pickup for required recyclables. DOH also places requests with DOS for bulk pickup of wood pallets and other wood wastes, when necessary.

The Distribution Center has one electronic mail address and the account is maintained by the Management Information System (MIS) staff person who communicates with the DOH facilities that have electronic mail. According to DOH staff, the "outer borough" facilities served by the Distribution Center do not have electronic mail and would not be able to access forms electronically.

The activities conducted in the offices of DOH's Distribution Center include tracking and data entry, warehouse management, personnel and other administrative functions. The offices generate primarily paper waste.

The warehouse distributes supplies, including forms, to DOH locations throughout the City. DOH distributes materials and supplies obtained from the DCAS storehouse, outside vendors, and internal forms reproduced by DOH. Items stocked in the warehouse are logged into a computer inventory database. DOH locations submit a requisition form and the items are "picked and packed" by Distribution Center staff. The items are packed into reused corrugated cardboard boxes or into new corrugated cardboard boxes for shipment. DOH staff estimate that they pack and ship to a variety of locations an average of 100 cartons per day. DOH makes deliveries to each location approximately every six weeks.

Shipments are routed by DOH's transportation service and are delivered using one large truck and one van. The maximum number of vehicles available to make the deliveries is three vans and two large trucks. In addition, DOH-served facilities may pick up orders or make special arrangements for oversize items.

2. Waste Prevention Opportunities

Initiate a pilot program to test recharged toner cartridges for the printers.

DOH agreed to purchase and test the recharged toner cartridges available through the Department of Citywide Administrative Services (DCAS) storehouse via a contract with The Industries for the Blind, #9887256. DOH agreed to test the cartridges and monitor and report on their performance. If performance is satisfactory, DOH Distribution Center will purchase recharged toner cartridges in the future and publicize their availability to other DOH operations.

Initiate a pilot program to test recycled computer disks.

DOH agreed to purchase and test the recycled computer disks available through the DCAS storehouse via a contract with Source Data Corporation, #9787141 DOH agreed to test the computer disks and monitor and report on their performance.

Expand the furniture refurbishing program.

DOH agreed to continue to provide data on the type, quantity, and value of the furniture that is repaired and returned to DOH facilities. DOH also indicated that they have an interest in purchasing furniture from repair shops and would like to see a Citywide contract offering Agencies this alternative to the purchase of new furniture.

Review the statistics on new box purchases to determine how and where they are being used.

DOH agreed to continue to review how the 5,000 new boxes purchased annually are being used to see if there is an opportunity to reduce the purchase of new boxes.

Encourage staff to use reusable mugs.

DOH Distribution Center management purchased reusable mugs and encourages staff to discontinue the use of paper cups.

Review the products used to refurbish the furniture and use less toxic, alternative products where possible.

DOH agreed to review the products used in the furniture refurbishment program to ensure that the products do not have health and safety implications for the staff. DOH indicated that all current products are purchased through the DCAS storehouse. They agreed to test alternative products.

3. Opportunities to Enhance Recycling

Establish a toner recycling program.

DOH agreed to establish a formal program to collect and return printer cartridges to the manufacturer.

Collect and recycle pallets.

DOH reuses pallets in the Distribution Center and provides off-spec pallets to the NYC Police Department for use in their operation. DOH also noted that DCAS requests and receives an equal number of reusable pallets for those they deliver to the Distribution Center.

DOH indicated that it currently buys new pallets for the Distribution Center operation. DOH is interested in working with other agencies that have unwanted, reusable pallets to develop an exchange program. DOH's Transportation Department can pick up reusable pallets from other City Agencies that are discarding the pallets as waste.

DOH indicated that they would be willing to participate in a recycling program for broken or off-spec pallets but believe that the program should be implemented by DOS or DCAS.

4. Waste and Recyclables Generation Data

The following table summarizes the trash and recyclables data gathered at DOH during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Department of Health

Offices/Warehouse—Trash and Recycling

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	37.6%	8.09
- *mixed paper*	9.3%	2.00
- *corrugated cardboard*	22.1%	4.75
- *mixed containers*	6.2%	1.34
Recyclable Materials Discarded in Trash	17.3%	3.72
- *paper (white paper, mixed paper)*	9.3%	2.00
- *corrugated cardboard*	4.7%	1.00
- *mixed containers*	3.4%	0.72
Properly Disposed Trash	30.2%	6.50
- *food service items*	7.0%	1.50
- *food/liquid*	8.1%	1.75
- *bathroom waste/paper towels*	7.0%	1.50
- *other*	8.1%	1.75
Contaminants in Recyclables	14.8%	3.18
TOTAL TRASH AND RECYCLING	100.0%	21.49

TRASH		Description	
Paper	29.4%		3.00
- *white paper**	4.9%	copy paper, printer paper	0.50
- *mixed paper**	14.7%	newspaper, colored and glossy paper	1.50
- *corrugated cardboard**	9.8%	small boxes	1.00
Food Service Items	14.7%		1.50
- *cups (paper and plastic)*	4.9%	1 foam cup, 48 paper cups	0.50
- *plastic food service items*	2.4%	utensils and wrappers	0.25
- *paper food service items*	7.3%	napkins, food boxes, and paper bags	0.75
Mixed Containers	7.0%		0.72
- *redeemable plastic bottles/jugs**	1.9%	3 bottles	0.19
- *recyclable aluminum cans**	0.3%	1 can	0.03
- *aluminum foil/trays**	2.4%	foil from take-out food items	0.25
- *juice boxes/gable top bev. cartons**	2.4%	2 1-quart milk cartons, 1 1-pint o.j. carton	0.25
Food/Liquid	17.1%	lunch items	1.75
Bathroom Waste/Paper Towel	14.7%	used and unused paper towels	1.50

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)			
Other	17.1%		1.75
- *other plastic*	4.9%	plastic bags and strapping	0.50
- *plastic film*	2.4%	stretch wrap from supplies	0.25
- *miscellaneous trash*	9.8%	plastic tape, label backing	1.00
TOTAL TRASH	100.0%		10.22
RECYCLING		**Description**	
Mixed Paper	17.7%	photocopies, post-its, fax cover sheets, NCR forms (some blank)	2.00
Corrugated Cardboard	42.1%	boxes from supplies, work boots, bleach	4.75
Mixed Containers	11.9%	1 1-gallon milk container, 7 aluminum cans, 1 coffee can, 1 plastic bottle, and various redeemable aluminum cans to be returned to distributor	1.34
Contaminants in Recycling	28.2%		3.18
- *in mixed paper*	15.5%	3 paper cups, note pad backing, gum wrappers, paper plate	1.75
- *in corrugated cardboard*	11.3%	paperboard and tissue paper	1.27
- *in mixed containers*	1.4%	spoiled milk left in containers	0.16
TOTAL RECYCLING	100.0%		11.27

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

E. DEPARTMENT OF JUVENILE JUSTICE

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

Three Department of Juvenile Justice (DJJ) operations within the Bronx Juvenile Center participated in the assessment and waste sort: the cafeteria and kitchen, the admissions area, and the health clinic.

Cafeteria/Kitchen

The facility's cafeteria seats 48 people and serves three meals a day to all residents and all on-duty staff: 120 to 160 meals, three times a day, seven days a week. In addition, staff prepare bag lunches for residents who will be off-site at court appearances during the day.

The kitchen staff consists of a food services manager who oversees menu development and ordering and a head cook who oversees all food preparation and food service, as well as the daily operation of the kitchen and cafeteria. The food services manager and the head cook work alternate shifts. The head cooks are supported by 13 kitchen staff who assist them in food preparation and serving.

The kitchen consists of a dry storage area, two walk-in coolers, a walk-in freezer, a stove, ovens, a deep fryer, a warm storage area, a serving counter, and a dishwashing area. Most of the foods

are purchased in bulk (*e.g.*, potatoes and onions are purchased dehydrated in 50-pound bags). Tomato and spaghetti sauce, carrots, kale, beans, and similar items are purchased in #10 steel cans. Flour and sugar are purchased in bulk and dumped into large storage containers. Bread is delivered to the facility, five days a week, on reusable racks from the bakery on Rikers Island.

Breakfast cereals and milk are the primary items not purchased in bulk. Both are purchased in single-serve containers. The cereal comes in paperboard boxes and the milk comes in gable-top cartons.

Admissions

The first stop for all residents entering the facility is the admissions area. In addition to processing residents, the admissions operation is responsible for retaining all forms, including booking records and court records for all juveniles that pass through the facility.

When a juvenile is brought to the facility, he/she is issued a pair of standard coveralls and a pair of new tennis shoes (*i.e.*, sneakers). The resident is then processed and booked. This involves completing several forms to gather biographical data and information regarding the juvenile's general mental state. The forms are multi-part carbonless forms. Two copies of each form generally are retained on-site (one in admissions and one by the case worker), while one copy is sent to the courts. In addition, the information is later entered into a computer database. Once the juvenile reaches 18 years of age, the records are sealed and transferred to a storage facility where they are archived indefinitely.

Residents' personal clothing is taken from them and stored in vinyl bags in a storage room. The clothes are returned to them when they leave. When a resident leaves, the coveralls are returned and laundered for use by new residents. The tennis shoes are discarded when they are too worn to reuse. DJJ staff were unclear as to the typical procedures for managing used tennis shoes. During the assessment there was a large stack of used tennis shoes accumulated in the storage room. Interestingly, it does not appear that residents are given standard tennis shoes; instead, the pile of used shoes consisted of numerous different brands and styles.

The admissions area also is responsible for preparing and printing daily spreadsheets showing the list of residents, their next and last court dates, court disposition, and a list of new admissions and releases. These lists are printed out on 11" x 14" CPO paper. The lists are good for one day only and then are discarded. Several copies of each list are printed and distributed.

Health Clinic

The clinic consists of several exam rooms, including a gynecological exam room and a dental room, as well as an admissions desk, a small pharmacy, and four staff offices. The clinic provides daily medical care for residents. A dentist visits the clinic three days a week and has a fully equipped dental office, including an autoclave, in the clinic. The clinic also provides psychiatric care, which appears to be one of its primary tasks. Approximately 15 residents visit the clinic each day.

All incoming residents receive physicals after they are processed by the admissions staff, but according to clinic staff, residents are transported for the physical to the Vernon C. Bain Center, a prison barge owned by the New York City Department of Correction and currently on loan to the Department of Juvenile Justice. In addition, X-rays are performed off-site.

The clinic generates two distinct waste streams: office waste and medical waste. The office waste consists primarily of white and mixed paper. The medical waste stream is divided between red bag wastes and non-red bag wastes. The red bag wastes include items such as examination gloves, gauze and other items that could have come in contact with blood or other bodily fluids. In addition, all sharps are placed in disposable sharps containers and disposed with red bag wastes. The red bag waste receptacles are clearly labeled that they are for bloody items and "not for regular trash." The red bag wastes are packaged in 1.5' x 1.5' boxes and collected by the facility's contractor for medical waste management, EMSA.

The exam rooms have regular trash receptacles for disposable items that have not come in contact with blood and bodily fluids. These include primarily paper wastes, such as paper exam gowns, tissues, wrappers, etc. The clinic appears to generate approximately one bag of non-red bag medical wastes each day.

2. Waste Prevention Opportunities

Increase use of reusable dishware.

DJJ agreed to pursue the possibility of initiating the use of reusable bowls and cups at the Bronx Juvenile Detention Facility. Additional dishwasher capacity is available, since the dishwasher currently is used only to wash trays. Issues of concern include staff resistance, increased labor requirements and resident safety.

Implement bulk distribution of cereals.

The Bronx Juvenile Detention Facility currently provides cold breakfast cereal in single-serve boxes. DJJ staff indicated that they also serve hot cereal, which staff dispenses. DJJ staff also indicated that dispensers for cereal and other food items were recommended in the design of the facility. DJJ agreed to continue to identify the most effective mechanism for reducing waste from single-serve cereals.

Implement bulk distribution of milk and juice.

DJJ agreed to consider installing dispensers for beverages served to residents and eliminate the gable-top, single-serve milk and juice containers from the waste stream. This recommendation is a direct extension of the recommendation to purchase reusable cups, since increased use of paper cups for beverages, instead of recyclable gable-top milk and juice containers, would off-set the waste prevention value of this recommendation.

Control distribution of bread, jelly, butter, milk and juice.

DJJ agreed on the potential to prevent waste through greater staff oversight of the distribution of bread, butter, jelly and beverages. Staff will distribute items at individual tables when they distribute napkins and forks.

Coordinate with Rikers Island compost facility for food waste management.

DJJ staff indicated that a science teacher was initiating a hydroponics/composting project that might impact on this recommendation. The project involves growing vegetables and herbs hydroponically, both indoors and outdoors, then adding a composting and traditional gardening project when the weather is warmer. DJJ and DOS can work together to develop a plan and implement the composting portion of the project to include certain food wastes from the cafeteria, perhaps beginning with prep wastes, and moving toward the inclusion of dining room wastes.

DJJ agreed to review the quantities of food purchased for the Bronx Juvenile Detention Facility to identify opportunities to reduce or eliminate the potential for over-ordering, which may allow expired food products to be discarded uneaten. DJJ is assigning unique budget codes so that each Detention Facility can purchase and track its own food use.

Consider electronic distribution of daily status reports.

DJJ's new system will allow electronic access to specific information, reducing the paper purchasing costs. In addition, DJJ will have less paper to recycle.

Replace photocopy machines with equipment capable of double-sided copying.

DJJ agreed to train staff on the operation of the duplex function on the existing photocopy machines.

Establish a toner cartridge management program.

DJJ agreed to collect and return printer toner cartridges for recharging and to purchase recharged toner cartridges.

Donate used tennis shoes/sneakers to a charitable organization.

DJJ's goal is to provide identical shoes for all residents to reduce the potential for arguments. When a resident leaves the facility, the shoes often are washed and reused. When shoes are discarded, many are too worn to be useful. DJJ agreed to consider donating shoes that may still be worn to organizations that need used footwear.

Explore the possibility of using reusable sharps containers.

DJJ agreed to consider the possibility of replacing the disposable sharps containers with reusable sharps containers.

3. Opportunities to Enhance Recycling

Implement a recycling program for milk and juice cartons.

New York City requires that City Agencies receiving DOS collection of their waste recycle gable-top milk and juice containers. DJJ agreed to determine the potential to establish a recycling program for the beverage containers but expressed concern about odors and vectors if containers are stored on-site.

Implement recycling program for cereal boxes.

New York City requires that City Agencies receiving DOS collection of their waste recycle mixed paper. The single-serve cereal boxes used at the Bronx Juvenile Detention Facility are recyclable mixed paper. DJJ agreed to consider recycling the boxes after a review of the cost of labor associated with removing the liner.

Eliminate contamination in the cardboard recycling program.

DJJ agreed to enhance training to reduce the potential for contamination in the recycling containers.

Eliminate contamination from steel can recycling.

DJJ installed an additional waste receptacle in the staff locker room to eliminate the problem of contamination in the recycling containers. DJJ agreed to install signs near the recycling bin to remind staff that only steel cans should be placed in the bin.

DJJ agreed to review the schedule for steel can recycling pick-up to develop a more effective program of storage and collection for the material.

Enhance the effectiveness of mixed paper recycling.

DJJ agreed to explore mechanisms to enhance the diversion of mixed paper, including white paper, for recycling, including staff training, improved signage and baling.

4. Waste and Recyclables Generation Data

The following tables summarize the trash and recyclables data gathered at DJJ during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Department of Juvenile Justice

Cafeteria/Kitchen—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	30.3%	165.00
- *corrugated cardboard*	25.4%	138.00
- *steel cans*	5.0%	27.00
Recyclable Materials Discarded in Trash	9.7%	52.88
- *paper (white paper, mixed paper, corrugated cardboard)*	2.2%	12.13
- *mixed containers*	7.5%	40.75
Properly Disposed Trash	56.6%	307.75
- *food service items*	9.5%	51.50
- *food/liquid*	44.8%	244.00
- *other*	1.1%	6.25
- *miscellaneous trash*	1.1%	6.00
Contaminants in Recyclables	3.4%	18.50
TOTAL TRASH AND RECYCLING	100.0%	544.13

TRASH		Description	
Paper	3.4%		12.13
- *mixed paper**	0.0%	credit card application, colored paper	0.13
- *paperboard**	2.9%	single-serve cereal boxes, large molded egg trays, cookie box	10.50
- *corrugated cardboard**	0.4%	corrugated boxes cut in half	1.50
Food Service Items	14.3%		51.50
- *cups (paper and plastic)*	1.8%	201 paper cups	6.50
- *plastic food service items*	2.9%	jelly packets, utensils, cereal bags, foam clamshells	10.50
- *paper food service items*	9.6%	napkins, bowls, plates, food packaging, waxed paper, small fruit cups	34.50
Mixed Containers	11.3%		40.75
- *redeemable plastic bottles/jugs**	0.1%	3 soda bottles	0.50
- *redeemable aluminum cans**	0.1%	1 can	0.25
- *aluminum foil/trays**	2.2%	lasagne pans	8.00
- *juice boxes/gable top bev. cartons**	8.9%	710 single-serve milk and juice containers	32.00
Food/Liquid	67.7%	bread ends, uneaten bread, broccoli, mashed potatoes, turkey, butter, meat, scrambled eggs, orange peels, oranges, tomato, bologna, toast, unused broccoli tops and ends	244.00
Other	3.4%		12.25
- *other plastic*	1.2%	stretch wrap, plastic wrap, 2 durable containers	4.50
- *paper towels*	0.5%	paper towels	1.75
- *miscellaneous trash*	1.7%	wet mop head, plastic strapping, tape	6.00
TOTAL TRASH	100.0%		360.63

Category/Material	Percent of Total		Weight of Sample (Pounds)
RECYCLING		**Description**	
Corrugated Cardboard	75.2%	cardboard boxes	138.00
Steel Cans	14.7%	food cans	27.00
Contaminants	10.1%		18.50
- *in corrugated cardboard*	2.7%	foam packaging, plastic film, plastic, egg cartons, paperboard, waxed cardboard	5.00
- *in steel cans*	7.4%	1 utensil, 1 plate, 7 hair brushes, 1 night gown, 11 unopened cookie packages, 3 used hair gel containers, 1 used milk container, 1 cup, 1 soda can, folders, envelopes, 4 books, white paper, construction paper, 2 partially used note pads, letters, mail, birthday cards and school work	13.50
TOTAL RECYCLING	100.0%		183.50

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Department of Juvenile Justice

Admissions—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	58.1%	25.00
- *white paper*	58.1%	25.00
Recyclable Materials Discarded in Trash	9.3%	4.00
- *paper (white paper, mixed paper, paperboard)*	6.4%	2.75
- *mixed containers*	2.9%	1.25
Properly Disposed Trash	30.2%	13.00
- *food service items*	11.6%	5.00
- *food/liquid*	9.3%	4.00
- *other*	7.0%	3.00
- *miscellaneous trash*	2.3%	1.00
Contaminants in Recyclables	2.3%	1.00
TOTAL TRASH AND RECYCLING	100.0%	43.00

TRASH		Description	
Paper	16.2%		2.75
- *white paper**	2.9%	copy paper, index cards	0.50
- *mixed paper**	8.8%	magazines	1.50
- *paperboard**	4.4%	cereal box, film box, toothbrush box, packaging	0.75
Food Service Items	29.4%		5.00
- *cups (paper and plastic)*	2.9%	5 waxed paper, 4 plastic	0.50

Category/Material	Percent of Total	Description	Weight of Sample (Pounds)
TRASH (continued)			
- plastic food service items	7.4%	utensils, food packaging, candy wrapper, foam clamshells, stretch wrap	1.25
- paper food service items	19.1%	food packaging, napkins, plates, bowls, bags	3.25
Mixed Containers	7.4%		1.25
*- redeemable aluminum cans**	1.5%	1 can	0.25
*- aluminum foil/trays**	1.5%	foil	0.25
*- juice boxes/gable top bev. Cartons**	4.4%	12 half-pint juice and milk containers	0.75
Food/Liquid	23.5%	orange peels, banana peel, liquid, tomato, cabbage	4.00
Other	23.5%		4.00
- other plastic	8.8%	slipper packaging, toothbrush, art supply blister pack, gloves	1.50
- paper towels	1.5%	paper towels	0.25
- textiles	7.4%	yarn, pair of socks, underwear, bra, t-shirt, slipper sole	1.25
- miscellaneous trash	5.9%	1 hair brush, wire hanger, pencil, deodorant container	1.00
TOTAL TRASH	100.0%		17.00

RECYCLING		Description	
White Paper	96.2%	form-fed CPO paper	25.00
Contaminants	3.8%		1.00
- in white paper	3.8%	1 newspaper, copy paper ream wrap	1.00
TOTAL RECYCLING	100.0%		26.00

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Department of Juvenile Justice

Health Clinic—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	0.7%	0.06
- mixed paper	0.7%	0.06
Recyclable Materials Discarded in Trash	45.7%	3.75
- paper (white paper, newspaper, magazines, corrugated cardboard)	30.5%	2.50
- mixed containers	15.2%	1.25
Properly Disposed Trash	53.4%	4.38
- food service items	19.9%	1.63
- food/liquid	12.2%	1.00
- other	21.3%	1.75
Contaminants in Recyclables	0.1%	0.01
TOTAL TRASH AND RECYCLING	100.0%	8.20

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
Paper	30.8%		2.50
- *white paper**	12.3%	memos, letters, forms	1.00
- *mixed paper**	18.5%	newspaper, envelopes, junk mail	1.50
Food Service Items	20.0%		1.63
- *cups (paper and plastic)*	1.6%	2 paper cups	0.13
- *plastic food service items*	6.2%	food packaging, condiment packets, bottle cap	0.50
- *paper food service items*	12.3%	napkins, plates, bags	1.00
Mixed Containers	15.4%		1.25
- *redeemable plastic bottles/jugs**	6.2%	1 soda bottle	0.50
- *recyclable aluminum cans**	3.1%	1 can	0.25
- *juice boxes/gable top bev. cartons**	6.2%	5 half-pint milk and juice containers	0.50
Food/Liquid	12.3%	liquid, cookies, meat bone	1.00
Other	21.5%		1.75
- *medical*	21.5%	medicine boxes, foam slippers, bloody napkins, plastic wraps from napkins, paper gown, tongue depressor, used medicine tubes, 25 small plastic cups, blister-back pill casing	1.75
TOTAL TRASH	100.0%		8.13

RECYCLING		Description	
White Paper	85.7%	shredded white paper	0.60
Contaminants	14.3%		0.10
- *in white paper*	14.3%	colored paper	0.10
TOTAL RECYCLING	100.0%		0.70

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

F. DEPARTMENT OF SANITATION OFFICES

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

The Department of Sanitation's Bureau of Waste Prevention, Reuse and Recycling (BWPRR) is responsible for overseeing programs and public education to reduce the City's waste stream. These programs include: composting, recycling, and waste prevention. BWPRR's 35 employees occupy the fifth and sixth floors of the building at 44 Beaver Street. Eighteen employees work on the fifth floor and 17 employees work on the sixth floor. The fifth floor includes office space divided into cubicles and a few private offices, storage space and a conference room. The sixth floor houses the Director's office, additional office space divided into cubicles, the copy center and mailroom, a reception area, and another conference room. Each floor has a small closet for on-site storage of cleaning products and equipment.

BWPRR units include Waste Prevention, Composting, Public Education and Outreach, MIS and Administration. All units report to the Director of the BWPRR. The following offers a brief description of each unit's activities.

The primary focus of the *Waste Prevention* unit is developing innovative waste prevention and recycling programs targeting residents of New York City, City Agencies and institution, and private businesses. Some of the unit's current projects include:

- *NYC Stuff Exchange*, a telephone referral service providing information about opportunities to donate to, or purchase from, local reuse businesses in each borough;
- *NYCitySen$e*, a project targeting enhanced waste prevention and recycling in City Agencies;
- *NYC WasteLe$$*, waste prevention for business and industry; and
- *NY WasteMatch*, a New York City waste exchange.

This BWPRR unit also is responsible for the special waste program, including capital construction contracts for special waste sites and liaison with private contractors to provide waste hauling equipment and removal of the waste.

The *Compost Unit* of BWPRR handles facility oversight, contract administration, and research for all organic waste recovery and composting activities planned and/or carried out by the Department of Sanitation. Some of these efforts include:

- Overseeing the Queens, Staten Island, Brooklyn, and the Bronx Botanical Gardens to promote backyard composting and grass recycling by City residents and horticulture professionals;
- Managing the Organic Waste Recycling, Inc. contract to run the Department's enclosed food composting facility at Rikers Island;
- Managing the Organic Waste Recycling, Inc. contract to run the Department's outdoor leaf composting sites in Ferry Point, Bronx, and Canarsie, Brooklyn;
- Maintaining the DOS leaf composting site at the Fresh Kills Landfill; and
- Conducting research and developing public outreach materials to promote the New York City composting program.

BWPRR's *Public Education and Outreach Unit* researches, designs, develops, distributes and oversees advertising campaigns and educational efforts to reach identified markets with general and/or specific information about the City's waste prevention, reuse, and recycling programs and services. This unit's activities include:

- Informing residents, institutions, and businesses of the City's waste prevention, reuse, and recycling rules and regulations;
- Performing market research and analysis of public attitudes toward, and level of participation in, the City's programs to divert waste from disposal;
- Developing marketing plans, goals, and objectives for meeting mandated diversion rates;
- Producing educational materials and placing media support;
- Initiating public awareness campaigns in all media;

- Responding to public inquiries;
- Managing contractors and vendors; and
- Monitoring the public education materials inventory.

The *Special Projects Unit* oversees unique projects and performs economic analysis to support planning and research activities.

The *MIS Unit* is responsible for the management and maintenance of the Bureau's computer information systems, including telephones and hardware for the Reuse Hotline.

The *Administration Unit* is responsible for BWPRR's procurement, contracts administration, and accounts payable and receivable activities. Activities include purchasing inventory for the day-to-day operations of the Bureau, processing invoices and serving as the liaison with DOS Bureau of Fiscal Services. The Contracts group is responsible for administering BWPRR contracts, including those with private contractors who process the recyclables collected by DOS.

2. Waste Prevention Opportunities

Develop outreach and identify opportunities to present waste prevention concepts to all DOS employees.

BWPRR agreed that there may be opportunities to introduce waste prevention concepts into existing training courses such as the annual Right-to-Know training for BWPRR employees. In addition, there may be an opportunity to access the DCAS orientation for new employees.

Reduce paper use by setting photocopy machines to default to duplex, where possible. Increase education and outreach to staff regarding double-sided photocopying.

BWPRR agreed to contact the service providers for each brand of equipment and ask that the default settings be changed to duplex. BWPRR believe that the best solution is a centralized program with one individual responsible for all copying.

Establish a toner cartridge recharging/recycling program. Encourage the purchase and use of recharged toner cartridges, where possible.

BWPRR agreed to document their participation in the toner cartridge recycling program and in increasing purchases of recharged toner cartridges for those brands of equipment that can use them.

3. Waste and Recyclables Generation Data

The following tables summarize the trash and recyclables data gathered at DOS during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Department of Sanitation

Fifth Floor—Trash and Recycling Stream

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING			
Properly Recycled Materials	74.4%		21.00
- *white paper*	4.4%		1.25
- *mixed paper*	44.3%		12.50
- *corrugated cardboard*	23.9%		6.75
- *mixed containers*	1.8%		0.50
Recyclable Materials Discarded in Trash	4.1%		1.15
- *paper (white paper, mixed paper)*	3.6%		1.02
- *mixed containers*	0.5%		0.13
Properly Disposed Trash	13.5%		3.81
- *food service items*	4.6%		1.31
- *food/liquid*	3.5%		1.00
- *other*	5.3%		1.50
Contaminants in Recyclables	8.0%		2.25
TOTAL TRASH AND RECYCLING	100.0%		28.21
TRASH		**Description**	
Paper	20.5%		1.02
- *white paper**	0.32%	lunch receipts	0.02
- *mixed paper**	20.2%	newspaper, junk mail	1.00
Food Service Items	26.5%		1.31
- *cups (paper and plastic)*	1.3%	3 paper cups	0.06
- *plastic food service items*	10.1%	cup lids, clamshell, cookie/cracker trays, snack bags	0.50
- *paper food service items*	15.1%	popcorn bag, food bags, paper trays, napkins	0.75
Mixed Containers	2.5%		0.13
- *aluminum foil/trays**	1.6%	1 tray and 3 balls of foil	0.08
- *juice boxes/gable top bev. cartons**	0.9%	1 juice container	0.05
Food/Liquid	20.2%	orange peels, tarter sauce, bread crust, tea bags, pickle	1.00
Other	30.3%		1.50
- *paper towels/restroom waste*	30.3%	c-fold paper towels from restrooms	1.50
TOTAL TRASH	100.0%		4.95
RECYCLING		**Description**	
White Paper	5.4%	copy paper, printer paper	1.25
Mixed Paper	53.8%	newspaper, glossy flyers, food bags, cardboard box, colored paper	12.50
Corrugated Cardboard	29.0%	unflattened cardboard boxes	6.75
Mixed Containers	2.2%	1 plastic bottle, 2 aluminum trays, 7 aluminum cans	0.50
Contaminants - *in mixed paper*	9.7%	8 paper cups, stack of carbon forms, cigarette box, Tyvek envelope, ketchup package, food-contaminated bag	2.25
TOTAL RECYCLING	100.0%		23.25

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Department of Sanitation

Sixth Floor—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	61.5%	8.25
- *paper (white and mixed)*	59.7%	8.00
- *mixed containers*	1.9%	0.25
Recyclable Materials Discarded in Trash	0.3%	0.05
- *aluminum foil/trays*	0.3%	0.05
Properly Disposed Trash	37.5%	5.03
- *food service items*	7.7%	1.03
- *food/liquid*	7.5%	1.00
- *other*	22.4%	3.00
Contaminants in Recyclables	0.6%	0.08
TOTAL TRASH AND RECYCLING	100.0%	13.41

TRASH		**Description**	
Food Service Items	20.3%		1.03
- *cups (paper and plastic)*	0.6%	2 paper cups	0.03
- *plastic food service items*	9.8%	cutlery, wrappers, utensils, candy wrappers	0.50
- *paper food service items*	9.8%	paper bags, napkins, food wrappers	0.50
Mixed Containers	0.9%		0.05
- *aluminum foil/trays**	0.9%	2 balls of foil, 1 aluminum perfume bottle	0.05
Food/Liquid	19.7%	banana peels, cookies, popcorn kernels	1.00
Other	59.1%		3.00
- *paper towels/restroom waste*	39.4%	c-fold paper towels from restrooms	2.00
- *miscellaneous trash*	19.7%	sheets of unused sticky labels, label backing, pen, pencil, blister packaging	1.00
TOTAL TRASH	100.0%		5.08

RECYCLING		**Description**	
White Paper	54.0%	copy paper, printer paper	4.50
Mixed Paper	42.0%	food bags, newspaper, white paper, colored paper, paperboard boxes	3.50
Mixed Containers	3.0%	5 aluminum cans, 4 balls of foil	0.25
Contaminants - *in mixed paper*	0.9%	straw, napkins, 3 paper cups	0.08
TOTAL RECYCLING	100.0%		8.33

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

G. DEPARTMENT OF SANITATION GARAGE

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

Two bureaus participated in the waste sort and assessment at the District 5 garage: the Bureau of Cleaning and Collection and the Bureau of Motor Vehicles.

Bureau of Cleaning and Collection

The garage area used by the BCC occupies approximately 75 percent of the facility. This area includes a fueling area, a vehicle wash area, vehicle storage areas and materials/equipment storage areas along the perimeter of the garage. Outside of the building is a salt storage facility. In addition, there is a used tire collection container for tires dropped off by the public. The BCC uses the DOS Garage to stage vehicles for use. The primary collection shift runs from 6:00 a.m. to 3:00 p.m. Staging of the vehicles includes fueling and topping off of any fluids required and preparing the trucks for alternate uses (*e.g.*, attaching snowplows). Approximately 56 people operate the trucks during the day shift and approximately 20 people staff the garage with nine people on the day shift including a supervisor, a foreman, two clerks, two garage utility workers, two Work Experience Program (WEP) workers and two to three relay workers who deliver loads to the appropriate transfer locations. Trucks are stored in the building overnight. During the winter months the staffing changes to meet the need for additional snow/ice removal duties.

The BCC operates three fueling locations in the building. The facility has two 4,000 gallon underground diesel fuel tanks and one, 2,500-gallon unleaded fuel tank. The BCC stores equipment, including snow plows, snow plow parts and other supplies and equipment, along the perimeter of the garage.

The waste generated from BCC operations is primarily sorbent and personal waste (*e.g.*, waste removed from vehicles). This waste is typically discarded directly into the appropriate collection vehicle. Scrap metal is segregated for recycling through a scrap vendor.

Bureau of Motor Equipment

Part of the DOS Garage is used as a repair facility. The BME occupies approximately 25 percent of the building. This includes seven bays to perform maintenance on vehicles, a parts storage room and an office space. There also are several work areas along the perimeter of the garage. There are three mechanics on the day shift and two on the night shift with a third mechanic available as needed on the night shift if the workload increases. The mechanics repair and maintain approximately 75 to 80 pieces of equipment including collection trucks, front end loaders, dump trucks, salt spreaders, pressure washers, utility trucks, fork lifts and passenger cars.

Preventive Maintenance (PM) is typically performed on a 60-day cycle. However, the garage has developed a comprehensive maintenance program that is tailored to the vehicle. There are eight PM intervals that vary from every 30 days for lubrication and safety checks to annually

scheduled PM items. Motor oil and filters are changed on a 60-day cycle. Fuel filters are changed every other PM cycle (*i.e.*, every 120 days).

The functional areas of the repair facility, (i.e., the service bays and supply operations) generate a variety of wastes. These wastes include used oil, antifreeze, parts solvent, metal, oil filters, batteries, tires, soiled rags, sorbent, wood, cardboard and paper. The repair facility has an active recycling program for many of these materials.

2. Waste Prevention Opportunities

Identify damaged and unusable equipment in the garage area and target for disposal or recycling.

BCC agreed that usable parts and equipment stored along the perimeter of the garage should be relocated to reduce or eliminate the potential for future damage. BCC also agreed that damaged, unusable materials should be sent to the DCAS Salvage Warehouse in Brooklyn.

Move oil supply drums and oil filter storage drums to minimize spills into the wastewater sumps.

BCC acknowledged that 55-gallon drums of oil and other fluids are located on grates covering the water collection sumps. BCC agreed to move the drums for which they are responsible from the grates.

Use hydrophobic mops for oil cleanup.

BCC agreed to consider initiating a pilot project to test and evaluate hydrophobic mops as an alternative to the current corn-based absorbent. A hydrophobic mop has a polyethylene mop head that is very effective in absorbing and containing spills of oil. BCC may already have some mops in stock and available for use, thereby minimizing purchase costs.

Purchase a more effective soap for truck washing.

BCC identified a substitute for the soap currently used for truck cleaning. Because the substitute soap is initially more expensive per gallon, BCC has been unable to purchase it. The current product is delivered in 55-gallon drums and does not perform effectively at the 20:1 dilution recommended by the manufacturer. To clean effectively, DOS staff use the soap at a 2:1 dilution. DOS has tested a substitute soap that is delivered in bulk with automatic mixing equipment and performs effectively at a 30:1 dilution.

Move oil supply drums and oil filter storage drums to minimize spills into the wastewater sumps.

BME acknowledged that 55-gallon drums of oil and other fluids as well as oil filter storage drums are located on grates covering the water collection sumps. BME agreed to move the drums for which they are responsible from the grates to the floor of the garage.

Install oil evacuation system.

BME agreed to review additional information about installation of an oil evacuation system to reduce the time required to perform oil changes, as well as the potential for spills of oil.

Reduce solvent waste from parts cleaning.

The garage has one parts washer containing 30 gallons of mineral spirits and serviced by 95 Inc. The lid on the parts washer was open during the assessment, allowing the mineral spirits used to clean parts to volatilize and increasing solvent exposure for mechanics. BME agreed to remind mechanics to close the parts washer when it is not in use. BME also is interested in obtaining additional information about less hazardous cleaning solutions that might be available for use in this equipment.

Provide improved storage for flammables.

Ether is an extremely flammable substance and ether canisters should be stored in a fireproof flammables storage cabinet. BME currently uses the flammables cabinet for storage of brake alcohol and agreed to move the ether canisters to this same cabinet.

Implement a rag cleaning option.

BME purchases rags through the DCAS Central Storehouse; all used rags are discarded as solid waste. The on-site washing machine belongs to the mechanics, who use it to wash their work clothes. BME cannot wash rags in this machine. BME agreed to consider rag reuse services, if the service is cost effective.

Remove Graymills solvent sink for reuse in another facility.

The Graymills sink was installed during facility construction and never used. The sink is large (approximately 50 gallons) and used solvent must be pumped out. The current solvent contractor, 95 Inc., prefers its own equipment with a 30-gallon tank that is easily replaced. BME agreed to seek another user for the equipment, perhaps at the Fresh Kills Landfill.

Improve in-house management of lead acid batteries.

During the assessment, batteries were noted in several locations. BME agreed that a central storage area with proper equipment to prevent acid spills from reaching the floor drains would be preferable.

Establish a pallet reuse and recycling program.

Although the garage and repair facility does not generate large quantities of pallets, the unwanted pallets can be returned to the DCAS Storehouse or delivered for reuse or recycling to another Agency operation.

3. Waste and Recyclables Generation Data

The following table summarizes the trash and recyclables data gathered at the DOS garage during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Department of Sanitation—District 5 Garage
Trash and Recycling

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING			
Properly Recycled Materials	56.0%		14.50
- *mixed paper*	17.4%		4.50
- *mixed containers*	38.6%		10.00
Recyclable Materials Discarded in Trash	3.4%		0.89
- *paper (white paper, mixed paper)*	2.9%		0.75
- *mixed containers*	0.5%		0.14
Properly Disposed Trash	38.6%		10.00
- *food service items*	7.7%		2.00
- *other*	30.9%		8.00
Contaminants in Recyclables	1.9%		0.50
TOTAL TRASH AND RECYCLING	100.0%		25.89
TRASH		**Description**	
Paper	6.9%		0.75
- *white paper**	2.3%	forms, hole punches	0.25
- *mixed paper**	4.6%	newspaper, colored paper	0.50
Food Service Items	18.4%		2.00
- *cups (paper and plastic)*	9.2%	15 paper cups, 6 foam cups	1.00
- *plastic food service items*	4.6%	foam tray, bags, cup lids, wrappers	0.50
- *paper food service items*	4.6%	paper bags, napkins, soup cups	0.50
Mixed Containers	1.3%		0.14
- *recyclable plastic bottles/jugs**	0.5%	1 water bottle	0.05
- *aluminum foil/trays**	0.3%	foil	0.03
- *steel cans**	0.6%	1 drink can	0.06
Other	73.5%		8.00
- *absorbent*	41.3%	corn-based absorbent	4.50
- *miscellaneous trash*	32.1%	floor sweepings, lock, recycling sticker	3.50
TOTAL TRASH	100.0%		10.89
RECYCLING		**Description**	
Mixed Paper	30.0%	newspaper, glossy catalogs, paperboard boxes, brown paper bags	4.50
Mixed Containers	66.7%	21 plastic bottles, 17 glass bottles, 2 aluminum cans, 1 foil tray, 1 steel can, 2 beverage cartons	10.00
Contaminants in Recycling	3.3%		0.50
- *in mixed paper*	3.3%	foam cups, cigarette pack, paper towels	0.50
TOTAL RECYCLING	100.0%		15.00

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

H. DEPARTMENT OF TRANSPORTATION

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

Four DOT Sign Shop operations participated in the assessment and waste sort: the sign stock room, the machine shop, the art room and the overnight painting storage area.

Stock Room

The stock room consists of a 9,000 sq. ft., fenced area in the center of the garage. The stock room entrances are locked and access is controlled by staff in the stock room office. In the stock room, DOT stores supplies, materials and tools used by the Sign Shop staff. The inventory of signs for the boroughs also is stored in the stock room. Tools and other expensive supplies are kept in locked storage cabinets. Cleaning supplies and other items used routinely are stored on open metal shelving.

When an order needs to be filled, the required signs are taken off the shelves and put in reusable 4-square-foot corrugated steel containers used to deliver signs to the boroughs. The primary wastes from this operation are paper, cardboard, and broken pallets from receipt of shipments of supplies and materials.

Machine Shop

The machine shop is where all the aluminum for signs is cut. The aluminum comes in two different thicknesses, depending on the job. For highway signs, a 0.125–inch aluminum sheet is used. A thinner 0.080 inch sheet is used for street signs. The Sign Shop keeps approximately 10 skids with 50 sheets each of the thicker aluminum in stock and 25 skids containing 70 sheets each of the 0.080 inch aluminum. The Sign Shop maximizes the number of signs cut from each sheet by strategic placement of patterns and reuses scrap aluminum as sign bracing, paint stirrers and straight edges to reduce waste.

Scrap pieces of aluminum are stored in the reusable, 4-square-foot metal containers while punchings and smaller metal pieces are collected in 55 gallon steel drums. The scrap aluminum, approximately one bin and one drum each month, is sent to the DCAS Surplus Warehouse in Brooklyn. Sign Shop staff was not able to provide a weight for the aluminum delivered to the DCAS Surplus Warehouse. DCAS provides a ticket confirming the delivery of the material, but does not document the weight or volume of the delivery. DCAS sells the scrap aluminum at auction.

Art Room

In the Sign Shop Art Room signs are painted using powder coating and silkscreen. The Sign Shop has invested in basic electrostatic spray powder coating equipment that significantly increases the efficiency of the paint application, while reducing waste. Aluminum signs are hung from a conveyor and travel into a paint booth where they are electrostatically sprayed. An electrical charge is applied to dry, white powder paint particles, while the aluminum sign to

be painted is electrically grounded. The charged powder and grounded aluminum sign create an electrostatic field that pulls the paint particles to the sign. The white powder coating deposited on the sign retains its charge, which holds the powder in place. In the curing oven, the paint particles are melted onto the sign surface and the charge is dissipated. The white signs are then cooled and readied for screen printing.

The powder-paint system is an extremely efficient method for applying coatings because it reduces paint loss through overspray. Most powder paints are sprayed at a 96 percent efficiency rate, as opposed to 50 percent efficiency with sprayed liquid paints. In addition, unused powder paint is captured and recycled within the paint booth. At the DOT Sign Shop, the powder process is done only in white, eliminating loss of paint during color changes. In addition, the resulting surfaces are harder, and thus more resistant to chipping, and have a higher luster than liquid-painted signs Other advantages over conventional spray painting include reduced labor, improved corrosion resistance and elimination of drips, runs, and bubbles. Powder coating virtually eliminates waste streams associated with conventional painting techniques including air emissions and spent cleaning solvents. Powder coating also greatly reduces employee exposure.

All other colors are applied either by vinyl coating or ink screen. If the sign is not powder coated white, a vinyl coating is applied prior to the silkscreening process. The vinyl is available in a full range of colors. The backing is taken off the cut pieces of vinyl and the vinyl layer is heat bonded to the aluminum. The next step of the process is screen printing the signs, which requires mixing an ink with a solvent and spreading it over a stencil on top of the sign.

The Art Room contained a number of open containers of silkscreen paint and thinner. In addition, the assessment team also noted a number of empty 55-gallon steel drums without labels in the Art Room and near the parts washers.

The Sign Shop has two parts washers and one solvent sink under contract with Safety-Kleen; the Safety Kleen contract specifies that the waste solvent will be recycled.

The wastes from this operation include paints, solvents, and the empty paint and solvent containers. A number of rags containing paint and solvent are discarded as solid waste. The backing from the vinyl rolls is a significant component of the waste stream.

Night Paint Operations

The Night Paint Operations are responsible for line painting and channelization (marking of specific areas) of New York City streets. The group consists of two supervisors and nine traffic device maintainers. They work from midnight until 8:30 am. Their vehicles are maintained in the garage and they have a paint and supply storage room within the DOT garage.

There are two different substances that are traditionally used for line painting: traffic paint and Thermoplast. The traffic paint costs approximately $9 per gallon and requires the use of a solvent thinner. Each gallon of traffic paint covers 300 linear feet. Once applied, the paint has a life expectancy of 0.875 years. The Thermoplast comes in a 55 lb. block. One block covers 300

linear feet at a cost of $15 per block. The Thermoplast does not require a solvent; it is melted and extruded onto the roadway. Once applied, Thermoplast lasts four to six years. DOT currently uses Thermoplast for most line painting operations.

The wastes from this operation are paint, solvents, and empty containers from paint and solvent, as well as rags. Any extra Thermoplast is cooled to solid form and melted again for use at a later time.

2. Waste Prevention Opportunities

Review solvent management practices.

DOT agreed to review the level of use of the two parts washers. DOT also agreed to discuss with the solvent contractor, Safety-Kleen, the potential for improving the screen washing technology, installing filters to increase solvent life or substituting alternative, less toxic solvent products.

Send obsolete supplies to other DOT operations or to DCAS.

DOT agreed that the Sign Shop may be storing unused roofing products from a completed project. To ensure that these products will be used and will not remain on the shelf until their useful life has been exceeded and they become waste, DOT agreed to review the types of products and the current quality of the products and determine whether the products are still useable. If the products are still useable, DOT will determine whether they will be given to another DOT operation or returned to DCAS for redistribution through the Surplus Warehouse or for use by DCAS in its own building maintenance program.

Identify less toxic substitutes for certain products.

Many of the solvent-based cleaners and inks used in screen printing pose adverse health effects to workers through skin contact or inhalation. In addition, these products are highly flammable. DOT agreed to consider the purchase and use of less or non-toxic substitutes for the cleaning agents and other products whose constituents include chemicals targeted for replacement by USEPA under the Industrial Toxics program. Products targeted include Motsenbocker's Lift Off Graffiti Remover and Tape Remover, containing chlorinated solvents and methyl chloroform; Rite Off Mark Remover, containing toluene and methyl isobutyl ketone; and E-44-T Contact Cement containing methyl ethyl ketone and toluene.

Reduce quantity of products stored on-site. Store paints and other flammables in appropriate flammables storage cabinets.

DOT agreed to review and evaluate the quantity of flammable materials, such as paints, inks, solvents and toxic cleaning products stored in the Sign Shop Stock Room and establish appropriate supply levels based on actual product use. This will reduce the potential for products to exceed their useable shelf life and become waste.

Provide training for Stock Room staff.

DOT agreed to determine whether staff at the Sign Shop who work with products that contain hazardous constituents have received training, such as the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training. DOT agreed to ensure that staff are fully capable of reading MSDS; working with hazardous materials safely; collecting, segregating, labeling and accumulating wastes; handling empty containers and leaks; and responding to emergency incidents. DOT agreed to review current staff training and provide additional training for Stock Room staff, as needed.

Increase the funding allocation for sign refinishing.

DOT agreed to review the current cap on the Sign Shop's contract for sign refinishing with American Reflective Products.

Provide data to support development of a case study and cost/benefit analysis of the powder paint process.

DOT agreed to supply data, as available, and anecdotal information for a case study documenting the cost and labor implications of the purchase, installation and use of the powder paint operation.

Initiate a paint conservation policy.

DOT agreed to review the policy requiring employees in the Art Room and the Night Paint operation to replace the lids on containers to maintain the integrity of paints and solvents and reduce loss of product to evaporation.

Review management of used rags.

The cleanup rags in the Art Room are saturated with paint and solvent. Currently, employees source separate the rags into a plastic bag. The separated rags are discarded as solid waste. DOT agreed to review the current rag disposal procedures and policies and determine whether the rags are a hazardous waste. DOT agreed to initiate and enforce a program to ensure the separate collection and proper disposal of the rags.

Seek a reuse option for the plastic end pieces from rolls of vinyl.

DOT agreed to request information from the vinyl vendor(s) concerning the potential to return the plastic end pieces from rolls of vinyl to the vendor for reuse. DOT also agreed to ask the vendor to provide information about the plastic resin used to manufacture the end pieces.

3. Opportunities to Enhance Recycling

Establish a recycling program that encourages source separation and recycling of white paper, mixed paper, corrugated cardboard, beverage containers, toner cartridges and metal cans, including empty and dry paint cans and aerosol cans.

DOT agreed to initiate a recycling program that complies with New York City regulations. DOT agreed to evaluate the quantities of recyclable materials generated by Sign Shop operations and determine the most effective mechanisms for source separation and collection of recyclable materials.

Track the amount of aluminum being recycled through DCAS.

When the Sign Shop brings aluminum scrap and old signs to the DCAS Salvage Warehouse, the DOT Sign Shop receives only a ticket documenting the date of the delivery. DOT is interested in quantifying the amount of aluminum delivered to DCAS to provide baseline data that the Sign Shop can use to determine whether switching to a private vendor for scrap metal recycling would increase revenues for the City of New York. In addition, DOT can receive credit for this recycling in their reports to the Mayor's Office of Operations. Once the aluminum recycling has been quantified, DOT and DCAS can review the economic issues associated with this recommendation.

Determine whether the vinyl backing paper can be recycled.

Currently, the backing for the vinyl is a non-recyclable, coated paper; the vinyl contract will be rebid in 1999. DOT agreed to initiate an investigation to determine whether its current suppliers produce a comparable vinyl product with a recyclable paper backing. If an acceptable product is available, DOT can write the bid specifications to require recyclable paper backing.

Collect and recycle pallets.

DOT has agreed to explore alternative methods for pallet disposal.

4. Waste and Recyclables Generation Data

The following table summarizes the trash and recyclables data gathered at DOT during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Department of Transportation
Trash and Recycling

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	39.0%	178.00
- *corrugated cardboard*	7.2%	33.00
- *scrap metal*	31.8%	145.00
Recyclable Materials Discarded in Trash	2.1%	9.49
- *paper (white paper, mixed paper, corrugated cardboard)*	1.0%	4.50
- *mixed containers*	1.1%	4.99

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING (continued)			
Properly Disposed Trash	47.9%		218.59
- *pallets*	41.7%		190.00
- *food service items*	0.9%		4.25
- *food/liquid*	0.7%		3.25
- *rags*	3.1%		14.00
- *other*	1.6%		7.09
Contaminants in Recyclables	11.0%		50.05
TOTAL TRASH AND RECYCLING	100.0%		456.13
TRASH		**Description**	
Paper	2.0%		4.50
- *white paper**	0.2%	invoices, copy paper	0.50
- *mixed paper**	0.7%	newspaper, colored paper	1.50
- *paperboard**	0.7%	boxes from tv dinners, pizza, cereal	1.50
- *corrugated cardboard**	0.4%	scraps of boxes	1.00
Food Service Items	1.9%		4.25
- *cups (paper and plastic)*	0.4%	36 paper cups, 2 foam cups	1.00
- *plastic food service items*	0.4%	cup lids, plastic bags, food containers	1.00
- *paper food service items*	1.0%	paper bags, napkins, plates	2.25
Mixed Containers	2.2%		4.99
- *recyclable glass containers**	0.8%	2 juice bottles, 1 coffee jar	1.75
- *recyclable plastic bottles/jugs**	0.5%	tape remover, ammonia, juice, water, bleach	1.25
- *redeemable plastic bottles/jugs**	0.4%	7 soda bottles, 1 juice bottle	1.00
- *recyclable aluminum cans**	0.1%	1 Slimfast can	0.16
- *redeemable aluminum cans**	0.0%	1 soda can	0.03
- *aluminum foil/trays**	0.2%	trays, foil	0.50
- *steel cans**	0.1%	1 food can	0.14
- *juice boxes/gable top bev. cartons**	0.1%	½-gallon milk container	0.16
Food/Liquid	1.4%	lunch items	3.25
Rags	6.1%	wet, soaked with solvent, paint, etc.	14.00
Pallets	83.3%	one 40x48", one 145x62"	190.00
Other	3.1%		7.09
- *paper towels*	0.4%	paper towels from cleaning operations	1.00
- *plastic gloves*	0.1%	7 latex gloves	0.25
- *tape*	0.9%	paint covered	2.00
- *vinyl*	0.1%	unused vinyl scraps	0.25
- *vinyl backing*	1.3%	paint covered, coated-paper backing	3.00
- *aluminum*	0.0%	one small strip	0.09
- *miscellaneous trash*	0.2%	cigarette butts, cleanser	0.50
TOTAL TRASH	100.0%		228.08
RECYCLING		**Description**	
Corrugated Cardboard	14.5%		33.00
Scrap Metal	63.6%		145.00
Contaminants in Recycling	21.9%		50.05
- *in corrugated cardboard*	21.9%	vinyl backing, four unused vinyl sheets, soda bottle, light bulb, cups, cigarette boxes, polystyrene, plastic gloves, plastic strapping, rags	50.05
- *in scrap metal*	0.0%		0.00
TOTAL RECYCLING	100.0%		228.05

* Indicates required recyclable material found in trash.

Note: Percentages may not total 100% due to rounding.

I. FINANCIAL INFORMATION SERVICES AGENCY

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

Two areas of FISA's operations participated in the waste sort and assessment: the warehouse and the computer rooms.

Warehouse

The warehouse is on the ground floor of the building and four people work in the warehouse full-time. The 20,000 square-foot space is used for storage and distribution of all agency supplies, such as printer paper, forms, and checks/warrants. The large rolls of specialized, continuous feed paper used for printing FISA reports also are stored in the warehouse. FISA receives an average of 50 skids of paper per week. Each roll weighs 600 lbs. and includes strapping and stretch wrap. In addition, standard boxes of printer and copier paper, as well as forms and office supplies are stored in the warehouse.

The primary wastes generated in the warehouse are packaging materials, such as stretch wrap and strapping from pallets of supplies, broken wood pallets, paperboard, angleboard, and corrugated cardboard.

Computer Rooms

The computer rooms, located on the fourth floor, are composed of the command center, the print room, and the tape library. Nine City employees and a team of consultants initiating FMS 2000 work in the computer rooms. In the computer print room, two large printers (3800 IBM and 3900 IBM) continuously run reports.

The primary waste generated in the computer rooms is white paper, in the form of continuous feed paper edging, print mistakes, blank paper generated between print runs, and the ends of paper rolls. Additional wastes include packaging from supplies.

2. Waste Prevention Opportunities

Reduce the amount of blank paper waste.

During the initial waste sort, nearly one-third of the total white paper recycling stream was usable, blank paper. This paper is a result of misfed roll paper and the ends of the rolls that do not contain enough paper for complete job. Because FISA indicates that nothing can be done to change the way the paper is printed, finding a reuse option for the end rolls and other unused paper is the feasible alternative. FISA agreed to investigate methods for reducing the quantity of this paper in the waste and recycling streams, such as donating the ends of the rolls to a needy organization.

Initiate training to encourage desktop printing when FMS 2000 is fully implemented.

The FMS 2000 program will allow certain City employees to access FISA reports on their own PCs. This will allow FISA to stop printing some reports and employees to print only portions of reports that they need. FISA will take over training after implementation of FMS 2000, although this date has not yet been determined. Until then, training will be conducted by the AMS Training Center on Wall Street.

Review forms for reduction opportunities.

Currently, FISA orders between 90 and 100 different forms. FISA is determining if all are needed. FISA anticipated that about 60 forms will still be printed. The remaining forms will be phased out and eventually any remaining forms will be recycled. Most forms will be carbonless forms, reducing the number of carbon forms used. However, it may not be possible to replace forms with four parts or more with carbonless forms.

Return plastic tube caps from computer paper rolls to the vendor.

Plastic tube caps for rolls of computer paper are currently discarded despite vendor contract language indicating that the vendor is required to take back the end caps for reuse. FISA has recently set up a bin to collect end caps for return.

3. Opportunities to Enhance Recycling

Develop outreach and identify training opportunities to present FISA's waste prevention and recycling program.

FISA plans to add information to its orientation package about waste prevention and recycling activities. Handouts also will be provided with paychecks when new programs are put in place or changes to old programs occur.

Improve diversion of white paper for recycling.

FISA's white paper recycling program is successful, but slight contamination occurs in specific bins. FISA agreed to place a trash bin near the recycling bin that experiences contamination in the tape library in an effort to reduce contamination in the recycling bin.

Collect and recycle mixed paper.

DOS collects corrugated cardboard from FISA. FISA agreed to begin a recycling program internally for mixed paper, which it will bag in clear bags and set out with the cardboard for collection.

Collect and recycle mixed containers.

FISA agreed to consider developing a collection system for mixed containers. Factors under consideration include: storage space on the loading dock, collection containers, review of

current practices, custodial requirements, and potential for DOS to add FISA to the mixed container collection route.

Collect and recycle plastic film.

FISA generates plastic film in its warehouse from the packaging associated with paper and other supplies. FISA agreed that it can store used plastic film for several months to accumulate quantities large enough for collection by recyclers or brokers. FISA agreed to contact plastic film recyclers to learn more about the feasibility of the project.

Identify a recycling market for plastic strapping.

FISA generates plastic strapping as a waste product from paper roll packaging. FISA agreed to investigate recycling options for the strapping through the film recyclers, some of whom accept various types of plastic for recycling.

4. Waste and Recyclables Generation Data

The following tables summarize the trash and recyclables data gathered at FISA during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Financial Information Services Agency
Warehouse—Trash and Recycling Stream

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING			
Properly Recycled Materials	26.2%		4.75
- *white paper*	4.1%		0.75
- *corrugated cardboard*	22.1%		4.00
Recyclable Materials Discarded in Trash	7.6%		1.38
- *white paper*	1.4%		0.25
- *mixed containers*	6.2%		1.13
Properly Disposed Trash	22.1%		4.01
- *food service items*	4.2%		0.76
- *other*	17.9%		3.25
Contaminants in Recyclables	44.1%		8.00
TOTAL TRASH AND RECYCLING	100.0%		18.14
TRASH		**Description**	
Paper	4.6%		0.25
- *white paper**	4.6%		0.25
Food Service Items	14.1%		0.76
- *cups (paper and plastic)*	9.3%	5 waxed paper	0.50
- *plastic food service items*	2.4%	1 plastic food container	0.13
- *paper food service items*	2.4%	paper bags	0.13

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
Mixed Containers	21.0%		1.13
- *recyclable plastic bottles/jugs**	18.6%	2 water jugs	1.00
- *aluminum foil/trays**	2.4%	tin foil	0.13
Other	60.3%		3.25
- *plastic film*	27.8%	plastic stretch wrap	1.50
- *paper towels*	13.9%	paper towels	0.75
- *miscellaneous trash*	18.6%	cigarette butts, plastic lids, gloves	1.00
TOTAL TRASH	100.0%		5.39
RECYCLING		**Description**	
White Paper	5.9%		0.75
Corrugated Cardboard	31.4%		4.00
Contaminants			
- *in corrugated cardboard*	62.7%	broken wooden pallets, angleboard, paperboard boxes	8.00
TOTAL RECYCLING	100.0 %		12.75

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Financial Information Services Agency

Computer Room—Trash and Recycling Stream

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING			
Properly Recycled Materials	80.6%		337.00
- *white paper*	80.6%		337.00
Recyclable Materials Discarded in Trash	8.3%		34.75
- *paper (white paper, newspaper, magazines, corrugated cardboard)*	6.0%		25.00
- *mixed containers*	2.3%		9.75
Properly Disposed Trash	9.2%		38.50
- *food service items*	1.4%		6.00
- *food/liquid*	0.8%		3.50
- *other*	6.9%		29.00
Contaminants in Recyclables	1.9%		8.00
TOTAL TRASH AND RECYCLING	100.0%		418.25
TRASH		**Description**	
Paper	34.1%		25.00
- *white paper**	6.1%	white copy paper	4.50
- *mixed paper**	4.8%	colored paper, newspaper, post-its	3.50
- *paperboard**	16.4%	paper roll cores, food packaging, cereal box	12.00
- *corrugated cardboard**	6.8%	cardboard boxes	5.00
Food Service Items	8.2%		6.00
- *cups (paper and plastic)*	2.0%	46 paper, 2 foam	1.50
- *plastic food service items*	2.0%	cup lids, plastic bags, clamshells, utensils, food packaging, food containers	1.50
- *paper food service items*	4.1%	paper bags, napkins	3.00

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
Mixed Containers	13.3%		9.75
- *recyclable glass containers**	5.5%	8 juice and water bottles	4.00
- *redeemable glass containers**	2.0%	2 sparkling water bottles	1.50
- *recyclable plastic bottles/jugs**	1.4%	6 bottles water and sports drink	1.00
- *redeemable plastic bottles/jugs**	1.4%	6 plastic bottles	1.00
- *recyclable aluminum cans**	0.3%	1 can	0.25
- *redeemable aluminum cans**	1.0%	5 cans	0.75
- *aluminum foil/trays**	1.0%	3 food tins, foil	0.75
- *juice boxes/gable top bev. cartons**	0.7%	3 milk cartons	0.50
Food/Liquid	4.8%	tea bags, lemons, liquid from cups, food	3.50
Other	39.6%		29.00
- *plastic film*	18.4%	wrapping from large computer paper rolls	13.50
- *other plastic*	5.5%	2 toner containers, plastic nails, computer paper roll tube caps	4.00
- *plastic strapping*	6.1%	strapping from large computer paper rolls	4.50
- *polystyrene packaging*	1.4%	foam	1.00
- *paper towels*	0.7%	paper towels	0.50
- *wood*	2.0%	broken packing material	1.50
- *composites*	3.4%	fuzzy roll, cardboard/foam inserts, storage tapes	2.50
- *miscellaneous trash*	2.0%	label backing, gum wrappers, photocopy machine rags	1.50
TOTAL TRASH	100.0%		73.25
RECYCLING		**Description**	
White Paper	97.7%	93 lbs. edging from computer feed paper; 139 lbs. reports; 37 lbs. stacks of unused paper; 68 lbs. rolls of unused paper	337.00
Contaminants			
- *in white paper*	2.3%	cardboard box with record storage tapes, instant soup label, colored form, 4-5 newspapers, tissues, paper towels	8.00
TOTAL RECYCLING	100.0%		345.00

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

J. FIRE DEPARTMENT

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

The functional areas of the Vehicle Maintenance Facility (VMF) (*i.e.*, the service bays and supply operations), generate a variety of wastes as they service the Emergency Medical Services (EMS) equipment. These wastes include used oil, antifreeze, parts solvent, metal, oil filters, batteries, tires, soiled rags, sorbent, wood, cardboard and paper. The VMF has an active recycling program for many of these materials. The facility has three 10-cubic-yard containers for trash and one 10-cubic-yard container designated for cardboard. Institutional aides are responsible for performing cleaning and waste collection as well as loading, unloading and storing supplies.

Service Bays

The vehicle maintenance activities conducted in the service bays include fluid changes (*e.g.*, oil, transmission, brake, radiator etc.), filter changes, battery maintenance, tire replacements, and tune-ups as well as many other mechanical repairs. Each of these processes and the wastes generated is described below. The VMF shop houses approximately 11 bays that are used for vehicle repair. These bays are used by all three shifts of mechanics. Mechanics are not assigned to a specific bay, but rotate according to the location of the vehicle that requires service.

Ambulances and other severe duty vehicles are serviced on a 45-day preventive maintenance (PM) cycle. Staff cars are on a 90-day PM cycle. This PM includes a complete safety and maintenance review.

The administrative offices are located at one end of the shop. The administrative workers manage the flow of vehicles through the facility, including scheduling repairs and maintaining records on the vehicles. The significant wastes from this area include paper (computer and white paper) and corrugated cardboard. The administrative offices had a hamper outside the office area for paper. Paper recycling containers were not in use in the office space. Paper was noted in nearly all trash containers. Waste from this area was not included in the waste sort.

The Parts Supply room is located at one end of the shop. Workers request the parts required for repairs with a written authorization. The stock clerk provides the parts as needed. The stockroom is responsible for maintaining the appropriate levels of stock and managing the warehouse of parts. The significant wastes from this area include paper (computer and white paper), corrugated cardboard, paperboard, packaging materials and wood pallets. The Parts Supply room did not appear to have paper recycling containers. Corrugated cardboard was separated for recycling. Other packaging waste, wood and pallets were discarded with the trash. It was estimated that the stock room generates 6-8 pallets per day. On the day of the assessment, 21 wooden pallets were to be discarded with the trash.

The VMF also has an active welding and metal fabrication room. The shop contains a welding station, as well as several standard metal fabrication tools including lathes, drill presses, band saws and other metal cutting and bending equipment. Maintenance on the equipment is performed as needed. The major waste from these operations is metal, which is typically recycled. During the assessment, numerous brake rotors and drums were being refabricated and turned in the lathe area.

The lunch rooms has tables, chairs and a beverage vending machine. No recycling containers were present in either the lunch rooms or locker room. VMF mechanics purchase their own coveralls. Workers pay for a laundry service to clean their coveralls. Hangers from this laundry service were collected, placed on a rack and collected by the laundry for reuse.

2. Waste Prevention Opportunities

Develop outreach and identify training opportunities to present the NYFD/EMS waste prevention program.

NYFD/EMS agreed to review its training and orientation programs to ensure that employees learn about the waste prevention programs in place at NYFD/EMS. NYFD/EMS expressed interest in performing some training for supervisory staff that could then be implemented as a function of their daily responsibilities in making staff aware of changing waste management procedures.

Install an overhead bulk fluids dispensing system.

NYFD/EMS agreed to consider installing an overhead bulk fluids dispenser to supply fluids to the bays in its new facility. Implementation of this supply system will reduce spills and sorbent use, enhance worker safety, allow more effective tracking of supply usage and potentially reduce purchasing costs.

Install a fluid suction system to collect used fluids and replace oil pan drain plugs with quick drain connectors.

NYFD/EMS agreed to continue to explore opportunities to install quick drain connectors. Installation of an evacuation system to collect the oil from the vehicles would make fluid changes faster, easier and cleaner. This system consists of a specially designed drain plug, and a suction pump. When performing an oil change with a typical drain plug, the plug must be removed from the oil pan. The oil then drains out of the vehicle into a container and the plug is replaced. The quick drain plug is designed with a spring-loaded valve on the inside which allows a hose (with a bayonet connector) to be placed directly onto the plug. The action of attaching the hose causes the valve to open. A suction pump is used to draw the oil directly from the vehicle to a central used oil container. This type of plug is available for nearly all vehicles and is designed to take the place of the existing drain plug. This system reduces oil spills because there is no drain plug to remove and because a continuous hose connects the engine's oil pan to the waste oil collection reservoir.

Use oil collection equipment to collect leaks more effectively.

NYFD/EMS agreed to procure additional fluid collection equipment for use by mechanics and initiate a requirement that staff utilize appropriately sized containers under any standing vehicle.

Use reusable pads and wringer to collect oil spills.

Cleanup wastes may be minimized by using reusable absorbent pads under leaks and to clean spills. NYFD agreed to use pads on tops of drums to reduce spills to the floor but did not want to use wringers to reuse the pads.

Improve access to emergency spill equipment.

Emergency spill equipment is located on the top shelf of the stock room making it inaccessible during emergency cleanups. NYFD agreed to relocate emergency spill equipment in the work areas where it will be easily accessible to workers responsible for containing spills.

Improve used oil and antifreeze segregation and recycling.

Improve labeling and secondary containment.

During the waste assessment, the shop areas near the repair bays had numerous drums for the collection of used oil and antifreeze. Often these containers were unlabeled and contained antifreeze, used oil and, in several cases, fuel from fuel filters. NYFD/EMS agreed to consider establishing a more efficient system for the collection of each of these fluids in separate containers. NYFD/EMS agreed to identify appropriate locations for the storage of spent fluids and provide labels to identify each drum of material.

Use rerefined oil in some vehicles.

The Fire Department uses only virgin motor oil. Rerefined oil is not used because of concerns about product quality and durability during the severe use of these vehicles. NYFD/EMS is hesitant about using rerefined oil in its vehicles, but stated that it would look at information provided DOS before ruling out the use of rerefined motor oil.

Improve spent lead-acid battery in-house management.

During the assessment at NYFD/EMS, numerous batteries were scattered throughout the facility, with batteries in nearly every bay. The battery storage room and areas outside of the room had excessive numbers of spent batteries. NYFD/EMS agreed to organize battery collection more effectively and increase the frequency of battery shipments to the vendor.

Reduce the procurement and use of industrial toxic chemicals by changing purchasing practices.

The VMF currently uses aerosol cans of solvents and degreasers containing chemicals on the U.S. Environmental Protection Agency's (EPA) 33/50 list, which is a list of chemicals targeted by EPA for reduction or elimination. The NYFD/EMS has agreed to review its purchasing practices to see if replacement products could be procured that do not have these constituents.

Ensure that halon fire extinguishers are managed in an appropriate manner.

During the waste sort, a full Halon 1211 fire extinguisher was found in the waste stream. According to NYFD staff, the extinguisher was discarded because the handle was broken. Halons are among the most ozone-depleting chemicals in use today. EPA requires that technicians who handle halon-containing equipment be appropriately trained; bans releases of halons during the testing, maintenance, repair, servicing, and disposal of halons and halon-

containing equipment. The NYFD stated that no halon equipment should be in the vehicles. All halon containing equipment should be brought to the 34th St. station for appropriate management. They stated that they would reinforce procedures with workers.

Reduce solvent waste from parts cleaning.

NYFD/EMS vehicle repair facility uses solvent-based parts cleaners. NYFD stated that they have procured new solvent sinks that filter the solvent. These units are used at the 34th St. facility and greatly reduce the quantity of solvent generated. NYFD stated that it would implement the same change at the 58th St. facility.

Change from C-fold towel dispensing systems in restrooms/wash areas to towel rolls or electric dryers.

NYFD/EMS restrooms and wash areas typically have fold paper towel dispensers. NYFD/EMS currently uses approximately 885 cases of paper towels per year. NYFD/EMS agreed to consider replacing all C-fold towel dispensers with either roll towels or hand dryers. The NYFD/EMS agreed to install roll towel dispensers. The stock room supervisor stated that he had the dispensers in stock.

3. Opportunities to Enhance Recycling

Develop outreach and identify training opportunities to present NYFD/EMS recycling programs.

NYFD/EMS agreed to review its training and orientation programs to ensure that employees learn about the recycling programs in place at NYFD/EMS. NYFD/EMS felt that it was not reasonable for them to hold a training session for all of the shop employees because of the existing workload requirements for servicing vehicles. NYFD/EMS expressed interest in performing some training for supervisory staff that could then be implemented as a function of their day-6 to-day responsibilities in making staff aware of changing waste management procedures.

Establish an improved white paper and mixed paper recycling program.

The NYFD has a paper recycling program but it appears to be limited to computer printouts. The offices did not have paper recycling containers. Much of the office paper was mixed with the trash. There was no paper recycling occurring in the service bays. Worksheets, newspapers, magazines and other paper products are disposed with the trash. An improved recycling program can begin in the offices. NYFD/EMS agreed to consider providing each employee with a separate paper recycling container. NYFD/EMS agreed to establish a better white paper and mixed paper recycling program.

Improve separation of cardboard for recycling.

Contamination of the cardboard recycling was noted during the assessment and waste sort. The NYFD agreed to address the contamination by ensuring that all staff understands the recycling program and that bins are placed conveniently to allow for easy access by all staff.

NYFD can post signs throughout its operations to direct employees to properly recycle materials. NYFD/EMS agreed to address this issue by ensuring that stockroom and all other staff understand the recycling program and that bins are placed conveniently to allow for easy access by all staff.

Establish an oil filter recycling program.

All oil filters generated at the 58th St. facility are disposed with other solid waste. Some filters are drained and crushed prior to disposal but many go directly in the trash. The NYFD/EMS facility agreed to investigate the feasibility of establishing a filter recycling program.

Improve metals segregation for recycling.

The NYFD/EMS has established a metal recycling program that collects metal parts from repair operations including brake drums, rotors, fenders etc. Although a large amount of metal is recycled, more than five percent of the waste sorted on the day of the assessment was recyclable metal. The NYFD agreed to increase employee access to containers available for metals recycling.

Improve drum recycling.

Although 55-gallon drums have a $20 deposit associated with them and some are returned, numerous drums were noted throughout the facility that could be returned. NYFD/EMS agreed to reorganize the fluid collection process and improve the drum return process.

Establish a pallet reuse and recycling program.

NYFD agreed to consider establishing a contract with a private recycler to take wooden pallets. It was estimated that the stock room generates six to eight pallets per day that are disposed of as solid waste. Some pallets are returned to the DCAS warehouse.

NYFD/EMS agreed to try to establish a pallet recycling program, however, they were concerned about having enough space at the facility to store the pallets.

Improve management of fluorescent tubes.

NYFD/EMS agreed to consider establishing a fluorescent lamp recycling program.

4. Waste and Recyclables Generation Data

The following table summarizes the trash and recyclables data gathered at the Fire Department during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Fire Department/Ambulance Maintenance VMF

Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	38.8%	841.00
- *corrugated cardboard*	6.2%	135.00
- *scrap metal*	32.6%	706.00
Recyclable Materials Discarded in Trash	5.0%	107.75
- *paper (white paper, mixed paper, paperboard, and corrugated cardboard)*	1.7%	37.25
- *mixed containers*	0.3%	5.50
- *vehicle waste - metal*	3.0%	65.00
Properly Discarded Trash	55.1%	1,192.00
- *food service items*	0.3%	7.00
- *food/liquid*	0.3%	6.00
- *vehicle waste (other than metal)*	6.7%	144.75
- *other miscellaneous mechanic waste*	4.5%	97.00
- *ambulance supply waste*	1.1%	24.00
- *other*	42.2%	913.25
Contaminants in Recyclables	1.2%	25.50
TOTAL TRASH AND RECYCLING	100.0%	2,166.25

TRASH		Description	
Paper	2.9%		37.25
- *white paper**	0.3%	white paper forms	3.50
- *mixed paper**	0.9%	colored paper, newspaper, magazines	11.75
- *paperboard**	0.4%	auto parts boxes	5.00
- *corrugated cardboard**	1.3%	boxes from parts shipments	17.00
Food Service Items	0.5%		7.00
- *cups (paper and plastic)*	0.2%	97 paper cups, 10 plastic/foam cups	3.00
- *paper food service*	0.2%	paper bags, food packaging, cup trays	2.50
- *plastic food service*	0.1%	food wrappers, clamshells, utensils	1.50
Recyclable Containers	0.4%		5.50
- *recyclable glass containers**	0.3%	5 bottles	4.00
- *redeemable plastic bottles**	0.0%	5 bottles	0.50
- *redeemable aluminum cans**	0.0%	8 cans	0.50
- *aluminum foil/trays**	0.0%	4 orange juice containers	0.25
- *juice boxes/gable top bev. cartons**	0.0%	foil and 2 food tins	0.25
Vehicle Waste	15.3%		196.75
- *auto parts - metal**	5.1%	radiator caps, ignitions, other metal parts	65.00
- *auto parts - plastic/rubber*	2.1%	auto lenses, belts, other rubber parts	27.00
- *auto parts - composites*	4.5%	fuel filters, fuses, etc.	58.50
- *oil filters*	3.1%	crushed vehicle oil filters	39.25
- *air filters*	0.5%	4 oval air filters and 1 round filter	7.00
Other Mechanic Waste	7.5%		97.00
- *sorbents*	4.2%	clay sorbent	54.00
- *cloth rags and dropcloths*	1.6%	oily and clean rags, large dropcloths	20.00
- *paper towels*	1.0%	towels from mechanic wash stations	13.00
- *plastic gloves*	0.7%	mechanics' plastic gloves	9.00
- *aerosol containers*	0.0%	1 aerosol container	0.50
- *quart oil containers*	0.0%	1 empty oil container	0.50

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
Ambulance Supply Waste	1.9%		24.00
Food/Liquid	0.5%	lunch waste	6.00
Other	71.0%		913.25
- *wood pallets*	65.3%	21 pallets at 40 lbs. each	840.00
- *wood (other than pallets)*	0.6%	cabinet door, dry sweep compound	8.00
- *plastic film*	1.4%	2 full trash bags of stretch wrap	18.50
- *batteries*	0.1%	1 6-volt battery	1.00
- *foam packaging*	0.0%	rigid EPS foam pieces from parts shipping	0.25
- *miscellaneous trash*	3.5%	broken office chair, pressure sensitive packing material, cigarette wastes	45.50
TOTAL TRASH	100.0%		1,286.75
RECYCLING		**Description**	
Corrugated Cardboard	15.1%	corrugated shipping boxes	135.00
Scrap Metal	79.1%	wheel rims, rotors, brake system, backing plate for brakes, brake shoe, aluminum pump, muffler, aluminum sheet	706.00
Contaminants in Recycling	2.9%		25.50
- *in corrugated cardboard*	1.3%	refrigerant in box, 2 used fluorescent tubes in box, EPS foam packaging, gloves, white paper, plastic bag, paperboard boxes, aerosol cans	11.50
- *in scrap metal*	1.6%	mirror, rubber gasket, plastic lens, glass-lined boxes, rag, plastic part	14.00
TOTAL RECYCLING	100.0%		892.00

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.
Percentages indicated as 0.0% are less than 0.1%.

K. HUMAN RESOURCES ADMINISTRATION

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

HRA oversees the Medical Assistance Program (MAP) to assist Medicaid clients, manages the welfare reform effort, and provides other public assistance support to approximately two million clients annually in the five boroughs. HRA selected the 2nd and 9th floors at 330 West 34th Street in Manhattan to participate in the waste assessment and waste sort. These two floors are representative of the range of services provided and activities performed by HRA Medical Assistance Program staff at the 34th Street location. Staff provides direct client assistance, and performs research, records review and general maintenance of client assistance status.

The primary waste generated by the Medical Assistance Program operations is paper. MAP staff provided SAIC with a list of the 600 different forms used by HRA staff to process clients being served by the MAP. These forms are provided in a variety of different types: (*e.g.*, multiple copy forms with carbon, white paper, multiple copy carbonless, etc.). Different forms require

different envelopes. The forms are received from diverse sources including: the HRA warehouse in Brooklyn, HRA print shop, private vendors and the New York State Department of Social Services. Because of limited storage space, MAP forms are ordered monthly, based on quarterly forecast of use. In addition, the Administrative Services office supplies forms for all Medicaid users in New York City, including hundreds of nursing homes and HHC hospitals.

2nd Floor: Client Services

The operations on the 2nd floor include client interviews, photo identification services, the Director's office, the security office, computer systems operations, and staff to assist managed care providers and Medicaid conversion activities. Approximately 160 employees work on the 2nd floor, providing research assistance to more than 600 clients per day and miscellaneous services to more than 200 clients each day.

The floor is divided into office space, both private offices and common work areas; areas for MAP staff to meet with clients to complete paperwork; photo identification card processing; and waiting areas, some with seating and others for standing in line for assistance at a window. In addition, public restrooms and limited records storage space are available on the 2nd floor.

The wastes generated by MAP operations on the second floor include white paper, mixed paper, corrugated cardboard, beverage containers, food, waste associated with the Polaroid photos for identification cards and bathroom waste.

9th Floor: Administrative Services Unit

The Administrative Services Unit and Assistant Deputy Commissioner's Unit are housed on the 9th floor. One hundred fifty MAP staff are assigned to desks or work stations on the floor. They support the Transportation Unit, Client Service Type Match Unit, Field Staff, Mail Rectification Unit and the Client Review Services.

A small employee lounge contains a table, chairs, vending machines and recycling collection bins for mixed containers, although the recycling program for mixed beverage containers is somewhat unclear. It appears that the custodial crew or HRA staff remove the deposit containers for the refund. The status of recycling for the non-deposit containers is uncertain.

Wastes generated by MAP operations on the 9th floor include white paper, mixed paper, corrugated cardboard, food and food services items and beverage containers.

2. Waste Prevention Opportunities

Develop outreach and identify training opportunities to present HRA's waste prevention and recycling program.

HRA agreed to pursue opportunities to raise the awareness of waste prevention and recycling initiatives as well as presenting training on certain waste prevention and recycling policies and success stories to its staff.

HRA agreed to implement seven opportunities that will reduce paper use and paper purchases. The implementation of paper reduction strategies begins with identifying current paper usage at printers and photocopiers, and implementing options to reduce the paper usage. The following describes these opportunities.

Reduce paper use by setting photocopy machines to default to the duplex setting.

Reduce paper use by reducing and copying 4-6 pages per side for storage copies.

Repair/replace photocopy machines that cannot produce double-sided copies.

Improve education and outreach regarding double-sided photocopying.

Ensure signs are posted at all photocopy machines directing staff to use the duplex capability of the machine.

Provide additional staff training in the use of computers and printers.

Quantify reduction in paper purchases, use and waste.

HRA agreed to identify all printers and copiers and document the capabilities of each. For each printer, HRA agreed to document the location, number of users, printer type, the toner cartridge type and determine if it has duplex capabilities and four-up and six-up capabilities, a feature available on many Lexmark Printers. For each photocopier, HRA agreed to document the location, brand and model.

Users of printers that have duplex capabilities will be trained in how to print duplex versions of documents and encouraged to use the duplex capabilities. Purchases of new printers with duplex capabilities will be considered, especially in areas where several people use a particular printer.

HRA agreed to encourage staff to format documents for multi-page printing. This will reduce full pages to fit four to six pages per side for those written materials that will be filed for reference only. This option is available on many Lexmark printers.

For those photocopiers with duplex capabilities, HRA has agreed to change the default settings, where possible, to facilitate duplex printing throughout the building. Much of the staff currently uses printers that are only capable of single-sided jobs. As a result, HRA has proposed that the program be started by changing the default settings from single-sided mode (1 to 1) to single to duplex mode (1 to 2). After HRA has procured a significant number of duplex printers, the copier defaults can be changed to duplex mode (2 to 2).

HRA also agreed to ensure that signs are posted at all photocopy machines encouraging staff to make double-sided photocopies. These signs will provide clear instructions on how to perform single to duplex copying and double-sided copying if duplex is not the default setting. Signs advocating doubled-sided copying can be requested from the Department of Sanitation. Staff also will be encouraged to reduce printing format (*e.g.*, decrease margins, font size, reduce unnecessary graphics and borders, etc.) to increase the amount of information that can be included on one sheet of paper.

When sending a used photocopier from one facility to another or to salvage, ensure that any remaining supplies, specific to the brand and model, are delivered to the new user.

HRA agreed to establish a checklist of machines and an inventory of supplies specific to each make and model. They will assign the responsibility of ensuring that all excess supplies are removed and delivered with each machine as it is removed from service.

Resolve issues delaying removal of obsolete equipment and unused furniture.

HRA has agreed to investigate compensating the management company for the use of the elevator to transport the excess furniture and supplies out of the building. HRA needs to coordinate with DCAS or DOS for the transfer or disposal of the obsolete equipment and furniture.

Establish a toner recharging/recycling program.

HRA agreed to establish a formal program to collect and return printer cartridges for recharging.

Encourage the purchase and use of recharged toner cartridges where possible.

HRA agreed to consider purchasing recharged printer cartridges for use in the printers throughout their facility.

Initiate a pilot program to test the impact of two-way envelopes on MAP programs.

HRA has agreed to target another mailing for two-way envelope usage based on the substantial increase in responses from the last trial run. The only potential problem HRA noted is that the mailing contractors' equipment cannot handle the two way envelopes. HRA agreed to target one of the map mailings in the near future to test the two-way envelopes.

Initiate discussions to eliminate the use of all carbon forms.

The carbon forms are often a contaminant in HRA's white paper recycling. HRA identified the state government as the source of carbon forms and said that half of all the State's forms were carbon. HRA agreed to initiate a discussion with State agencies to determine if the elimination of the carbon forms would be possible since an automated computer system will be used in the future. If the forms are still necessary, HRA, in conjunction with the state government, can decide whether NCR forms or plain paper forms that are photocopied when necessary are a more suitable option.

Initiate a mailing list review and update program to reduce the quantity of undeliverable mail that must be shredded and disposed.

To reduce future returned mail, HRA is in the process of verifying eligibility for welfare and Medicaid recipients. The database of mailings will be modified as a result of this process.

3. Opportunities to Enhance Recycling

Improve the diversion of white paper for recycling.

HRA agreed to explore option for improving its white paper recycling through increased availability of recycling receptacles and increased awareness of the white paper recycling policies of New York City.

Collect and recycle mixed paper.

Under New York City's Commercial Recycling Regulation, HRA is required to recycle newspapers, catalogs, magazines, and phone books. HRA agreed to collect colored paper, glossy paper, folders, envelopes, paper bags, and paperboard as part of a mixed paper recycling program. HRA agreed to initiate a mixed paper recycling program and coordinate their efforts with building management.

Collect and recycle mixed containers.

HRA agreed to enforce a program of recycling mixed containers. HRA agreed to educate its employees and clients on the mixed container recycling through training programs and posted literature.

Collect and recycle pallets.

HRA has agreed to explore alternative methods for pallet disposal. HRA will negotiate with building management concerning the possibility of separately collecting pallets for recycling.

Improve separation of paper and cardboard for recycling.

HRA agreed to take steps to limit contamination in the cardboard and paper recycling diverted from the office operations. HRA agreed to address the contamination issues by ensuring that staff understand the recycling program and that bins are placed conveniently to allow for easy access by all staff. HRA also agreed to improve signs posted throughout its operation to direct employees to properly recycle materials.

At each copy machine and printer, place both a waste container and a recycling container to reduce contamination of the white paper.

The waste sort revealed a large amount of contamination in the white paper recycling bins. HRA agreed to consider putting a recycling bin and a waste container at all the printers and photocopiers to discourage contamination.

4. Waste and Recyclables Generation Data

The following tables summarize the trash and recyclables data gathered at HRA during the one-day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Human Resources Administration

Second Floor—Trash and Recycling Stream

Category/Material	Percent of Total	Weight of Sample (Pounds)
TRASH AND RECYCLING		
Properly Recycled Materials	9.5%	36.00
- *white paper**	4.7%	18.00
- *corrugated cardboard**	4.7%	18.00
Recyclable Materials Discarded in Trash	9.2%	34.75
- *paper (white paper, newspaper, magazines, corrugated cardboard)*	9.2%	34.75
Properly Disposed Trash	81.3%	308.25
- *food service items*	8.4%	32.00
- *food/liquid*	11.3%	43.00
- *paper (mixed paper, paperboard)*	14.1%	53.50
- *mixed containers*	11.8%	44.75
- *other*	35.6%	135.00
Contaminants in Recyclables	0.1%	0.25
TOTAL TRASH AND RECYCLING	100.0%	379.25

TRASH		Description	
Paper	25.8%		88.50
- *white paper**	6.1%	forms, computer paper, copy paper	21.00
- *newspaper**	3.9%	newspapers	13.50
- *magazines**	0.1%	glossy magazines	0.25
- *mixed paper*	14.6%	paper ream wrappers, colored paper	50.00
- *paperboard*	1.0%	Polaroid film, office supply and food boxes	3.50
- *corrugated cardboard**	0.1%	cardboard box flaps and edges	0.25
Food Service Items	9.3%		32.00
- *cups (paper and plastic)*	1.3%	49 plastic cups, 154 paper cups	4.50
- *plastic food service items*	2.2%	clamshells, to-go bags, cutlery, trays, straws	7.50
- *paper food service items*	5.8%	paper bags, to-go boxes, napkins, plates	20.00
Mixed Containers	13.0%		44.75
- *recyclable glass containers*	10.2%	66 bottles—Snapple, juice, 2 salad dressing	35.00
- *redeemable glass containers*	0.1%	1 bottle — soda	0.25
- *recyclable plastic bottles/jugs*	0.1%	18 bottles — predominately water bottles	0.50
- *redeemable plastic bottles/jugs*	0.7%	33 bottles — sodas, sparkling waters	2.50
- *recyclable aluminum cans*	0.1%	14 cans — iced tea, punch, yoo-hoo	0.25
- *redeemable aluminum cans*	0.9%	82 cans — sodas, sparkling waters	3.00
- *aluminum foil/trays*	0.4%	predominately foil from food, some food tins	1.50
- *steel cans*	0.1%	8 cans — tuna, salmon, sausages, shake	0.25
- *juice boxes/gable top bev. cartons*	0.4%	28 cartons — pred. orange juice, w/5 aseptic	1.50
Food/Liquid	12.5%	chicken bones, banana peels, fruit, bread, etc.	43.00
Other	39.3%		135.00
- *other plastic containers*	0.1%	10 cont. — yogurt and deli tubs, dressing bottle	0.25
- *plastic film*	0.6%	non-food service bags (retail, pharmacy)	2.00

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
- sorted towels/restroom waste	2.6%	towels from restrooms and lunch use	9.00
- unsorted restroom waste	30.2%	towels from restrooms, sanitary products	103.50
- diapers	0.9%	7 diapers	3.00
- Polaroid waste	1.7%	photo cut-outs, empty film cartridges, backing	6.00
- carbon forms	1.3%	5-part carbon forms	4.50
- miscellaneous trash	2.0%	cigarette packs, pens, phone cards, blisterpack	6.75
TOTAL TRASH	100.0%		343.25
RECYCLING		**Description**	
White Paper	49.7%	TADs, forms, copy paper, shredded paper	18.00
Corrugated Cardboard	49.7%	cardboard boxes	18.00
Contaminants in Corrugated Cardboard			
- in corrugated cardboard	0.7%	forms and shredded paper	0.25
TOTAL RECYCLING	100.0%		36.25

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Human Resources Administration

Ninth Floor—Trash and Recycling Stream

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING			
Properly Recycled Materials	15.3%		22.00
*- white paper**	11.5%		16.50
*- corrugated cardboard**	2.8%		4.00
- mixed containers	1.0%		1.50
Recyclable Materials Discarded in Trash	22.8%		32.75
- paper (white paper, newspaper, magazines, corrugated cardboard)	22.8%		32.75
Properly Disposed Trash	60.6%		87.00
- food service items	10.5%		15.00
- food/liquid	13.9%		20.00
- paper (mixed paper, paperboard)	13.6%		19.50
- mixed containers	9.1%		13.00
- other	13.6%		19.50
Contaminants in Recyclables	1.2%		1.75
TOTAL TRASH AND RECYCLING	100.0%		143.50
TRASH		**Description**	
Paper	43.6%		52.25
*- white paper**	5.8%	forms, photocopies of forms	7.00
*- newspaper**	12.1%	newspapers	14.50
*- magazines**	9.2%	glossy magazines	11.00
- mixed paper	15.0%	CPO edge, env., TADs, ream wrap, ONP, NCR forms	18.00
- paperboard	1.3%	soda cases, office supply & food boxes, towel rolls	1.50
*- corrugated cardboard**	0.2%	box inserts	0.25

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH (continued)		**Description**	
Food Service Items	12.5%		15.00
- *cups (paper and plastic)*	2.1%	74 paper cups, 40 plastic cups (mostly foam)	2.50
- *plastic food service items*	3.8%	cake plates, clamshells, cutlery, lids, bags, wrappers	4.50
- *paper food service items*	6.7%	paper bags, napkins, plates, to-go boxes	8.00
Mixed Containers	10.9%		13.00
- *recyclable glass containers*	8.4%	21 bottles — Snapple, juice	10.00
- *redeemable glass containers*	0.2%	1 bottle — soda	0.25
- *recyclable plastic bottles/jugs*	0.4%	14 bottles — water, o.j., dressing, juice (#1 and #2)	0.50
- *redeemable plastic bottles/jugs*	0.2%	9 bottles — sodas	0.25
- *recyclable aluminum cans*	0.2%	4 cans	0.25
- *redeemable aluminum cans*	0.2%	16 cans — sodas, sparkling water	0.25
- *aluminum foil/trays*	0.8%	predominately food foil, some food tins	1.00
- *steel cans*	0.2%	3 cans — tuna, fruit, Slimfast	0.25
- *juice boxes/gable top bev. cartons*	0.2%	4 cartons — o.j., milk	0.25
Food/Liquid	16.7%	fruit, banana peels, chicken bones, etc.	20.00
Other	16.3%		19.50
- *other plastic containers*	0.2%	10 cont. — yogurt, creamer, deli tub, aspirin, toothpaste	0.25
- *plastic film*	0.8%	nonfood service bags (retail, pharmacy)	1.00
- *sorted towels/restroom waste*	5.4%	paper towels from restrooms and lunch use	6.50
- *carbon forms*	1.3%	5-part carbon forms	1.50
- *miscellaneous trash*	8.6%	pens, cigarette boxes, laminate package, candles	10.25
TOTAL TRASH	100.0%		119.75
RECYCLING		**Description**	
White Paper	69.5%	forms, copies	16.50
Corrugated Cardboard	16.8%	cardboard boxes	4.00
Mixed Containers	6.3%	12 containers	1.50
Contaminants			
- *in corrugated cardboard*	6.3%	cake box, strapping, foil, plastic wrap, ONP, food bag	1.50
- *in mixed containers*	1.1%	paper towels, straws, cup	0.25
TOTAL RECYCLING	100.0%		23.75

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

L. TAXI & LIMOUSINE COMMISSION

1. Description of Operations Assessed and Pre-existing Waste Prevention Activities

The three operations assessed have a total of 33 employees. The Administrative Offices house 23 employees and consist of the Executive Offices, Enforcement, Deployment and MIS/data entry operations. The Administrative Offices are responsible for deploying vehicles, preparing summonses for violations and preparing daily schedules.

The Communications Room is located on the first floor and provides licensing information to uniformed employees performing field enforcement. Six employees staff the Communications Room. The training classrooms are located on the second floor and are used for in-house training programs presented by four employees.

2. Waste Prevention Opportunities

Develop outreach and identify training opportunities to present waste prevention and recycling information to the regulated community.

TLC agreed to raise the awareness of waste prevention and recycling not only within their own operations but also among employees of the smaller taxi and limousine independent maintenance facilities.

Ensure signs are posted at all photocopy machines directing staff to use the duplex capability of the machine.

TLC agreed to post signs directing staff to use the duplex capabilities of the photocopying machines above each machine that is duplex capable.

Review cleaning products to ensure the use of less or non-toxic cleaning products.

TLC agreed to review the cleaning products currently used at the Woodside facility to determine whether less or non-toxic product substitutions are warranted.

3. Opportunities to Enhance Recycling

Establish a toner recycling program.

TLC agreed to establish a formal program to collect and return printer cartridges to the manufacturer, Lexmark.

Establish a white paper recycling program.

Establish a mixed paper recycling program.

Establish a mixed container recycling program.

Establish a corrugated cardboard recycling program.

TLC currently does not recycle any paper, paper products or containers at the Woodside facility. TLC is designing an Agency-wide recycling program and working with DOS to develop the infrastructure, including appropriate interior and exterior receptacles, to initiate a TLC recycling program.

Collect and recycle pallets.

TLC staff indicated that, although they do not discard a large number of pallets, they are willing to explore opportunities to remove the pallets from the waste stream. Currently, DOS collects the pallets as waste.

Continue to collect and recycle Ni-Cad batteries.

TLC staff indicated their commitment to ensure that all spent Ni-Cad batteries are collected and returned to the manufacturer for recycling. TLC staff stated that the Ni-Cad batteries found in the trash during the waste sort were discarded in the trash in error. The proper procedure is to deliver all spent Ni-Cad batteries to Nick Venezia's office. Once TLC has collected 50+ batteries, they are shipped to the manufacturer.

4. Waste and Recyclables Generation Data

The following table summarizes the trash and recyclables data gathered at TLC during the one- day waste sort. These data represent conditions **before waste prevention and enhanced recycling recommendations were presented to the Agency.**

Taxi and Limousine Commission

Trash and Recycling Stream

Category/Material	Percent of Total		Weight of Sample (Pounds)
TRASH AND RECYCLING			
Properly Recycled Materials	0.0%		0.00
Recyclable Materials Discarded in Trash	65.9%		85.00
- *paper*	55.8%		72.00
- *containers*	9.3%		12.00
- *scrap metal*	0.8%		1.00
Properly Disposed Trash	34.1%		44.00
- *food service items*	7.9%		10.25
- *food/liquid*	9.3%		12.00
- *other*	16.9%		21.75
Contaminants in Recycling	0.0%		0.00
TOTAL TRASH AND RECYCLING	100.0%		129.00
TRASH		**Description**	
Paper	55.8%		72.00
- *white paper**	23.3%	photocopy paper, forms, printouts, unused paper	30.00
- *mixed paper**	20.9%	newspapers, ream wrappers, colored paper	27.00
- *paperboard**	1.6%	office supply, cereal & disposable cup boxes	2.00
- *corrugated cardboard**	10.1%	supply boxes	13.00
Food Service Items	7.9%		10.25
- *cups (paper and plastic)*	1.6%	37 paper cups, 33 plastic/foam cups	2.00
- *paper food service items*	4.3%	cooler cups, napkins, kraft bags, popcorn bags	5.50
- *plastic food service items*	2.1%	foam trays, deli conts., cake shell, candy bags	2.75
Mixed Containers	9.3%		12.00
- *recyclable glass containers**	5.4%	12 containers — Snapple	7.00
- *redeemable glass containers**	0.6%	1 container — soda	0.75
- *recyclable plastic bottles/jugs**	0.8%	11 containers — water	1.00
- *redeemable plastic bottles/jugs**	1.0%	15 containers — soda	1.25
- *recyclable aluminum cans*	0.4%	7 cans — iced tea, juice	0.50
- *redeemable aluminum cans**	0.6%	10 cans — soda	0.75
- *aluminum foil/trays**	0.4%	5 trays and foil	0.50
- *juice boxes/gable top bev. cartons**	0.2%	2 cartons — juice	0.25
Food/Liquid	9.3%	beverage liquid, coffee grinds, lunch waste	12.00
Other	17.6%		22.75
- *towels/restroom waste*	8.1%	paper towels, partially full rolls of toilet tissue	10.50
- *other plastic*	3.5%	film canisters, EPS packaging, toner container	4.50
- *batteries*	3.3%	portable radio rechargeable NiCad batteries	4.25
- *plastic film*	0.8%	dry cleaner bags	1.00
- *scrap metal**	0.8%	metal hangers from dry cleaners	1.00
- *miscellaneous trash*	1.2%	cigarette butts and packs, carbon paper, rope	1.50
TOTAL TRASH	100.0%		129.00

* Indicates required recyclable material found in trash.
Note: Percentages may not total 100% due to rounding.

Section III. Sampling of Success Stories and Case Studies from Each City Agency

City Agencies have implemented a number of successful waste prevention and enhanced recycling programs. The *NYCitySen$e* project provided an opportunity for staff from participating City Agency operations to share their experiences and to highlight the wide variety of waste prevention initiatives that are in place in various operations throughout the City. Agency staff also shared, with DOS and its consultant, details of successful recycling programs. Although these recycling programs do not serve to prevent waste from entering the City's waste stream, recycling does divert a significant volume of material to beneficial reuse as feedstock for recycled-content products. Through various outreach activities, DOS has provided a forum through which to share information about these existing programs with all City Agencies, Boards, and Commissions.

In addition to the established waste prevention and recycling programs, each Agency participating in *NYCitySen$e* implemented additional waste prevention and enhanced recycling initiatives. Agencies also initiated research and evaluation of new products and processes that may allow them to enhance their waste prevention and recycling programs in the future.

Below are summaries of some of the new waste prevention and recycling initiatives City Agencies are undertaking to prevent waste and enhance recycling. The level of detail varies, based on the initiative implemented. Some include projected savings for initiatives that the Agency hopes to pursue, while others are descriptions of actions taken to promote waste prevention and increase awareness throughout the Agency. Finally, some of the case studies include data about actual cost savings and waste reduction impacts.

A. DEPARTMENT OF BUSINESS SERVICES

NYCitySen$e Program Initiatives

Distributing a Memo from the Commissioner

On April 15, 1999, DBS Acting Commissioner Deborah Weeks issued a memo to all DBS staff regarding the Agency's recycling policy. The memo reminded all staff about DBS's waste prevention policies, in light of the Mayor's Citywide effort to encourage reuse and recycling. The memo included several specific activities in which staff were encouraged to participate, including duplex photocopying, using outdated letterhead to print incoming faxes, recycling white and mixed paper, and returning unwanted office supplies, such as file folders and hanging folders, to the mail room for reuse by other employees.

Reducing the Quantity of Phone Books Ordered

DBS staff inventoried the telephone directories currently available to staff at 110 William Street. The telephone books used by the Agency include all boroughs, in both English and Spanish versions. The Agency found that they had 205 telephone directories available for about 140

employees. DBS surveyed the staff to determine the quantity of directories that are actually needed by each of its operations so that the Agency could request a reduced number of telephone directories from Bell Atlantic in the future.

Waste Prevented

DBS determined that staff could reduce the number of telephone directories by 97 books or 47 percent. During the next telephone directory order phase, DBS will request that Bell Atlantic deliver only 108 books. Based on an average weight of three pounds per telephone book, the quantity of waste diverted from disposal or recycling will be approximately 290 pounds.

Cost Savings

If DBS discarded 205 telephone directories, each weighing approximately three pounds, then DBS discarded a total of 615 pounds of telephone books annually. The cost to DOS, based on $41.50 per ton to operate the Fresh Kills landfill, was $12.76. Next year, only 108 books, or 324 pounds, will be managed as waste, reducing the disposal cost from $12.76 to $6.72. If the 324 pounds of directories are exported at a cost of $100/ton, the cost to DOS will be $16.20. If the telephone directories are not discarded, but are recycled as mixed paper, for which DOS receives revenue of $10 per ton, DOS would receive annual revenue of $1.60.

Establishing a Reuse Cabinet for Office Supplies

DBS initiated an office supplies reuse program. Employees are encouraged to return usable office supplies to the mail room for storage and eventual reuse by other employees. Whenever an employee leaves the Department, his/her office supplies are placed in the mail room and employees are notified that the supplies are available for reuse.

Waste Prevented

DBS indicated that the major types of supplies diverted from disposal include file folders and desk accessories. Lacking specific information about the actual supplies diverted from the waste stream, it can be estimated that the typical office supplies from an employee's work space may equal approximately two cubic yards or 500 pounds of waste annually.

Cost Savings

DBS estimates that approximately $200 worth of supplies have been reused between May and August 1999. If this four-month period is typical, it is estimated that the annual reduction in purchasing of new supplies may save DBS $800. Based on the estimate of 500 pounds of waste prevention, avoided disposal savings would be $10.37 for Fresh Kills or $25.00 for export.

B. DEPARTMENT OF CITYWIDE ADMINISTRATIVE SERVICES

NYCitySen$e Initiatives

Label Recycled-Content Products

To make it easier for staff at City Agencies and Authorities to purchase recycled-content products, DCAS Division of Municipal Supply Services (DMSS) agreed to label recycled-content items in the Storehouse Catalogue to be issued in March 2000. A column on each page of the Catalogue will permit DCAS to mark those products available with recycled content with an "R," indicating to the purchaser that the item was manufactured with recovered content.

Ensure That the Lexmark Requirements Contract Links the Printer Part Number with the Duplex Option Part Number

Review of the Lexmark requirements contract revealed that Agency staff purchasing Lexmark Optra S series printers also need to purchase a separate piece of equipment to make the printers capable of duplex printing. Discussions with staff at various Agencies regarding the inability to duplex print with the new Lexmark printers indicated that purchasing staff may not be aware that they also must purchase the Duplex Option part number 43H5103.

DCAS linked the two parts numbers in the purchasing system to ensure that City Agencies choosing to purchase Lexmark printers will order both a new printer and the necessary duplex Option.

Discuss Reduced Packaging Options with Staples

DMSS agreed to contact Staples concerning the potential to reduce packaging waste by initiating the use of reusable shipping containers for routine, local deliveries to City Agencies. On August 10, 1999, DMSS buyer, Carol Green, met with Staples Regional Sales Manager, Robert Feldman. In a letter dated September 3, 1999, Mr. Feldman indicated that Staples could not ship products in reusable containers because of issues concerning space in delivery vehicles as well as tracking and backhaul of empty containers. Specifically Staples noted:

- Plastic containers could not be stacked in their trucks.
- Plastic containers could not be relabeled for correct delivery to end users.
- Staples could not track the containers to ensure their return.
- Delivery vehicles are too full to accommodate backhaul of empty containers.

Mr. Feldman also indicated that Staples could not take back corrugated cardboard boxes for reuse because:

- Delivery vehicles are too full to accommodate backhaul of empty containers.
- Boxes are not strong enough for multiple uses.
- Drivers do not have time to load the boxes.

C. DEPARTMENT OF ENVIRONMENTAL PROTECTION

NYCitySen$e Initiatives

Printer Toner Cartridges Potential Savings

DEP's LeFrak City offices initiated a program to collect and return printer toner cartridges to the manufacturers for refurbishing or recycling. In addition, DEP is attempting to purchase refurbished toner cartridges through its purchasing agents. To date, no actual figures of spent cartridges collected or new cartridges purchased have been compiled. However, DEP was able to provide a partial count of the number and type of printers in operation at the LeFrak City location. Based on those figures, and several stated assumptions, the figures below were calculated to illustrate the potential waste reduction and cost savings that could be realized at DEP if all toner cartridges were returned for recycling/refurbishing instead of disposed and if DEP purchased only refurbished cartridges.

Waste Prevented

DEP estimates that its LeFrak City staff uses approximately 800 to 1400 printers. DEP provided data for an estimated one-quarter, or 234, of these printers; therefore, the total number of printers, for these calculations, is estimated to be 936 printers.

Assuming that one cartridge is replaced each quarter, DEP generates four spent cartridges/printer/year. For the 936 printers, DEP replaces 3,744 cartridges annually.

If each cartridge weighs 3 pounds, then 11,232 lbs. or 5.6 tons of waste per year is diverted from disposal.

Cost Savings

Based on the standard of $41.50/ton to manage waste at Fresh Kills, DOS would save $232.40/year in reduced disposal costs. If the waste is exported, cost savings increase to $560/year.

Depending on the brand and model of printer, there are significant differences in the purchase price for new and refurbished toner cartridges. Below are several examples of prices provided by DCAS and other vendors. Based on these estimates, assume an average price difference of $66. DEP would save $247,104/year in reduced purchasing costs by purchasing refurbished cartridges.

Cartridge Type	Price for Refurbished	Price for New
Hewlett Packard	$67	$82.25
Lexmark compatible	$111	$161.25
Lexmark	$90	$248
Canon	$59	$100

Electronic Telephone Directory

DEP has initiated a program in which its internal Department telephone directory is produced, updated, and disseminated in electronic form. This eliminates the annual production of a printed version of the telephone directory for distribution to all employees.

Waste Prevented

According to the DEP Division of Facilities Management and Construction, in the past, DEP printed 2,500 telephone directories annually. Each directory included 115 double-sided pages with front and back covers, and a heat binding. By replacing the printed directory with an electronic version, DEP reduced paper use by 230,010 sheets of 20 lb. paper and 5,000 sheets of 110 lb. cover stock. This represents an annual waste reduction of approximately 2,300 pounds of 20 lb. paper and 275 pounds of 110 lb. cover stock, or 1.29 tons of total paper reduction.

Cost Savings

Cost savings are primarily associated with reduced purchasing.

230,010 sheets of 20 lb. paper = 47 cartons of paper @ $24 each	$1,128
5,000 sheets of 110 lb. stock = 2 cartons of cover stock at $60	120
Printing charges on-site are $.0054/copy times 230,010 copies	12,240
Black ink costs $166/box and DEP used 2 boxes/run	332
Heat bind tape costs $106/box and DEP used 6 boxes	636
Fuser shield agent costs $172/box and DEP used 1 box	172
Total cost for printed Directory	$14,628

Developing an electronic employee telephone directory has saved DEP an estimated $14,628/year in purchasing costs. Since DEP recycles white paper, no avoided disposal costs are anticipated.

Rechargeable Batteries Pilot Program

DEP has initiated a pilot program to test the use of rechargeable batteries for its pagers and other battery operated equipment. The program involves installation of tracking software to monitor the use of batteries, as well as purchase of Rayovac rechargers and alkaline rechargeable batteries. Stockroom staff will monitor the program, distributing batteries to staff and recording battery use data.

Waste Prevented

In FY 98, DEP purchased, used and discarded 1,728 AA and 1, 728 AAA single-use batteries. These batteries weighed a total of 135 pounds. DEP is testing the use of rechargeable alkaline batteries manufactured by Rayovac. The manufacturer claims that each battery can be fully recharged and discharged 25 times prior to disposal as solid waste. The actual waste reduction

impacts will be based on DEP's evaluation of the number of times each battery can be charged and discharged. DEP will track data on the number of rechargeable batteries purchased, their discharge and recharge life and the waste stream impacts.

Battery Size	Weight	Rechargeable	Single Use from DCAS Storehouse
AA	0.85 oz.	$1.16	$0.21
AAA	0.40 oz.	$1.16	$0.22

1 pound of AA batteries = 19 batteries
1 pound of AAA batteries = 40 batteries

Cost Savings

In FY 98, DEP bought 1, 728 disposable AA and 1,728 AAA batteries. DEP paid $368.22 and $380.16 respectively, for a total of $748.38. In FY 99, DEP purchased 800 rechargeable AA batteries for $930 and 800 rechargeable AAA batteries for an additional $930 as well as ten battery chargers for $175. DEP has invested $2,035 in equipment to recharge batteries. Based on the number of times each battery can be recharged, DEP will calculate the long-term cost impacts of this program and the long-term effectiveness of rechargeable batteries for DEP equipment.

Double-Sided Copying in Reproduction Shop

The reproduction shop at DEP copies most large jobs. The shop has a policy of double-siding all copy jobs unless a specific justification for a single-sided job is provided.

Waste Prevented

The operations manager in the DEP reproduction shop estimated that the shop produces approximately 12 million images per year. He estimates that 92% of the copy jobs are double sided. The photocopy shop uses approximately 6,480,000 sheets of paper or 1,296 cartons of paper annually. Approximately 5,520,000 sheets of paper are saved by duplexing 92 percent of jobs. According to the November 1997 DEP waste reduction report, FY 98 paper usage includes:

- 4,222 cartons of 8.5 x 11 white paper
- 450 cartons of 8.5 x 14 white paper
- 225 cartons 11 x 17 white paper

Based on the above purchasing figures, the percentage of purchases are 86% 8.5x11, 9% 8.5x14, and 5% 11x17 paper. Using these percentages and the following paper weights, DEP has reduced its waste stream by 30.28 tons per year by duplexing 92% of its copy jobs.

8.5x11 = 5 pounds/ream

8.5x14 = 6.5 pounds/ream

11x17 = 12 pounds/ream

Cost Savings

If the paper waste stream is reduced by 30.28 tons/year through duplex copying efforts, DOS saves approximately $1,257 based on the $41.50/ton Fresh Kills costs. If the waste were exported, savings would be $3,038.

DEP saved approximately $26,090 in purchasing costs, based on the average cost to DEP of a carton of paper in FY 98.

D. DEPARTMENT OF HEALTH

NYCitySen$e Initiatives

Expanding the Office Furniture Refurbishment Program

Since 1997, the Department of Health Distribution Center has collected, refurbished and redistributed damaged and unwanted office furniture within the Department. Three Work Experience Program (WEP) workers have been assigned to perform such duties as cleaning, polishing, and repairing furniture. Furniture that has been refurbished through the program includes book cases, chairs, computer cabinets, conference room tables, desks, lamps, file cabinets, lockers, shelves, and numerous other pieces of office furniture and equipment.

In 1999, DOH expanded its program and hired a former WEP worker to fill a part-time (25 hours/week) position in the furniture refurbishing program. This program continues to grow and may serve as a model for other Agencies.

DOH also indicated that they have an interest in purchasing furniture from used furniture repair shops and would like to see a Citywide contract offering Agencies this alternative to the purchase of new furniture.

Waste Prevented

From July 1997 through June 1998, DOH recovered 548 pieces of furniture, preventing their salvage as scrap or disposal in the landfill. From July 1998 through June 1999, DOH recovered another 470 pieces of furniture. Assuming an average of 100 pounds per item, DOH recovered 101,800 pounds or 50.9 tons of furniture.

Cost Savings

The total value of these items for two years is $255,573 or an average of $112,786.50 annually. This is the total dollar value that DOH facilities avoided spending by reusing the refurbished furniture rather than purchasing new furniture.

Annual expenditures for the furniture refurbishment program include the salary of the part-time WEP worker, approximately $12,610/year, based on an hourly rate of $9.70/hour for 25 hours/week,

and supplies for refurbishing the furniture at $2,500/year. Subtracting these expenses from the annual furniture replacement cost provides, the annual savings to DOH of approximately $97,676.50.

At the Fresh Kills rate of $41.50/ton, the City saved $2,112.35 over the course of two years by diverting furniture from the waste stream, or an annual average of $1,056.17. If the waste were exported at a rate of $100/ton, the two-year cost savings might be more than $5,000.

Reusable Mugs

Staff at the Department of Health Distribution Center previously used paper cups for coffee and other beverages. During the course of the project, staff determined that using reusable cups would reinforce their commitment to establishing a less wasteful operation. The reusable cups were obtained at no cost and distributed to each of 14 employees.

Waste Prevented

The quantity of waste prevented is insignificant as there are only 14 employees at this site. An unknown number of truck drivers also used the disposable cups while waiting to unload. If each employee used two cups per day during the normal work days, they would use approximately 7,000 cups per year. At a weight of 0.3 oz per cup, the waste reduction associated with eliminating these cups would be approximately 131 pounds per year.

Cost Savings

The cost savings from eliminating purchase of disposable cups would be approximately $6 per year and disposal cost savings are negligible.

E. DEPARTMENT OF JUVENILE JUSTICE

NYCitySen$e Initiatives

Increased Use of Reusable Dishware — Potential Savings

To reduce the purchase and disposal of single-use paper products, DJJ staff is interested in initiating use of reusable bowls and cups at the Bronx Juvenile Detention Facility. Additional dishwasher capacity is available, since the dishwasher currently is used only to wash trays. Based on the number of residents and standard costs, the following calculations illustrate the potential waste reduction implications and cost savings that could be realized.

Waste Prevented

Average number of residents in the Bronx Juvenile Detention Facility = 125 residents

Assume 1 bowl and 3 cups used per day per resident

125 residents x 365 days x 1 bowl = 45,625 paper bowls

125 residents x 365 days x 3 cups = 136,875 paper cups

Assuming a weight of 0.5 ounces for each bowl and cup, the minimum waste reduction potential achieved by replacing cups and bowls with reusables is approximately 5,703 pounds or 2.85 tons.

Cost Savings

The City of New York currently pays $100 per ton to collect, manage, and export solid waste from the Bronx; excluding internal labor, waste management would cost approximately $285.00.

The following table compares the costs associated with reusable and disposable bowls:

Product	Purchase Price	Number of Units	Total Annual Purchase Price	Dishwashing Cost*	Disposal Cost**	Total Annual Cost
Polycarbonate Bowls (Year 1)	$2.15/bowl	150	$322.50	$124.22	$0.00	$446.72
Polycarbonate Bowls (Year 2)	$2.15/bowl	75	$161.25	$124.22	$0.00	$285.47
Paper Bowls	$0.015/bowl	100/day	$547.50	$0.00	$39.92	$547.50

* Based on estimated annual usage equivalent to 36,500 bowls. At 14 bowls per rack, this is equivalent to 2,600 washes. Estimated costs include $2.47 per 1,000 gallons of water (2.5 gallons per load); $0.035 for soap per load and $0.0015 for electricity per load.

** Based on disposal cost of $70 per ton and estimated paper bowl weight of 0.5 ounces. Because this cost is borne by DOS and not DJJ, it is not included in the total annual cost.

Implementing Bulk Distribution of Cereals — Potential Savings

The Bronx Juvenile Detention Facility currently provides cold breakfast cereal in single-serve boxes. DJJ staff indicated that they also serve hot cereal, which staff dispenses. DJJ staff also indicated that dispensers for cereal and other food items were recommended in the design of the facility. DJJ is interested in additional information to help them determine the most effective mechanism for reducing waste from single-serve cereals.

Waste Prevented

Average number of residents in the Bronx Juvenile Detention Facility = 125 residents

Assume that each of the 125 residents eats a box of dry cereal daily = 45,625 empty cereal boxes per year.

Assume a weight of 1 ounce per box = 1.43 tons of mixed paper for recycling

Cost Savings

Bulk cereal will be less expensive to purchase than the individual, single-serve boxes. DJJ may incur additional labor costs, since residents would not be allowed to serve themselves.

The City of New York may experience a reduction of $143 in waste management costs and an increase of $10 in recycling revenues for a total waste management impact of $153.

F. DEPARTMENT OF SANITATION VEHICLE MAINTENANCE

NYCitySen$e Initiatives

Quantifying Reductions for the Extended Preventive Maintenance Schedule

The Department of Sanitation's Bureau of Motor Equipment (BME) initiated an oil sampling program to determine whether the Preventive Maintenance (PM) cycle could be extended beyond the traditional 45 days. Based on test results, BME extended the PM cycle from 45 days to 50 days. A few years later, after testing continued to yield positive results, BME extended the PM interval to 60 days.

BME uses a standard engine oil sampling kit, available from major engine suppliers, and a variety of laboratories, to test ten percent of each of the major fleets (garbage collection trucks, front-end loaders, cutdowns and salt spreaders, and passenger cars). Every 60 days, BME tests the oil from approximately 350 vehicles. The current cost of a test kit is $6.50, which includes postage to send the sample to the laboratory. Each oil sample is subjected to standard spectrum analysis for trace and wear elements and additives in the oil. Test results are provided to BME on a computer disk, and indicate any parameters that exceed acceptable levels.

Based on the results of oil analysis, BME staff developed a PM Database with which they monitor oil analysis data, as well as vehicle use. By tracking engine hours, BME ensures service intervals meet manufacturers' recommendations for service every 350 engine hours.

Waste Prevented

The extension of the PM cycle reduces the number of times the oil and filters are changed in each BME vehicle from six times per year to four times per year. Specific reductions include:

- Number of filters purchased;
- Number of spent filters discarded or recycled;
- Quantity of oil purchased;
- Quantity of used oil recovered;
- Packaging received and discarded or recycled; and
- Labor to perform PM.

Assumptions:

The total DOS fleet, including landfill equipment and support vehicles, totals 5,582 vehicles. This analysis addresses four specific DOS fleets: collection trucks, front-end loaders, cutdowns and salt spreaders, and passenger cars and light duty trucks.

DOS Fleet	Collection Trucks	Front-End Loaders	Cutdowns & Salt Spreaders	Passenger Cars & Light Duty Trucks	Total for One PM
Number of vehicles in fleet	1,951	306	586	1,354	4,197
Filters (oil and fuel) per vehicle	4	4	5	2	
Total filters (oil and fuel) for fleet	7,804	1,224	2,930	2,708	14,666
Weight of filters per vehicle (lbs.)	6.3	4.1	13.95	2.4	
Total weight of one replacement of all filters for fleet (lbs.)	12,291	1,255	8,175	3,250	24,971
Per vehicle cost of one replacement of all filters	$17.77	$14.11	$20.10	$4.54	
Total cost of one replacement of all filters for fleet	$34,669	$4,318	$11,779	$6,147	$56,913
Quantity of oil per vehicle (qts.)	30	16	43	5	
Total oil from one PM for fleet (qts.)	58,530	4,896	25,198	6,770	95,394
Total oil from one PM for fleet (gallons)	14,633	1,224	6,300	1,693	23,848

Additional assumptions include:

Labor per vehicle per PM (2 hours @ $26.47/hr.)	$52.94	Packaging disposal cost	$100/ton
Cost of lubricating oil per gallon	$1.88	Oil filter recycling/55-gallon drum	$36
Average weight of filter packaging	2 oz.	Average filters per drum	50
		Revenue from used oil recycling	$0.01/gallon

Waste Prevented

Waste Prevention associated with reduction in number of PMs performed annually for 4,197 vehicles in the DOS fleet, FY 99:

DOS Fleet	One PM	45-Day Preventive Maintenance (6 per year)	60-Day Preventive Maintenance (4 per year)	Waste Prevented	Tons of Waste Prevented
Total weight of all filters (lbs.)	24,971	149,826	99,884	49,942	25
Total oil (gallons)	23,848	143,088	95,392	47,696	185*
Filter packaging (lbs.)	1,833	10,998	7,332	3,666	1.8
TOTAL					211.8

*Conversion of gallons to tons using DOS value of 7.75lbs./gallon

Through the extended PM initiative, the DOS fleet reduces waste generation by more than 211 tons per year.

Cost Impacts

	One Preventive Maintenance	45-Day Preventive Maintenance (6 per year)	60-Day Preventive Maintenance (4 per year)	Annual Savings
Labor	$222,189	$1,333,135	$888,756	$444,379
Filter purchase	$56,913	$341,478	$227,652	$113,826
Oil purchase	$44,834	$ 269,004	$179,336	$89,668
Filter disposal @$100/ton	$1,250	$7,500	$5,000	$2,500
Filter recycling	$10,548	$63,288	$42,192	$21,096
Oil recycling (revenue)	($238)	($1,428)	($952)	($476)
Packaging disposal	$92	$552	$368	$184
TOTAL				$671,177

The total cost of oil evaluation, six times per year for 350 vehicles is $13,650 per year. The annual cost savings to the Department of Sanitation for the extended PM schedule is $657,527.

Tire Recapping

The Department of Sanitation's Bureau of Motor Equipment contracts for tire recapping services through an annual competitive bid. The bid specifications require the vendor to pick up and deliver and provide recapping or section repair for tires from the BME heavy duty fleet, including front-end loaders, garbage collection trucks and Landfill equipment.

Tires that need repair are delivered to the Central Repair Service where DOS staff inspects the tires and assigns them for minor repair in-house or vendor repair. Tires that cannot be repaired are managed through a variety of contracts. They may be returned to the vendor, removed by private contractors, shredded and removed by a contracted vendor, or reused as barge bumpers. After tires are repaired, DOS staff again inspects them. If the repair is satisfactory, the tires are placed in inventory. In FY 98, DOS recapped 6,543 tires.

Waste Prevented

Based on the weight of each tire minus the weight of the cap, DOS reported diversion of 417.35 tons of tires.

Cost Savings

If DOS had discarded the 6,543 tires and purchased new tires, the additional purchasing cost would have exceeded $1.7 million. At $100 per ton, the cost of disposing of 417 tons of tires

would have been $41,700. DOS incurred costs of $717,000 for the tire recapping contract. DOS saved $1,024,700 through its tire management program.

Filter Recycling Program

The Department of Sanitation's Bureau of Motor Equipment contracts for the removal and recycling of oil and fuel filters from 75 DOS repair facilities in all five boroughs. The vendor, Key Environmental, collects uncrushed filters in 55-gallon drums. Key Environmental is required to recycle the oil, metals and paper from the filters; no landfilling is allowed. Filter recycling benefits the City of New York and the Department of Sanitation by reducing the cost and liability associated with hazardous waste disposal and minimizing the volume of waste disposed. Recovered oil and filtering material are burned as fuel; new steel products may be produced from the steel recovered through recycling of the filters.

Based on 4,197 vehicles and the 60-day PM schedule, for FY 98, the following assumptions apply:

Number of filters generated per year (4 changes per vehicle)	58,664
Weight of filters generated annually	99,884 lbs.
Drums of filters collected by recycler	1334
Cost per drum	$36
Per ton cost of export	$100

Waste Prevented

Based on four changes of oil filters per year, DOS diverted 50 tons of filters from disposal to recycling.

Cost Impacts

DOS avoided export costs of approximately $5,000. The recycler charged DOS $48,024 for a net program cost of $43,024.

Purchase Rerefined Lubricating Oil

In FY 98, the Department of Sanitation purchased 196,057 gallons of rerefined oils for use in all major brands of equipment. DOS also purchased 69,586 gallons of virgin oil specifically for the heavy duty landfill cranes. In bulk deliveries, the cost of virgin and rerefined oil is identical; by 55-gallon drum, the cost of virgin engine oil is $0.02 per gallon higher.

Routine test of oil samples from DOS equipment show no variance in performance between the virgin lubricating oil used previously and the current rerefined lubricating oil. DOS also worked with engine manufacturers to obtain assurances that the manufacturer would honor all warranties. Although the quality of rerefined oil has improved and DOS is satisfied with the

performance of the rerefined oil, DOS will continue to use the oil sampling program to assess the long-term performance of the rerefined oil.

Change to a More Effective Soap for Cleaning Collection Trucks

The DOS Bureau of Cleaning and Collection (BCC) proposed a substitute for the soap currently used to clean collection vehicles. The current soap product is sold in concentrate in non-returnable 55-gallon plastic drums for $1.25 per gallon of concentrate. The manufacturer instructs users to mix the product at a ratio of 1 part soap to 20 parts water. Unfortunately, BCC staff found that the soap was not effective at that concentration and began to reduce the water to soap ratio. In BCC garages, the soap is now mixed with water in equal parts: one part soap to one part water. While this produces an effective cleaning product, the highly concentrated soap is irritating to the skin and, in some cases, has damaged plastic parts and rubber gaskets on the trucks. Garage staff is reluctant to return to using the soap at the manufacturer's recommended dilution.

BCC proposed the purchase of a substitute product that is delivered to a bulk tank supplied by the vendor. The substitute soap has been tested and found effective at a ratio of one part soap to 30 parts water. However, the substitute soap costs $2.00 per gallon. Because of the higher per gallon cost, BCC had difficulty convincing purchasing staff to buy the more costly product.

Based on a cost benefit analysis, however, BCC has demonstrated that the substitute product is not only less costly but reduces waste and waste management costs.

Assumptions:

- Current product is mixed at a ratio of one part water to one part soap (1:1); substitute product is mixed at a ratio of thirty parts water to one part soap (30:1).
- In FY 98, DOS purchased 390 55-gallon drums of soap or 21,450 gallons of soap concentrate that produced 42,900 gallons of usable product.
- Current product is delivered in non-returnable, 55-gallon plastic drums; substitute product is delivered in bulk.
- Current product requires 20 to 25 minutes of labor per drum to mix it with water; substitute's tank includes a self-mixing mechanism and no additional labor is needed.
- Cost of current product is $1.25/gallon; cost of substitute product is $2.00/gallon.

Waste Prevention

In FY 98, BCC purchased and used 390 55-gallon drums of soap. Each empty drum weighs approximately 10 pounds. When BCC changes to the bulk tank for soap, they will eliminate 3,900 pounds or nearly two tons of solid waste.

Cost Savings

Cost	Current Product	Substitute Product
Price of concentrate	$1.25/gallon	$2.00/gallon
Price per gallon of cleaning solution	at 1:1 ratio $0.625/gallon	at 1:30 ratio $0.067/gallon
Cost of one year's supply (42,900 gallons)	$26,812.50	$2,874.30
Cost of labor	390 drums x 25 minutes @ $21 per hour = $3412.50	$0
Cost of waste disposal	2 tons @ $41.50 = $83	$0
	2 tons @ $100 = $200	
TOTAL ANNUAL COST	$30,308 - $30, 425	$2,874.30

The Department of Sanitation will save $27,434 per year in annual purchasing expenditures, labor and waste disposal costs by switching to the alternative soap and bulk delivery.

G. DEPARTMENT OF SANITATION, BEAVER STREET OFFICES

NYCitySen$e Initiatives

Establish a Toner Cartridge Recharging/Recycling Program and Purchase Recharged Toner Cartridges, Where Possible

BWPRR staff documented their participation in the toner cartridge recycling program and their purchases of recharged toner cartridges.

BWPRR offices use 27 printers:

Brand	Quantity	Brand	Quantity
Brother HL8V	9	HP 4500	1
Brother HL8e	3	Kyocera FS3600A	1
HP LaserJet 3	2	Lexmark Optra RT+	7
HP DeskJet 560C	3	Lexmark 403910 Plus	1

Waste Prevention

In the four months between August and December, 1998, BWPRR recycled seven toner cartridges through Laser Save, a New Jersey toner cartridge company. Assuming a weight of three pounds per cartridge, DOS avoided disposal of 21 pounds of waste. Based on this

representative quarter, DOS BWPRR's avoided disposal through toner cartridge recycling is estimated at 84 pounds.

Cost Savings

Waste disposal cost savings are negligible. DOS BWPRR also purchased 15 refurbished Lexmark toner cartridges and 12 refurbished Hewlett Packard (HP) toner cartridges at the Bureau level from Laser Save at significant cost savings over purchase of the same items from the Staples catalogue. Total procurement cost savings equaled $936.75.

Toner Cartridge	Staples Cost	Laser Save Cost	Savings per Cartridge
Lexmark 13802150	$161.25	$111	$50.25
HP C3906A	$82.25	$ 67	$15.25

H. DEPARTMENT OF TRANSPORTATION

NYCitySen$e Initiatives

Re-Directing Unused Materials to Reuse

Through an improved housekeeping initiative, the Department of Transportation's Sign Shop identified eight types of supplies, in their inventory, that were no longer needed within the sign shop operations. Initially, the supplies were going to be discarded as trash as part of the facility clean up activities. During discussions with the *NYCitySen$e* team, DOT agreed to identify a source that could use the materials and to re-direct the products to a different operation. DOT Sign Shop staff contacted staff at DOT's Facilities Maintenance Unit and determined that staff in the maintenance operations could use the materials. The Sign Shop staff completed the proper relinquishment forms and delivered the materials for use within DOT operations.

Product	Quantity	Replacement Value
Manville Flashing Cement	Eight 5-gallon pails	@$21.95/pail = $175.60
BuildingPride Leak Stop	One 5-gallon pail	$21.33
Firestone Splice Wash	Four 5-gallon pails	@$34/pail = $136
Firestone Splice Primer	One 5-gallon pail	$66.25
AstroOptic Adhesive Cement	One box	$26
Uncured EPDM Flashing	Six 12' x 100' rolls	@$100/roll = $600
Karnak Cotton Fabric	Three boxes	@$15/box = $45
Kentile Asphalt Floor Tile	Three boxes	@$17.50/box = $52.50

Waste Prevented

The diversion of the unused products to reuse within DOT's operation diverted approximately 0.75 tons from disposal in the landfill.

Cost Savings

By diverting the materials from disposal to reuse, DOT's Sign Shop saved the potential cost of disposal and the DOT Facility Maintenance Unit saved the cost of purchasing new products. The City's avoided disposal cost is $30 and the savings in purchasing costs is approximately $1,122. A total savings to New York City of $1,152 simply by re-directing 27 individual containers of various products to reuse.

Review Solvent Management Practices

DOT contracts with Safety Kleen for a silk screen washer filled with 20 gallons of petroleum naptha solvent and the bi-weekly replacement and recycling of the solvent. DOT used 520 gallons of solvent in the silk screen washer each year. DOT staff met with the Safety Kleen representative to discuss use of a less hazardous cleaning solution. DOT provided Safety Kleen with copies of the Material Safety Data Sheets for the inks used in the silk screen process. As a result of this meeting, Safety Kleen initiated a trial of an alternative solvent. Safety Kleen increased the service interval from bi-weekly to monthly.

Equipment	Solvent	Service	Cost per Service	Annual Cost
Silk Screen Washer (Model 520)	20 gallons	bi-weekly (26)	$93	$2,418

Waste Prevented

The increased service interval reduced the quantity of solvent waste from 520 gallons per year to 240 gallons per year, a reduction of 280 gallons.

Cost Savings

The increased service interval reduced the cost of the Safety Kleen service for the Silk Screen Washer from $2,418 to $1,116, a savings of $1,302 per year.

I. FINANCIAL INFORMATION SERVICES AGENCY

NYCitySen$e Initiatives

Tracking Impacts of Implementing a Citywide Computer System

FISA's operations at 450 West 33rd Street in Manhattan involve producing numerous reports for distribution to City Agencies throughout the City. As the largest computer center in New

York City government, FISA is currently in the process of developing Financial Management System (FMS) 2000, a system of software and hardware, with cable links to each City Agency. The system will eventually allow employees at all Mayoral Agencies to print parts of reports from their desktop computers. The system began operation on July 1, 1999 at numerous sites. When the system is fully operational, it should eliminate the need for FISA to print and distribute reports. Under the current system, FISA is unable to extract a specific piece of information from its databases and must print and distribute a hard copy of an entire report in response to each specific request for information.

Waste Prevented

FISA estimates that it uses an average of 19 rolls of paper per week. This means that annually, FISA uses approximately 988 rolls of paper to print reports. Each roll contains 67,000 usable sheets of paper. At 1 pound per 100 sheets, FISA would reduce its waste generation in the form of distributed reports by 661,960 pounds or 331 tons annually if all printed reports were eliminated. More realistically, approximately 20 percent of the current reports would still need to be printed. Therefore, waste reduction may be closer to 265 ton/year. The majority of this paper is distributed to all City Agencies, where it may be filed, discarded, or recycled. As a result, actual waste prevented is difficult to calculate.

Cost Savings

The cost of a roll of paper is subject to market fluctuations, but averages $300 per roll. FISA currently spends $296,400 to purchase paper. Following implementation of the FMS system, If four rolls per week (20% of current usage) are still printed, then FISA would realize savings of $234,000 in annual paper purchasing costs.

If 50% of the 331 tons of paper printed and sent out to other City Agencies currently is discarded, then potential waste disposal cost reductions from switching to on-line documents would be more than $6,800 at Fresh Kills or $16,500 for export. In addition, if another 30 percent of the paper is recycled, the 99 tons of paper could generate revenues of up to $9,900 for the City of New York.

J. FIRE DEPARTMENT

NYCitySen$e Initiatives

Develop and present a waste prevention fact sheet and training program to NYFD/EMS supervisors

Working with SAIC, NYFD/EMS staff developed, reviewed and finalized a waste prevention program fact sheet for distribution to staff of the NYFD 34th Street and 58th Street vehicle maintenance and repair operations. On June 3, 1999, NYFD supervisors from both facilities participated in a training session.

Establish an oil filter recycling program

All oil filters generated at the NYFD/EMS 58th St. maintenance and repair facility were disposed with other solid waste. Some filters were drained and crushed prior to disposal, but many went directly into the solid waste containers. NYFD established an oil filter recycling program at the NYFD/EMS facility.

Waste Prevented

In FY 99, NYFD/EMS reported that the NYFD/EMS 58th St. maintenance and repair facility recycled one 55-gallon drum containing 215 crushed oil filters (based on the number of routine Preventive Maintenance services performed during the month). The filters were collected by the contracted recycler, Key Environmental, at a cost of $45 per drum. Approximately 300 pounds of waste was diverted from disposal. NYFD anticipates that they will continue to recycle one drum of filters from this facility each month, for annual waste diversion of 3,600 pounds or 1.8 tons at a total cost of $540.

In FY 2000, NYFD also will begin recycling oil filters from six additional locations: Jacobi Repair Shop, Bronx; Coney Island Repair Shop; Gouverneur Repair Shop, Manhattan; Seaview Repair Shop, Staten Island; 34th Street Repair Shop, Queens; and the PM Shop, Randalls Island. If each location generates one drum per month, the NYFD could divert an additional 10 tons of waste from disposal annually at an additional cost of $3,240.

Cost Savings

The cost to recycle the filters is $3,780. Avoided disposal of 11.8 tons of filters would reduce the costs at Fresh Kills by $489.70 or the export cost by $1,180. The filter recycling program will have ongoing annual contractor costs of $2,600.

K. HUMAN RESOURCES ADMINISTRATION

NYCitySen$e Initiatives

Issued Memo to Staff Regarding Toner Cartridge Recycling

On March 10, 1999, the Director of the Office of Purchasing and Warehousing at HRA issued a memo to HRA staff regarding recycling of computer printer toner cartridges. The memo pointed out each Agency's responsibility to implement waste prevention and recycling strategies. It also included a list of specific model cartridges available through the DCAS requirements contract with Industries for the Blind and explained the procedure for returning spent cartridges for refurbishing.

Quantifying the Two-Way Envelopes Pilot

In January 1998, HRA switched from the standard BRE envelope to a two-in-one envelope for a series of Social Security mailings. Instead of asking the recipient to use the enclosed envelope

to return the information, the recipients simply turned the flap on the same envelope and returned it to HRA.

Waste Prevented

Social Security Mailings Using Two Separate Envelopes			
Month	**Number of Mailings**	**Weight of Envelopes Used**	**Response Rate**
October	4,138	90.5 lbs.	3.0%
November	4,209	92.1 lbs.	3.3%
December	3,797	83.1 lbs.	4.0%
Subtotal	12,144	265.7 lbs.	3.4%
Social Security Mailings Using Two-in-One Envelope			
January	3,877	66.6 lbs.	15.8%
February	3,851	66.2 lbs.	15.4%
March	3,399	58.4 lbs.	16.5%
Subtotal	11,127	191.2 lbs.	15.9%

Weight of a one-way envelope = 0.35 oz.
Weight of a two-way envelope = 0.275 oz.

Reduced weight of waste from envelope is 4.7 lbs./1000 mailings.
The average number of annual mailings, based on the six months of data provided, is 46,542 mailings.

46,542 mailings x 4.7 lbs./1000 mailings = 218.75 lbs. of waste reduced by HRA. This reduction was primarily realized by City residents, and not by HRA itself.

Cost Savings

Based on costs presented in a case study developed by SAIC and Tellus for the NYC DOS, cost savings were calculated for HRA's program.

Assume $14.50/1000 one-way envelopes or $2,900/200,000 envelopes
Assume $2,500/100,000 two-way envelopes

Estimate 50,000 mailings per year

Cost of one-way envelopes = $1,450/year
Cost of two-way envelopes = $1,250/year
Cost savings in purchasing envelopes is $200/year

L. TAXI AND LIMOUSINE COMMISSION

NYCitySen$e Initiatives

Initiate a Comprehensive Recycling Program

Staff at the Taxi and Limousine Commission (TLC) enforcement and licensing facility identified a need to establish a recycling program. TLC has a program in place to separate wood pallets, scrap metal and Ni-Cad batteries from the trash. TLC also separates bulk items (*e.g.*, tire rims, furniture, etc.) and delivers these material to the DCAS Surplus Warehouse. The remaining materials, such as paper, beverage containers, and cardboard, were discarded for collection by the Department of Sanitation (DOS) for disposal in the City's landfill.

During the one-day waste sort, a total of 129 pounds of waste was collected, sorted and weighed. Of the 129 pounds of trash, 85 pounds was determined to be recyclable materials. Assuming this 24-hour period is representative of these particular operations, each employee generates approximately 2.6 pounds of recyclable material each work day. The annual generation of potentially recyclable materials is estimated at more than 11 tons.

TLC purchased recycling containers and appropriate plastic bags and conducted staff training sessions to initiate its recycling program. The mixed paper, beverage containers, cardboard and metals are now separated and collected by DOS for recycling.

Waste Prevention

Assuming a 50% recovery rate for recyclables, TLC can divert 5.5 tons of waste for recycling. If a higher recovery rate is achieved, a larger quantity of material will be recovered.

Cost Savings

Using a tipping fee of $41.50 per ton for general trash, the City avoids $228.25 in landfill operating costs. If the material were exported, savings would increase to $550. The City also recognizes revenue gains from the sale of recyclable commodities that have value. Of the 11 tons generated each year, approximately nine tons is estimated to be mixed paper and corrugated cardboard. At a 50% recovery rate and a fee of $10 per ton, the City will receive $55.00 per year from the sale of TLC's mixed paper. Currently, the City pays between $40.00 and $60.00 per ton to recycle mixed containers. Therefore, using an average of $50.00 per ton, the City will pay approximately $25 to recycle 0.5 tons of mixed containers.

(Note: TLC also generated one pound of metal on the day of the waste sort. This calculation does not include the potential revenue that can be generated through a metals recycling program.)

Section IV. Measurement Challenges

Introduction

Through the *NYCitySen$e* project, DOS and SAIC hoped to establish baseline waste generation information from each participating City Agency operation, implement waste prevention initiatives for key waste streams within each operation, and track and measure the changes in the quantity of waste generated after implementation of the waste prevention programs. Using this information, DOS hoped to present overall waste prevention achieved by the participating Agencies and develop Citywide potential waste prevention projections based on the data recorded by the participating City Agencies. While the *NYCitySen$e* project succeeded in measuring the achievements of a variety of specific waste prevention initiatives within select City Agency operations, the effort to measure multiple individual programs and consolidate the data into aggregate measurements was much more difficult than originally anticipated.

The *NYCitySen$e* project was not able to derive an overall estimate of waste preventable by City Agencies through implementation of waste prevention programs similar to those initiated by participating agencies. The *NYCitySen$e* project also was not able to project the total labor hours and costs associated with the activities required to develop the desired aggregate measurements. The *NYCitySen$e* project did identify certain impediments which, if addressed, could facilitate efforts to estimate Citywide waste prevention.

This section presents a discussion of the challenges associated with measuring waste prevention programs. SAIC has provided DOS with five sample measurement methodologies that may assist DOS and the City as they consider future waste prevention measurement initiatives. These methodologies are included with this report as Appendix I: *Potential Methodologies for Measuring the Effects of Waste Prevention and Enhanced Recycling Initiatives at New York City Agencies.*

Motivating Waste Prevention

A dominant perception among City Agency managers and employees is that the collection and disposal of the Agency's waste and recyclables, either by the Department of Sanitation (DOS) or by a private carter, is a service provided at no cost to the Agency. Therefore, waste management costs have no impact on the Agency Budget and there is no need to incorporate the potential for waste prevention into the decision-making process. Agency representatives noted that they would not consider purchasing a waste preventing product or service, initiating a recycling program for new materials or enhancing their existing recycling program if their operation might incur additional costs.

To appreciate the benefits of waste prevention, City Agency staff need to understand the true cost of collecting, transporting, transferring and ultimately disposing of the wastes generated by their daily activities. According to the DOS *Comprehensive Solid Waste Management Plan, Draft Modification,* April 1998, the incremental cost of FY 2000 curbside collection is $64 per ton. The closure of the Fresh Kills Landfill and the expanding effort to export New York City's waste has increased the cost of disposal from $42.50 per ton at Fresh Kills to $100 per ton at

out-of-state landfills. Thus, the current cost to the City of New York to manage one ton of waste is $164.

As the City's cost for waste management increases, each City Agency pays through reduced budgets and services. If more and more of the budget must be directed to DOS for the increasing cost of managing the waste generated by residents, institutions and City Agencies, other Agencies will have access to smaller and smaller pieces of the remaining City budget. Increasing waste management costs will reduce the funding for programs such as education, law enforcement, housing, and other vital City services.

Measuring the results of any program is key to assisting City Agencies in determining if their resources are being allocated efficiently. The impacts of waste prevention projects on purchasing costs as well as on the quantity of waste and the cost to manage that waste must be documented to determine their efficacy. In addition, documenting successful initiatives also provides a mechanism for informing other Agencies that they may anticipate similar cost savings and waste reduction if they implement similar waste prevention techniques. However, as the *NYCitySen$e* project confirmed, not everything is measurable, and waste prevention efforts cannot always be quantified efficiently and effectively.

Measurement Difficulties

New York City has undertaken a wide range of ambitious waste prevention programs and initiatives. Key to successful and cost-effective measurement of the economic and waste reduction impacts of these initiatives is access to essential data and the application of feasible and realistic measurement strategies. Given the current status of technological improvements, and the staffing to meet the demands of the missions of City Agencies, it is currently feasible to measure waste prevented only for certain activities and operations.

Access to data is limited by the computer systems, software and equipment available to New York City Agencies. Many Agency locations do not have access to the tools needed to track products or materials from the procurement process, through use, to the point of recycling or discard of the product or material and its associated packaging. Agencies also do not have access to essential data to initiate and maintain the tracking process.

Further confounding the measurement process is the fact that the City tracks procurement by the dollars spent, not by the individual items purchased by each Agency. Therefore, an Agency can determine how many dollars were spent on office supplies, for example, but not which office supplies were purchased. Unless staff is assigned to review individual invoices one at a time, City Agencies cannot easily determine which items were purchased.

Maintaining tracking data can be a rigorous effort that requires the commitment of both financial and labor resources. Under present circumstances, many City Agencies lack the staff to measure the impacts of their waste prevention efforts. Limited staff at multiple operations and locations complicates reporting at the Agency level. It is costly to divert staff to track and aggregate the waste prevention and recycling efforts of diverse operations when these same personnel are needed to perform the essential duties of the Agency. Thus, time restraints mean

that City Agencies often are unable to provide dependable, quantified data to support case studies of successful waste prevention and recycling programs. In addition, in some cases, City Agencies find that essential data simply are not available. In other cases, City Agencies may determine that the effort required to quantify the achievement may not be cost justified, practical or even feasible. While one of the focuses of the *NYCitySen$e* project was measuring waste reduction, in some cases, the cost of measuring the impact of a waste prevention program might actually exceed the cost savings and other benefits of the waste prevention effort.

Efforts to measure waste prevention have been most successful when a single City Agency operation implements a clearly defined waste prevention project targeting specific wastes. Access to baseline data against which progress in waste prevention can be tracked supports the measurement process. It also is possible to evaluate the waste prevention achieved using procurement records, vendor records, carting records, waste audits to verify the weight and volume of products and packaging, and employee interviews concerning how products or materials are used and discarded. For example, the Department of Sanitation was able to measure both waste and cost impacts of extending the preventive maintenance schedule for its vehicle fleet based on access to records of the kinds and sizes of vehicles serviced, the quantities and costs of oil and filters purchased, the labor expended in performing preventive maintenance and other relevant data.

Similarly, the Department of Environmental Protection (DEP) could quantify the waste and cost impacts of replacing the hard copy employee directory with an electronic version. DEP staff knew how many copies of the directory were printed and the cost of paper and other supplies. Their print shop could provide data on the labor and printing costs.

In contrast, when an Agency conducts a large-scale waste prevention awareness and/or education campaign, contact with participants often is fleeting and undocumented. The contact may occur during a brief site visit, at a seminar, through paper or electronic mail, or through other methods for which cause and effect are difficult to observe, evaluate, and quantify.

For example, the Department of Business Services (DBS) issued a policy statement to its employees regarding participation in the Agency's recycling and waste prevention programs. DBS does not know how many employees read the statement or how many individuals modified or improved their recycling or waste preventing behaviors in response to the information presented in the statement. Common sense suggests that contacting each employee to inquire about the impacts of the policy statement is possible, but would be time-consuming and costly and would provide only anecdotal evidence of program enhancements. Designing and implementing statistically significant sampling procedures to determine how and to what extent the policy changed staff behavior would be even more expensive. Yet, although the impacts are not quantifiable, such efforts in waste prevention education are inexpensive and certainly commendable.

Many of the initiatives and programs that City Agencies undertook in response to the *NYCitySen$e* program have not been in place for a sufficient period of time to allow measurement of success. Several of the waste prevention initiatives presented to the Agencies required the purchase of new equipment or alternative products. In these instances, several Agencies considered specific

recommendations and elected to implement a pilot project to determine the effectiveness of the product or equipment in their unique operations and to gauge the potential for larger-scale success. The information generated as a result of these pilot programs will assist the Agencies in determining if full implementation of the initiative could result in significant savings and prevention of waste in the future.

Operations at several City Agencies have implemented successful waste prevention and recycling programs. However, the perception and, in many cases, the reality, that tracking purchasing and waste quantities is a complex and labor intensive undertaking has resulted in a little or no quantification of the impacts of these waste prevention programs, beyond the examples presented in Section III.

The Elements of Measurement

Establishing a Baseline

Efforts to measure waste reduction generally rely on the development of a baseline. The baseline may be defined and documented in terms of products and materials purchased, or in terms of waste quantities generated. Either way, baseline data provides a starting point from which to measure waste prevention and recycling achievements.

One objective of the *NYCitySen$e* program was to provide guidance to City Agencies regarding strategies for developing baseline information pertaining to purchasing and waste generation patterns and quantities, as well as methodologies for tracking and measuring the results of waste prevention efforts. Equally important to New York City Agencies is the use of consistent formats for baselines and for tracking and measurement strategies. Consistency in reporting will support tallying the economic and waste management impacts of waste prevention initiatives to allow aggregation of waste prevention data across multiple City Agencies.

The general difficulties underlying the measurement process in New York City have been described above. The discussion that follows attempts to clarify the particular difficulties with developing baseline procurement data, using paper as an example.

Baseline in Terms of Purchases

It has been difficult for City Agencies to establish baseline procurement data because:

1. The City's current data management system does not track procurement by specific product or material type. The Department of Citywide Administrative Services (DCAS) generates reports that indicate the total dollars spent by paper and paper products.
2. Many of the Agencies that participated in the *NYCitySen$e* project indicated that they purchase paper from other sources, including Staples and other local vendors,[1] in addition to their paper purchases through the DCAS Storehouse. To document and track all paper purchases, an Agency would need to assign a staff person to the task.

[1] *NYCitySen$e* Seminar, Waste Prevention and Recycling Opportunities for Offices. July 28, 1999.

This individual would be tasked by management to:

- Inventory existing supplies of paper;
- Identify all of the individuals in each Agency operation who currently do or could conceivably purchase paper;
- Educate these individuals concerning the importance to the Agency of tracking paper purchases and the need to document each purchase;
- Obtain a copy of each invoice or purchase order listing the quantity and type of paper purchased;
- Generate an initial list of paper purchases by quantity and type; and
- Track all future paper purchases.

3. One challenge for Agencies with multiple operations and locations is to conduct an Agency-wide inventory to determine how much of each type of paper is stockpiled in every office of each Bureau and Department of the Agency. This information, when added to the procurement information, forms the baseline for the total quantity of paper available to the Agency, prior to initiating a paper waste prevention program.

Recognizing the issues associated with dedicating staff time to the tracking effort, the *NYCitysSen$e* project developed a methodology for developing a baseline for paper inventory and purchases for City Agency operations which is included in the Appendix. This methodology includes a sample table to record purchases, and a sample table to record inventory. It suggests the kind of detail required for accounting for paper purchases for just one site, let alone for an entire agency. While DOS does not advocate mandatory Citywide accounting of purchases for this purpose, it may be appropriate for particular sites to use these forms as an exercise in assessing and trying to reduce paper use, or to apply the proposed tracking process to other materials.

Once an Agency has developed baseline procurement information, the next step is to consider the many variables that may influence the measurement process and waste prevention initiatives over the course of a fiscal year. For example, the Agency must consider whether significant change in the number of employees from one year to the next has had or will have an impact on annual paper use. Similarly, changes in existing programs or the addition of new programs may require less paper or a large, one-time, purchase of paper. For example, if an Agency initiates the use of on-line forms, paper use will be affected. Adding or consolidating office locations also may affect paper use.

Once adjustments for these types of variables are made to the paper purchase/inventory numbers, the resulting numbers can serve as the baseline against which the Agency can evaluate annual reductions in paper use attributed to specific waste prevention efforts. Obviously, limitations inherent in a measurement methodology may affect the reliability of the results, as will the accuracy and completeness of the input data.

Baseline in Terms of Waste Generation

Waste prevention activities also can be evaluated against a measured base amount of waste generated. For example, an approximate measure of waste generation on a volume basis could be made by determining how many waste containers are located at each Agency facility or operation, their size (*e.g.*, 90-gallon toters, 3-cubic-yard containers, 30-cubic-yard open top container, 40-cubic-yard compactor, etc.), how often the waste is collected, and whether the containers are full or only partially full when emptied. Other factors, such as whether or not the waste containers are used by other tenants in the facility should be considered.

Completion of this evaluation would require sufficient staff labor to complete telephone inquiries and site visits to each of the Agency's facilities or operations to compile data and the additional labor to report on these data. As with the purchasing baseline, year to year comparisons can be made after taking into account changes in the number of employees, programs, and locations.

It should be noted that once the City has fully implemented the FMS 2000 system, City Agencies may be able to develop facility or operation-specific and agency-wide baseline measurements in ways other than those suggested here.

Direct Quantification of Waste Reduction by Program

Direct quantification of waste reduction measures the impacts of particular waste prevention programs, rather than an overall site or Agency comparison of present to baseline data. For example, DOS used direct quantification to measure the waste impacts of reducing the number of times preventive maintenance (PM) is performed on specific classes of vehicles. Because DOS knows the quantity and weight of products used, the weight of the packaging for those products and the volume or weight of the waste generated, DOS can calculate the quantity of waste generated by the performance of each preventive maintenance and quantify the waste impacts of reducing the number of times the maintenance is performed. See Section III of this document for further detail on the direct quantification of this source reduction effort.

As with the baseline measurements, direct quantification may be hampered by the potential to confuse observed changes in waste generation with the direct effects of waste prevention activities when, in fact, the two activities may not be directly related. An operation may generate less waste if the workforce is reduced, although waste generating behaviors remain unchanged. Measuring the amount of waste prevented requires separating actual waste prevention results from external forces that can affect waste production rates, such as declining employment or reduced productivity. Direct measurement also is limited by access to and the quality of data.

Waste Reduction Cost Analysis

Waste reduction cost analyses generally incorporate two financial factors—the cost of undertaking the source reduction effort and the resulting purchasing and disposal cost savings—to calculate the realized total costs of the effort. A cost analysis usually incorporates data from other waste

prevention measurement exercises, in calculating whether there are savings from a change in purchases or waste generation after taking offsetting costs into account.

The basic steps in analyzing source reduction costs may include:

- Identifying the source reduction effort to be analyzed.
- Identifying the direct cost of implementing the source reduction effort (capital and operating/maintenance costs).
- Identifying the costs to be measured (such as purchasing, disposal, labor, and other relevant factors) before and after implementation of the source reduction effort.
- Identifying any additional indirect benefits that accrue from implementing the source reduction effort, such as freeing additional storage space for raw materials or products, and, if necessary, determining their financial value.[2]
- Determining the net cost of the source reduction effort using a process that considers the time-value of money.

The labor costs of the analysis itself are not included in this list.

DOS performed a cost analysis to determine the savings associated with the reduction in the number of times preventive maintenance was performed on specific kinds of DOS vehicles. DOS documented the cost of implementing this source reduction program and the ongoing costs before and after implementation to determine the actual cost savings to the DOS Bureau of Motor Equipment. See Section III of this document for further detail on this source reduction cost analysis.

Conclusion

The largest waste streams generated by City operations are wood and paper, followed by furniture and electronic equipment.[3] As the largest waste streams, these wastes are key targets for waste prevention initiatives, some of which may be measured. Other waste streams, such as oil and oil filters, that are eminently recyclable and may pose management hazards due to their potential toxicity, also are targets for reduction and measurement.

By measuring waste prevention achievements using the proposed methodologies, where applicable, City Agencies can develop the data necessary to calculate reductions and evaluate their waste prevention efforts and successes.

DOS believes that reductions in the quantity of waste generated by City Agencies will not reduce their collection and transportation costs, as the reductions will most likely not allow

[2] Indirect benefits, such as making increased storage space available for other raw materials or products, can be valued based on per square foot rental charges. Other indirect benefits, such as preserving land that would otherwise be utilized as a landfill, are much more difficult to value. In assessing indirect benefits, the best practice is to consider rational benefits and value all those that can be reasonably quantified.

[3] SAIC, *Characterization of New York City's Solid Waste Stream*, 1997; and U.S. EPA, *Characterization of Municipal Solid Waste in the United States, 1998 Update*. July 1999.

DOS to alter or eliminate collection routes to achieve any efficiency gains. However, waste prevention and enhanced recycling may effectively reduce the cost of exporting that waste, as well as reduce the labor and environmental impacts of waste handling and transportation to disposal facilities outside the City and the state.

According to the 1990 *New York City Waste Composition Study,* DOS collected one million tons of institutional waste, of which approximately 15 percent, or 150,000 tons, may be attributed to City Agencies. This figure is based on a per capita annual waste generation of 0.6 tons per City employee[4] and 249,427 City employees[5]. The estimated cost of export is $100 per ton. (As noted previously, the cost to DOS to collect the waste was estimated at $64 per ton; an unknown percentage of City Agency waste is collected by private carters, reducing the collection burden for DOS.) Therefore, each percent of waste reduction achieved by City Agencies could save the City an estimated $150,000 in avoided export costs.

This discussion of waste prevention measurement suggests that there are real, sometimes moderate, economic benefits to City Agencies from initiating waste prevention programs, despite the lack of an overall estimate of waste preventable by City government operations. Trying to prevent waste — and Section II offers many program opportunities — is a positive educational process, even with modest results. Waste prevention encourages awareness of buying and using materials with care, and of disposing them in ways that cause the least environmental and economic impacts for the City of New York.

[4] Department of Sanitation, Bureau of Waste Prevention, Reuse and Recycling, December 1999.

[5] Actual full-time employees (Mayoral, Covered and Elected Officials) as of February 29, 2000, as reported in The City of New York, Executive Budget, Fiscal Year 2001, Appendix-Exhibit 5.

Section V

The purpose of this section is to identify initiatives that may be worthy of consideration for further study by DOS and the Mayor's Office of Operations.

DOS and the *NYCitySen$e* project team worked with the staff of the City Agencies participating in *NYCitySen$e* to identify those waste prevention and enhanced recycling opportunities that present long-term potential. During meetings at City Agencies and during the DOS-sponsored seminars, Agency staff members offered new information and participated in discussions regarding the resources and processes they believe are required to implement waste prevention and enhanced recycling opportunities successfully and efficiently.

Based on the experience gained through the *NYCitySen$e* project and on going discussions with City Agency staff, representing a wide range of activities and services within the City, the project team identified six recommendations:

- Encourage understanding of the true cost of waste management and how City Agency actions impact the City's waste management budget;
- Expand and enhance waste prevention and recycling education within City Agencies;
- Commit resources to assist the Department of Citywide Administrative Services, Division of Municipal Supply Services to identify and provide less wasteful products and services;
- Use new ways to communicate with City Agency staff;
- Recognize and reward waste prevention successes; and
- Incorporate recycling compliance, affirmative procurement and waste prevention into City leases and specifications.

The following discussion clarifies these recommendations and offers examples of the kinds of assistance Agencies require to move forward with their waste prevention and enhanced recycling initiatives.

Understanding the True Cost of Waste Management

A dominant perception among City Agency managers and employees is that collection of waste and recyclables, either by DOS or a private carter, is a free service that has no impact on the Agency budget. Staff are not accustomed to incorporating the cost of waste management into their decision-making processes. During the *NYCitySen$e* seminars, several Agency representatives emphasized that they might not initiate a recycling program for new materials or enhance their existing recycling program if, as a result, their operation might incur costs.

There is an opportunity for DOS to educate City Agency staff about the true cost of collecting, transporting, transferring and ultimately disposing of the wastes generated by their daily activities and discarded into their waste containers and compactors. DOS may wish to consider providing City Agency staff with a figure that represents the per ton cost to the City of New York to collect

and transport a ton of waste. This figure, added to the approximately $100 per ton export fee, may help City Agency staff understand the importance of waste prevention to the City's long-term financial planning and to the availability of funds to support their Agency's operations. DOS could use the projected $64/ton FY 2000 incremental cost of curbside collection (*Comprehensive Solid Waste Management Plan, Draft Modification,* April 1998) plus the current estimate of $100/ton for waste export for a $164 per ton total waste management cost to the City of New York.

Placing waste management services in the context of City dollars and tons may make it easier for City Agency staff to appreciate the financial benefits to the City from initiating or expanding waste prevention and recycling programs. It may become easier to motivate Agency representatives to initiate a recycling program for new materials or enhance their existing recycling program if, as a result, they see the potential to reduce City costs and increase City services.

Expand and Enhance Waste Prevention and Recycling Education

The *NYCitySen$e* project presented significant opportunities to discuss waste prevention and recycling with participating City Agency staff during the on-site assessments and waste sorts and the implementation meetings. The eight seminars opened the discussions to City Agency staff, from both Mayoral Agencies and non-Mayoral Agencies, beyond those participating in the project. Through these discussions, DOS and its consultant identified additional opportunities to educate City Agency staff on the importance of waste prevention, to share new information, and to reinforce existing regulations.

For example, the DOS Bureau of Waste Prevention, Reuse and Recycling (BWPRR) can continue to reach out to key staff at City Agency locations to ensure there is a clear understanding of what materials are required to be collected for recycling at each location. DOS can discuss the recycling collection services provided at Agency facilities and operations to determine if there are any corrections or changes needed to improve the service. For Agencies in privately owned buildings, DOS can work with the Trade Waste Commission to help Agency Waste Prevention Coordinators ensure that the recycling program, offered by the carter with whom the building management has contracted, is compliant with City rules and regulations.

Since only a limited number of City Agencies were able to participate in the *NYCitySen$e* program and attend the seminars, DOS could present the waste prevention and enhanced recycling information to staff of Agencies that were not previously able to participate. City Agency staff who were able to attend the seminars shared with DOS and SAIC their surprise at the amount of information that they did not know prior to attending the seminars and how much they learned. BWPRR may wish to ask City Agency staff who attended the seminars to share information within their Agency and with staff of other City Agencies who perform similar functions. This approach was successfully demonstrated at the Fleet Managers Roundtable, hosted by DOS and the Mayor's Office of Operations.

City Agency Commissioners and upper management at Agencies, Boards, and Commissions are key to motivating City employees and to raising awareness of the fact that preventing waste can

reduce purchasing costs and decrease the cost to collect, transfer and export waste to out-of-state facilities. DOS and the Mayor's Office of Operations have formed a strong alliance and can continue to work together to reach out to key staff at City Agencies. DOS may want to develop waste prevention fact sheets aimed at upper management that can be delivered electronically. These communications can highlight special waste prevention activities, share new waste reduction initiatives undertaken by specific City Agencies, provide information from DCAS on new waste preventing or recycled content products available via Requirements Contracts, etc. These fact sheets have the potential to impact the waste generating behaviors of more than 249,000 City employees.

DOS also may wish to consider examining strategies for reinforcing the 1996 Mayoral Directive through outreach to Commissioners and Agency Chief Contracting Officers (ACCOs). Other steps DOS can pursue to encourage continued management support for waste prevention may include:

- Examining the merits and feasibility of assisting Agencies in establishing a formal waste prevention training plan. DOS may wish to ask the Mayor's Office to consider waste prevention training and recycling instruction for City employees.
- Examining the feasibility of assisting Agencies to incorporate waste prevention and recycling achievements as one of the performance indicators for Agency management.

Commit Resources to Assist the Department of Citywide Administrative Services to Identify and Provide Less Wasteful Products and Services

Many state and local governments across the country have established environmentally preferable purchasing programs that are supported by purchasing staff. Making the decision to reduce the quantity of waste generated by City Agencies was the City's initial step toward a less wasteful City government; issuing a *Mayoral Directive* communicated the Mayor's support. The next step is for DOS to work with the Mayor's Office and OMB to examine the merits and feasibility of allocating the necessary resources to support an environmentally preferable purchasing effort within DCAS. This effort would focus on specific tasks including identification of less wasteful products and alternatives to toxic products, purchasing environmentally preferable, energy efficient and recycled content products throughout the City, performing cost benefit and lifespan analyses, initiating and documenting product testing, and promoting the use of the less wasteful alternatives within all City Agencies.

During the *NYCitySen$e* seminars, City Agency staff offered a number of suggestions to enhance DCAS ability to assist Agencies in waste prevention through purchasing.

- DCAS could consider offering a list of recycled content, energy efficient, or reusable products available via Requirements Contract. DCAS could publish a list of available environmentally preferable products and mark those products in the Storehouse catalogue to encourage increased procurement of the environmentally preferable options.
- Agencies, including DCAS, can survey City vendors and initiate pilot programs to determine the effectiveness of reusable distribution packaging or other alternative packaging in reducing the quantity of packaging managed by the City as recyclables or waste.

A DCAS-initiated vendor survey could provide valuable information for individual Agency purchasing operations.

- City Agencies reported that they discard repairable, reusable wooden furniture that is not accepted at the DCAS Surplus Warehouse. Agencies who participated in the *NYCitySen$e* project are aware of the option to donate relinquished items to the City-sponsored Materials for the Arts program. DOS and DCAS can continue to share information about options for relinquishment and donation of furniture, electronic equipment and other reusable items.
- City Agencies indicated that the requirement that each Agency transport relinquished items to the DCAS Surplus Warehouse limits the relinquishment and donation program. DOS may wish to work with the Mayor's Office and DCAS to evaluate the merits and feasibility of making trucks and drivers available to the DCAS Office of Surplus Activities to provide transportation services.
- DOS and DCAS can examine the feasibility of establishing a reconditioning and repair training program, as part of the operations of the Surplus Warehouse. DCAS currently is setting up a program for restoration of items of historical value, and indicated that this program might be expanded to include repairable furniture and electronic equipment. The Surplus Warehouse would use these items as a basis for a training program in skills such as metal work, electronics repair, upholstery, and cabinet making, with the resulting renovated furniture and equipment returned to the providing Agency, made available to other City Agencies or sold as City memorabilia. The training program might be designed in cooperation with the Board of Education, like the training program at the Central Storehouse. Other Agencies that might wish to cooperate include the Department of Corrections and the Department of Juvenile Justice.
- DOS and DCAS can continue to remind City Agencies of the requirement to return pallets to the DCAS Storehouse or the option to provide pallets to other agencies or to initiate contracts to recycle them.
- DOS, the Mayor's Office of Operations, DCAS, and other key staff can work together to identify the appropriate mechanisms to initiate new service contracts and to determine who is best qualified to assist with and oversee contract negotiations to incorporate environmental criteria, to a greater extent, into service contracts for all City Agencies.

Use New Ways to Communicate with City Agency Staff

Participants in the *NYCitySen$e* program indicated that waste prevention and recycling program success may be enhanced by increased communication within and among City Agency staff regarding:

- Successful waste prevention initiatives;
- Lessons learned;
- Equipment and product test results;
- Vendor performance; and
- Costs associated with less wasteful products and services.

DOS can recommend that City employees involved in any aspect of waste prevention, recycling, procurement of goods and services, building management, contracting, waste management, etc. have access to E-mail communication to share experiences with other City employees engaged in similar activities.

Electronic communication can be further enhanced by creating a format to disseminate information to specific groups across all Agencies. For example, DOS can recommend that DCAS develop Procurement Bulletins to inform ACCOs and Agency purchasing staff about new waste preventing, energy efficient or recycled content products. The Bulletins also may be used to disseminate information submitted by City employees regarding results of a test of a new product with cost savings potential. To view an example of this type of information, visit the Commonwealth of Massachusetts web site at http://www.state.ma.us/osd/enviro/enviro.htm.

DOS may wish to work with DCAS and the Mayor's Office to evaluate the feasibility of using a focus group format to continue the inter-agency exchange of experience and ideas initiated by the *NYCitySen$e* seminars and training sessions. For example, the first focus group could target the Agency Waste Prevention Coordinators and the second focus group could include Agency Chief Contracting Officers. These two groups are key to moving any waste prevention and recycling initiatives forward. The focus groups could be scheduled so that they do not take more than one to two hours each and may begin with a three- to five-minute overview of the current state of waste prevention in City Agencies. The following provides a sample of the types of questions that may be posed to each group to initiate discussions regarding waste prevention in each agency.

Focus Group for Waste Prevention Coordinators

- What is the status of waste prevention within your agency?
- What waste prevention successes has your agency achieved?
- If you have quantified the cost savings and waste prevented, can you share the process undertaken to document the program?
- What are the two or three greatest barriers to enhancing waste prevention in your Agency?
- What do you see as the next necessary steps to furthering waste prevention initiatives at your Agency?

Focus Group for Agency Chief Contracting Officers

- What environmentally preferable, recycled-content and/or waste preventing products does your Agency currently purchase and use?
- How often are environmental criteria part of the decision-making process?
- Has your Agency written any contract specifications requiring less wasteful packaging or other waste preventing specifications?
- Has your Agency initiated a dialogue with vendors concerning packaging reduction or waste preventing products?

- How does your Agency learn about environmentally preferable products?
- What two or three things need to happen to increase the purchase of environmentally preferable products and services?

DOS can consider disseminating information on successful waste prevention projects or new markets and services for hard-to-recycle items. The following examples derive from discussions during the *NYCitySen$e* project.

- City Agencies, such as the DEP, have initiated innovative waste prevention initiatives such as placing the employee telephone directory in a PDF file on Adobe Acrobat and distributing it via Intranet or making forms available on demand via the Internet. Other Agencies may be interested in emulating these waste preventing and more efficient information distribution techniques, but are either not aware of them or unable to purchase the necessary equipment. For example, staff of many City Agencies indicated that their Agency or facility lacks some of the equipment necessary for duplex copying and printing. Many City Agencies lack E-mail and access to the Internet that would allow them to implement paper waste prevention efforts and to share innovations with other Agencies via a waste prevention bulletin on the Internet or via E-mail.
- Agencies with similar operations, such as fleets, do not routinely share information on waste preventing products and processes. For example, the Department of Sanitation has initiated a successful, comprehensive oil testing program and extended its preventive maintenance schedule from 45 days to 60 days, reducing the quantity of used oil and oil filters requiring disposal, reducing packaging waste and reducing mechanic labor to perform the maintenance. In addition, DOS uses re-refined lubricating oil which is cheaper than virgin oil, meets all performance standards for both passenger cars and heavy equipment, and has been tested as part of the extended PM schedule. This information could encourage other fleet managers to test and/or adopt similar waste preventing programs.

DOS can evaluate the merits of working with the Mayor's Office to develop a page on the Mayor's web site to disseminate waste prevention and recycling information, to complement or link to the DOS web site. The site can be developed over time and may contain highlights of successful waste reduction efforts by City Agencies, case studies of successful waste prevention programs in other local government jurisdictions, information about waste preventing practices and materials available to City Agencies. The site could incorporate a feedback loop for interested City employees who may wish to pose questions and/or access information regarding waste prevention, recycling, and any number of related topics.

Recognize and Reward Waste Prevention Successes

The 1996 *Mayoral Directive* contains a section describing an annual awards process. Based on the successes shared by City Agencies during the *NYCitySen$e* program, DOS could assist the Mayor's Office of Operations to move forward with this award process. DOS identified a number of successful waste prevention initiatives that have both reduced the quantity of waste

generated by City Agencies and saved the City money (see Sections II and III of this report). DOS and the Mayor's Office of Operations may wish to remind Agency Commissioners of the opportunity to nominate their Agency for recognition. Agency Commissioners, in turn, can share the award application with the Agency Waste Prevention Coordinator and key staff to determine what programs might be eligible for recognition.

In addition to awards from the Mayor's Office, innovative Agency waste prevention efforts could receive recognition on the New York City government web site, the NYC WasteLe$$ web site and in press releases.

Incorporate Recycling Requirements into City Leases and Specifications

DOS has an opportunity to support the DCAS Division of Real Estate Services in the development of future lease agreements that incorporate requirements to ensure the proper separation and collection of recyclables generated by City Agency operations housed in privately owned space. DCAS developed and currently manages more than 600 leases for 20 million square feet of space in the five boroughs. The waste removal and recycling terms of these leases vary significantly.

DOS provides collection of waste and recyclables for City Agencies in City-owned buildings. DOS also collects waste and recyclables from sites managed by DCAS, such as courts and municipal buildings. DOS is not required to provide waste or recycling collection services to City Agency operations occupying leased space. As waste export is phased in, DOS may wish to review its collection routes to ensure that privately owned and managed buildings housing City Agencies are not part of any DOS collection routes. The building owner or management company is responsible for providing tenants with collection services for waste and recyclables and for complying with the City's commercial recycling requirements.

To ensure that landlords are aware of their obligation to provide waste disposal and specified recycling services to their City Agency tenants, DOS can encourage DCAS to consider incorporating a standard clause into future lease agreements that clearly delineates both landlord and City Agency tenant waste management and recycling responsibilities. DCAS may wish to review landlord carting contracts to confirm that the appropriate recycling arrangements have been incorporated or DCAS may consider requiring that landlords show proof of their recycling arrangements prior to finalizing the lease agreement.

DOS also may want to encourage DCAS to consider revising the standard Cleaning Specifications exhibit (included as an attachment to leases) for future contracts for cleaning services, since the existing clauses do not specify recycling. To ensure that landlords and cleaning contractors are fully cognizant of their obligations under Local Law 87, DCAS could incorporate a clause in new cleaning contracts that clearly delineates the cleaning crew's responsibilities for ensuring that source-separated recyclable materials are collected and stored separately for recycling. DCAS also may wish to include a recommendation concerning the use of less toxic and recycled-content products.

Conclusion

An increased focus on waste prevention will require increased participation, education, resource allocation, and commitment from all levels of City government. Creative managers have already identified some ways to evaluate and implement waste prevention initiatives. City Agencies also are source separating designated recyclables, and looking for ways to recycle additional items. City Agency representatives indicated that the following are key to a successful, long-term waste prevention program:

- Overt management support;
- Product testing and analysis;
- Dissemination of information;
- Purchase of new equipment;
- Initiation of service contacts; and/or
- Overall changes in Agency or Citywide procedures and practices.

APPENDIX: Potential Methodologies for Measuring the Effects of Waste Prevention and Recycling Initiatives at New York City Agencies

Introduction

Waste prevention and enhanced recycling programs implemented through the *NYCitySen$e* program help City Agencies to conserve resources, reduce energy consumption and reduce both operating and waste management costs for the City of New York. Measuring the results of waste prevention and recycling programs initiated is one component in creating and maintaining these programs. Where measurement can be done without undue time and expense in itself, it assists in determining if resources are being allocated efficiently. Documenting successful initiatives also provides a mechanism for informing other Agencies that they can anticipate a cost savings and prevent waste if they implement similar waste prevention techniques.

Key to cost-effective waste prevention measurement is the use of feasible and realistic measurement strategies. Despite the data tracking and measurement challenges that exist, measuring program impacts is feasible in many situations. This document discusses the potential methodologies and considerations necessary for measuring specific waste reduction initiatives. The document provides background information and guidance for City Agencies seeking to implement baseline measurement programs and tracking and quantification efforts for five specific initiatives to reduce waste and enhance recycling. These initiatives include:

- A Citywide Pallet Management Program;
- A Vehicle Maintenance Oil and Filter Reduction Program;
- An Office Paper Use Reduction Program;
- An Electronic Employee Telephone Directory Program; and
- A Furniture Relinquishment Program.

The initiatives listed above focus on commodities that comprise a significant portion of the waste discarded by City Agencies. The largest waste streams generated by City operations are wood and paper, followed by furniture and electronic equipment.[1] As the largest waste streams, these wastes are key targets for waste prevention initiatives and measurement methodologies. Other waste streams, such as oil and oil filters, that are eminently recyclable and may pose management hazards due to their potential toxicity, also are targeted for reduction and measurement.

Data collected through tracking and record-keeping activities that demonstrate cost savings may provide the motivation to promote the implementation and maintenance of promising programs that can sustain the City's progress in waste prevention. However, the implementation of these methodologies may prove time-consuming and may not always be feasible or practical. Individual City Agencies or sites need to determine if conducting measurement activities provides a benefit (*e.g.*, favorable cost benefit analysis, procurement justification, etc.)

[1] SAIC, *Characterization of New York City's Solid Waste Stream*, for the New York City Department of Sanitation, 1997; and U.S. EPA, *Characterization of Municipal Solid Waste in the United States, 1998 Update*. July 1999.

when considering the labor and record-keeping requirements necessary to measure an initiative.

The following sections describe five specific initiatives that can be implemented to reduce the quantity of waste discarded and the cost of its management. In each case, the recommended measurement strategies present:

- The suggested waste prevention strategy and the research on which it is based.
- Data needs, focusing on available data concerning materials use and waste generation, as needed to support waste prevention and cost savings calculations. This information is presented both in terms of baseline requirements and data to be tracked through the implementation phase of each strategy.
- Calculations highlighting basic formulas and assumptions, specific to each waste reduction strategy, as necessary to establish the baseline and to calculate the amount of waste avoided and cost savings, where appropriate.

The development of strategies is based on the following assumptions:

- The population of the United States is 270,000,000 (U.S. Census Bureau, 1998).
- The population of New York City is 7,420,000 (U.S. Census Bureau, 1998).
- NYC population = 2.75% of U.S. population.
- City Agencies employ 338,016 people (Mayor's Office of Operations, 1999).
- Employees of City Agencies = 4.56% of NYC population.

I. Citywide Pallet Management Program

According to the U.S. EPA's *Characterization of Municipal Solid Waste in the United States, 1998 Update,* nationwide, pallets and wood packaging waste comprise almost five percent of the total municipal solid waste stream.[2] Pallets are an enormous component of the City waste stream and offer outstanding opportunities to divert pallet wood to productive reuse and recycling. A staggering 45 to 50 percent of the nation's hardwood timber harvest each year is directed to the manufacture of new pallets, making the pallet industry the nation's largest consumer of domestic hardwood lumber.[3] More than 223,600,000 pallets are discarded annually in the United States, after recycling, according to 1995 figures.[4] Based on this national disposal figure and the population data provided above, an estimated 6,144,500 pallets are discarded in New York City annually, with City Agencies potentially responsible for the disposal of 279,882 pallets per year. Assuming that the average weight of one pallet is 55 pounds, City Agencies may discard 7,696.75 tons of pallets per year. The cost to the Department of Sanitation for the collection and export of these pallets for disposal is $165/ton[5]. Therefore, the estimated annual cost to the City of New York to manage the pallet waste is approximately $1,269,964.

[2] U.S. EPA, *Characterization of Municipal Solid Waste in the United States, 1998 Update*. July 1999.

[3] Gruder, Sherrie, *Pallets: Management and Markets*. University of Wisconsin Solid and Hazardous Waste Education Center. Madison, WI. December 1994.

[4] Robert J. Bush et al., *Construction & Demolition Landfills and Wood Pallets—What's Happening in the U.S.* March 1997.

[5] $65/ton FY00 Incremental Cost of Curbside Collection (Figure 4-1, Comprehensive Solid Waste Management Plan, Draft Modification, April 1998) plus the current estimate of $100/ton for waste export.

Based on site visits conducted through the *NYCitySen$e* program, City Agencies, such as the Department of Transportation (DOT) Sign Shop and the Fire Department's EMS Repair Facility, discard a significant number of pallets. Based on extrapolations from the data developed during the one-day waste sorts, the quantity of pallet waste generated by the DOT Sign Shop is estimated to be 24 tons per year and the quantity generated by the Fire Department's EMS Repair Facility is estimated to be 105 tons per year. The management options available to the Agencies include:

- Return of standard 40" x 48" wood pallets to the DCAS Storehouse for reuse;
- Return of pallets to vendors for reuse and/or refurbishment;
- Routine pallet pick-up by a pallet refurbisher who will repair and/or reuse, and/or down cycle the pallets, for example by chipping them for use as mulch, fuel, or as a bulking agent for composting operations.

To determine the potential cost savings achievable through the initiation of an enhanced pallet management program, the City may consider developing baseline data representing the number of pallets that could be managed under the plan. Currently, the City has no data on the number of pallets routinely delivered to City Agencies. Agencies receive palletized shipments from the DCAS Storehouse, Staples, other materials suppliers, equipment vendors, parts vendors and a variety of other sources. Agency operations manage pallets several ways including: returning pallets to DCAS, offering pallets to other Agencies or tenants, returning pallets to vendors and, too often, by discarding usable pallets into dumpsters and other trash containers destined for collection and disposal by DOS.

Therefore, one of the key challenges inherent in efforts to measure the waste prevention achieved through Citywide pallet reuse and recycling efforts is estimating the number of pallets that pass through City Agencies each year and determining how many of these pallets are returned for reuse or recycling versus the number that are discarded into the waste stream. For the purposes of this report, estimates are formulated by gathering data from multiple Agency locations and rolling them up to an Agency-wide generation number. In this measurement methodology example, City pallet waste generation will represent the sum of the data from all City Agencies.

Alternatively, the methodologies can be tailored for use by specific operations within an Agency, for the assessment of pallet management at a specific loading dock location, for an entire City Agency, or for a building with multiple tenants. For example, an Agency with multiple locations may want to capture and record data at each Agency location that operates a loading dock. For locations that have multiple Agencies using the same loading dock, the analyst can report the total shipments for the location and then assign a representative percentage of the total number of pallets to each Agency housed in the building.

The following measurement methodology provides a strategy that City Agencies or sites can use to develop a baseline for the quantity of pallets their respective operations generate and a strategy for monitoring the reduction in pallet waste resulting from the waste prevention programs they choose to implement.

The measurement sheets can be used to develop weekly or monthly tallies depending on the level of activity in the receiving/shipping operation of the Agency location.

A. Data Needs

A.1. Determine Representative Pallet Weights

Complete Table 1 for all sizes of pallets received by the Agency, the Agency operation or the target location.

Table 1: Average Pallet Weights

Pallet Size	Weight (lbs)
48" x 40"	*Example: 55 lbs.*
42" x 42"	
48" x 42"	
48" x 48"	
Other:	

A.2. Establish a Pallet Waste Baseline

A.2.1. Determine the number and size of pallets discarded annually. If no current reuse, return, or recycling programs are in place, establish the Agency/site baseline pallet disposal values using Table 2. If possible, track and record the number of discarded pallets each day for the given month. If the number of discarded pallets is not easily tracked, record (estimate) the total number of palletized shipments received during each month of a representative year and consider this as the annual total baseline number of pallets discarded. **If you filled in Table 2 with pallets discarded, this will be your final discard quantity for the time period** (in this example, one month.)

Table 2: Pallets Discarded/Generated

Summary of Pallets Discarded or Incoming Palletized Shipments (Example)					
Date	Quantity of 48" x 40"	Quantity of 42" x 42"	Quantity of 48" x 42"	Quantity of 48" x 48"	Quantity of Other Sizes
1/5/00	0	5	10	0	5
1/6/00	5	8	20	0	3
1/8/00	0	5	0	5	1
1/12/00	6	3	0	0	9
1/18/00	7	14	5	0	2
1/26/00	3	0	12	3	1
Total for 1/00	21	35	47	8	21

A.2.2. If the Agency or operation has pallet reuse and/or recycling programs in place, use Table 3 to record pallet management efforts for an equivalent time period. Generally, it may be easier for staff to record measurement data for one month at a time.

Table 3: Pallet Return/Reuse

Recycling/Reuse Pallet Tracking Sheet (Example)						
Date	Quantity of 48" x 40"	Quantity of 42" x 42"	Quantity of 48" x 42"	Quantity of 48" x 48"	Quantity of Other Sizes	Destination
1/5/00	0	3	8	0	5	Vendor
1/7/00	3	4	10	0	0	DCAS
1/11/00	0	1	0	0	0	DCAS
1/11/00	0	0	0	2	2	Recycled
1/13/00	2	2	0	0	7	Vendor
1/19/00	5	0	3	0	0	DCAS
1/20/00	0	10	0	0	0	Vendor
1/21/00	0	0	2	0	1	Recycled/Reused
1/26/00	1	0	0	0		DCAS
1/27/00	0	0	12	0	1	Agency
Total for 1/00	11	20	35	2	16	

If you filled in Table 2 with the number of pallets generated, subtract the total number of pallets reused or recycled recorded in Table 3 (*e.g.*, the known number of pallets returned to DCAS, to product vendors, reused internally, and to recycling vendors) from the total number of pallets generated (from Table 2) to obtain the number of discarded pallets for the given period of time and record in Table 4.

Table 4: Number and Weight of Discarded Pallets (monthly)

Number Discarded	Pallet Size	Weight (lbs.)	Total Weight
10	48" x 40"	*Example: 55 lbs.*	550 lbs.
15	42" x 42"		
12	48" x 42"		
6	48" x 48"		
5	Other:		

A.2.3. Calculate the annual pallet disposal and return/reuse by tallying the monthly data for the following.

Number of each size of pallet discarded.

Number of standard 40" x 48" GMA pallets returned to DCAS Storehouse.

Number and size of pallets returned to vendor(s).

Number of pallets recycled through a recycling vendor.

A.3. Measuring Waste Reduction after Program Implementation

A.3.1. Use Tables 2 and 3 again to document the number of pallets reused, recycled and discarded after implementation of the pallet management program.

A.3.2. For each Agency operation or location, determine:

Number and size of pallets discarded annually.

Number of standard 40" x 48" GMA pallets returned to DCAS Storehouse annually.

Number and size of pallets returned to vendor(s) annually.

Number of pallets recycled annually.

B. Baseline Calculations

Use the weights from Table 1 to perform the following calculations.
Note: (a)(b) means multiply a x b. "/" means divide.

B.1. Baseline Weight of Pallet Waste Disposed Annually =

a. For each size pallet: (Pallet weight by size)(Number of pallets of each size) = Annual pallet weight by size

b. Sum of annual pallet weights by size: (Annual pallet weight by size) + (Annual pallet weight by size) = Baseline weight of annual pallet disposal

B.2. Baseline Weight of Pallets Recovered for Reuse or Recycling Annually = Sum of:

a. Weight of Pallets Returned to DCAS Storehouse for Reuse:
(Pallet weight by size)(Number of pallets)

b. Weight of Pallets Returned to Vendors for Reuse/Recycling:
(Pallet weight by size)(Number of pallets)

c. Weight of Pallets Picked up by Refurbisher for Repair/Reuse/Recycling:
(Pallet weight by size)(Number of pallets)

B.3. Total Weight of Pallet Waste Recovered for Reuse/Recycling by Agency = Sum of Weight of Pallets Recovered for Reuse/Recycling

B.4. Baseline Weight of Pallets Managed by Agency Annually = Sum of Total Weight of Pallets

1. Discarded by Agency.
2. Recovered for Reuse or Recycling from Agency.

B.4. Agency Total Weight of Pallets Managed = Sum of Agency Operation and Location totals

C. Waste Reduction Calculations

C.1. Post Implementation Pallet Disposal Quantity

Weight of Pallet Waste Disposed Annually = (Pallet weight by size)(Number of pallets disposed)

C.2. Post Implementation Pallet Recovery Quantity

Weight of Pallets Recovered for Reuse or Recycling Annually following implementation = Sum of:

a. Weight of Pallets Returned to DCAS Storehouse for Reuse: (Pallet weight by size)(Number of pallets)

b. Returned to Vendors for Reuse/Recycling: (Pallet weight by size)(Number of pallets)

c. Picked up by Refurbisher for Repair/Reuse/Recycling: (Pallet weight by size)(Number of pallets)

C.3. Post Implementation Weight of Pallets Managed by Agency Annually

Weight of Pallets Managed by Agency Annually = Sum of Total Weight of Pallets Annually

a. Discarded by Agency

b. Recovered for Reused or Recycling Disposal

C.4. To determine the *baseline percent of pallet waste recovered*, calculate:

100 (Total baseline weight of pallets recovered for reuse or recycling by agency)/ (Total baseline weight of pallets managed by Agency)

C.5. To determine the percent of *pallet material recovered after program implementation*, calculate:

100 (Total weight of pallets recovered for reuse or recycling by Agency after program implementation)/ (Total weight of pallets managed by Agency after program implementation)

C.6. To determine the *percent improvement in diversion* from disposal, calculate:

(% of pallet material recovered after program) – (% of baseline pallet material recovered)

C.7. To determine the *quantity of waste diverted from disposal through program implementation*, calculate:

(Total weight of pallets recovered after program implementation) – (Total baseline weight of pallets)

II. Vehicle Maintenance Oil and Filter Reduction Program

In New York City, a number of Mayoral Agencies, including the Police Department, the Fire Department, and the Departments of Correction, Environmental Protection, Parks and Recreation, Sanitation, and Transportation operate vehicle fleets. In addition, the Department of Citywide Administrative Services, Office of Fleet Administration manages fleet maintenance for the Department of Housing Preservation and Development, Human Resources Administration, the Department of Homeless Services, the Department of Finance's Office of the Sheriff and the Bronx Borough President's Office. According to the Mayor's Office of Operations, the Citywide fleet consists of more than 25,000 vehicles ranging from passenger cars and light duty trucks to fire engines and landfill equipment.

Each vehicle uses oil and fuel filters and lubricating oil. Depending on the type and size of the vehicle, each filter may weigh from one to five pounds. Based on potential oil filter generation in New York City, estimated at 7.7 million filters each year, New York City Agencies generate approximately 351,120 oil filters per year. The Steel Recycling Institute estimates a national oil filter recycling rate of 17.5 percent. In addition, the total quantity of used lubricating oil generated in New York City annually is estimated at 4.9 million gallons, of which City Agencies may generate approximately 223,440 gallons.[6]

Filters and used lubricating oil are generated as wastes during preventive maintenance (PM) on City-owned vehicles performed at Agency-determined intervals, either in Agency maintenance facilities or by off-site contractors. Some Agencies have extended the PM schedule and realized significant waste reduction and cost savings. For example, the Department of Sanitation formerly performed a safety check on each vehicle every 20 days and a full PM, which includes changing all filters and fluids, every 45 days. Now, DOS performs the safety check on each vehicle every 30 days and a full PM every 60 days. This change has resulted in prevention of more than 211 tons of waste including filters, packaging and used oil as well as annual cost savings of more than $318,000. The Fire Department Emergency Medical Services performs preventive maintenance on ambulances and support vehicles at a 45-day interval but the PM interval for staff cars is 90 days.

Since May of 1992, U.S. EPA has exempted used oil filters from hazardous waste requirements, as long as they are not constructed of terne plate steel (a lead/tin alloy). New York State

[6] SAIC, *Characterization of New York City's Solid Waste Stream*, for the New York City Department of Sanitation, 1997.

follows Federal requirements for used oil filter disposal. Currently, U.S.-manufactured oil filters are exempt from hazardous waste regulation if the oil filter is:

- Punctured through the dome end or anti-drain back valve and hot-drained; or
- Hot-drained and crushed; or
- Hot-drained and dismantled; or
- Hot-drained using an equivalent method to remove used oil.

Used oil contains varying amounts of heavy metals such as lead, cadmium, barium, chromium, and arsenic. In addition, used oil contains over two dozen known carcinogenic compounds. Draining an oil filter for 12 hours removes a little more than half of the oil that was present when the filter was removed from the car. A typical drained and crushed oil filter retains an average of one ounce of oil per filter.

Once the oil filters have been separated and collected by a recycler, they are sent to processing facilities where the filters are crushed into flat pucks, compressed into cubes (or hemispheres), shredded, or dismantled. The steel is then sent to a steel mill or foundry. Some steel mills produce flat rolled steel products by combining scrap products and hot metal from iron ore to make products such as steel cans, cars, and appliances, while others use virtually 100 percent scrap to make products such as rebar and I-beams. In addition, the residual oil is available for recycling and the paper filter medium may be a solid fuel.

"While almost all used oil filters were simply discarded only a few years ago, we now recognize them as a valuable resource," says Brent Hazelett, executive director of the Filter Manufacturers Council and Director of Environmental Affairs for the MEMA Environmental Institute. "We have certainly come a long way, from nearly zero used oil filters recycled to over 100 million annually, but we still have a great challenge ahead." Steel scrap, including recycled oil filters, is a vital ingredient in the steelmaking process. Approximately 160,000 tons of steel could be recovered if all the filters sold in the U.S. annually were recycled.[7]

A few years ago, City Agencies routinely discarded oil filters as solid waste. Recently, however, DOS, DOT and the Police Department have contracted for oil filter recycling services from one vendor, Key Environmental. In 1999, the Fire Department also began recycling oil filters at one location, the EMS Repair Facility in Maspeth Queens, and intends to extend the program to their other repair operations. The vendor provides 55-gallon drums for on-site storage of drained, crushed or uncrushed filters as well as transportation of full drums and appropriate documentation. The vendor is not charging City Agencies a consistent price for these services; fees range from $36 to $76 per drum of filters.

City Agencies also recycle used lubricating oil, either via a City Requirements Contract or through Agency-initiated contracts. Again, there are inconsistencies in vendor responsiveness. Also, the City Requirements contract does not generate revenue while individual Agency vendors may pay from one to five cents per gallon of used oil recovered.

[7] The Used Filter Recycling Hotline sponsored by the Filter Manufacturers Council and administered by the Motor and Equipment Manufacturers Association (MEMA) Environmental Institute, 1-800-99-FILTER (993-4583).

City Agencies are able to provide reliable information on the size and type of vehicles in their fleet, the weight and cost of oil filters purchased for each vehicle, the quantity of lubricating oil per oil change, the number of oil filters recycled, where appropriate, and the preventive maintenance schedules.

The following measurement methodology provides a strategy for each Agency or site to develop a baseline of the quantity of used oil, filters and filter packaging generated by their fleet and the current management. This baseline data can be used to quantify the potential waste prevention that could be achieved if oil filter recycling was initiated or if the preventive maintenance schedule was extended.

A. Data Needs

A.1 For each Agency maintenance operation determine:

Number of each type/size of vehicle in the Agency fleet.

Number of filters per type/size of vehicle.

Weight of filter(s) per type/size of vehicle.

Weight of filter packaging per type/size of vehicle.

Quantity of lubricating oil per type/size of vehicle.

Quantity of lubricating oil recycled.

Number of times preventive maintenance is performed on each vehicle, annually.

Number of filters discarded.

Number of filters recycled.

B. Baseline Calculations *Note: (a)(b) means multiply a x b. "/" means divide.*

B.1. Baseline filter data:

B.1.1. Total weight of filters per vehicle size/type

(Filter weight)(Number of filters)(Number of vehicles by type/size) = Total weight of filters per vehicle type/size

B.1.2. Filter waste generation

(Total weight of filters for each vehicle type/size) (number of times preventive maintenance is performed annually) = Annual filter waste generation per vehicle type/size

Per Agency sum of annual filter waste generation for all vehicle types/sizes = Total annual weight of filters generated per Agency

B.1.3. Filter packaging waste

(Packaging weight)(Number of filters)(Number of vehicles by type/size) = Total weight of filter packaging per vehicle type/size

(Total weight of filter packaging for each vehicle type/size) (Number of times preventive maintenance is performed annually) = Annual filter packaging waste generation per vehicle type/size

B.2. Used lubricating oil generation

Quantity of oil (qts.)(Number of vehicles by type/size) = Total lubricating oil per vehicle type/size

(Total quantity of oil (qts.) for each vehicle type/size)(number of times preventive maintenance is performed annually) = Annual used lubricating oil generation per vehicle type/size

Per Agency sum of annual lubricating oil generation for all vehicle types/sizes = Total annual used lubricating oil generated per Agency

(Quantity of oil (qts.)/4) (7.75 lbs)/2000 = Weight of used lubricating oil generated in tons

B. 3. Current Waste Reduction

Total annual weight of filters generated – Total weight of filters recovered for recycling = Total weight of filters discarded as waste

Total weight of filters recovered for recycling annually / Total annual weight of filters generated = Percent of filters recovered for recycling

Total annual weight of filter packaging generated – Total weight of filter packaging recovered for recycling annually = Annual weight of filter packaging diverted from disposal

Total weight of filter packaging recovered for recycling annually / Total annual weight of filter packaging generated = Percent of filter packaging recovered for recycling

Total weight of oil recovered for recycling annually / Total annual weight of oil generated = Percent of oil recovered for recycling

C. Waste Reduction Calculations

C.1. Oil Filter Recycling

If an Agency/site is not currently recycling oil filters, the weight of the total number of filters generated per year equals the amount of waste that could be diverted from disposal to recycling. A vehicle maintenance operation that contracts for filter recycling can track the actual number and weight of filters recycled based on filters generated. Agencies or sites also can track the number of 55-gallon drums of filters collected by the filter recycler and use standard estimates of 50 uncrushed filters or 300 crushed filters per 55-gallon drum. As Agencies contract for recycling services, each vehicle maintenance operation can document the total number and weight of filters recycled vs. filters discarded. Operations already recycling can continue to monitor the weight of filters recycled vs. filters discarded.

Number of drums x 50 uncrushed or 300 crushed filters = Number of filters recycled

Number of filters recycled x Average weight of a filter = Total weight of recycled filters

Total weight of filters recycled after program implementation – Total weight of filters recycled before program implementation = Total waste reduction achieved through program

C.2. Extended Preventive Maintenance Schedule

To calculate the impact of extending a PM schedule, multiply the waste generated during one PM by the number of PMs currently performed. Then multiply the waste generated during one PM by the proposed number of PMs. Subtract the reduction from the current number to determine waste prevention potential.

C.2.1. Filter Waste Prevention Potential

Sum of the total weight of filters for each vehicle type = Total weight of filters for one PM

Total weight of filters for one PM x Number of annual PMs = Current annual weight of filters generated

Total weight of filters for one PM x Proposed number of annual PMs = Potential annual weight of filters

Current annual weight – Potential annual weight = Filter waste prevention (lbs.)

Filter waste prevention (lbs.)/2000 = Filter waste prevention (tons)

C.2.2. Packaging Waste Prevention Potential

Sum of the total weight of filter packaging per vehicle type/size = Total packaging for one PM

Total weight of packaging for one PM x Number of annual PMs = Current annual weight of packaging generated

Total weight of packaging for one PM x Proposed number of annual PMs = Potential annual weight of packaging

Current annual weight – Potential annual weight = Packaging waste prevention (lbs.)

Packaging waste prevention (lbs.)/2000 = Packaging waste prevention (tons)

C.2.3. Used Oil Prevention Potential

Sum of the total quantity of oil (qts.) for each vehicle type/size/4 = Total gallons of oil for one PM

Total quarts of used oil from one PM x Number of annual PMs = Current annual used oil generation

Total volume of used oil from one PM x Proposed number of annual PMs = Potential annual used oil generation

Current used oil generation – Potential used oil generation = Used oil waste prevention (in quarts)

Used oil waste prevented (quarts)/4 = Used oil waste prevented (gallons)

Used oil waste prevented (gallons) (7.75 lbs) = Weight of used oil waste prevented (lbs.)

Used oil waste prevented (lbs.)/2000 = Used oil waste prevented (tons)

C.2.4. Total PM Waste Prevention

Filter waste prevention (tons) + Packaging waste prevention (tons) + Used oil waste prevented (tons) = Total annual waste prevention from extended PM schedule

D. Cost Impacts

By calculating the cost of purchasing filters and oil for one PM, the cost of collection and disposal of filters and packaging, the cost to recycle filters, any revenues from oil recycling, as well as the value of labor to perform the PM, City Agencies also can use this approach to determine potential cost savings from extending the PM schedule. For example, each vehicle maintenance operation could calculate the following costs for a single PM:

Filter purchase	Sum of the total cost of filters per vehicle type/size
Oil purchase	(Sum of the quantity of oil per vehicle type/size) x (cost per gallon)
Filter disposal	(Sum of the total weight of filters(tons) discarded per vehicle type) x ($165)
Filter recycling	(Number of 55-gallon drums) x (cost per drum)
Oil recycling	(Quantity of oil collected by recycler) x (cost or revenue per gallon)
Packaging disposal	(Sum of the weight of packaging per vehicle type/size) x ($165/ton)
Labor	(hourly labor rate) x (length of time to perform PM) x (total number of vehicles in fleet)

Cost savings can be calculated for each item and then the sum of the annual savings = the total potential cost savings from the extended PM schedule.

Table 4. Cost Savings Associated with Extended PM Schedule

	A. Cost for One PM	B. 45-Day PM (6 per year)	C. 60-Day PM (4 per year)	D. Annual Savings (B. – C.)
Labor				
Filter purchase				
Oil purchase				
Filter disposal @ $165/ton				
Filter recycling				
Oil recycling (revenue)				
Packaging disposal @ $165/ton				
TOTAL SAVINGS				

III. Office Paper Use Reduction Program

In New York City, Agencies continue to identify opportunities to reduce the quantity of office paper purchased and generated throughout the City. *The Mayoral Directive on Waste Prevention and Efficient Materials Management Policy*, 1996, targeted paper, one of the City's largest waste streams, for reduction throughout City Agency operations. According to the U.S. Environmental Protection Agency, our Nation's municipal solid waste stream contained more than 3,470,000 tons of office paper including high-grade copier paper, computer printout, stationery, and other uncoated paper in 1997.[8] This is 2.2 percent of the paper and paper-board generated in the United States in 1997.[9] Based on the assumptions, office paper discarded in New York City annually totals 95,355.6 tons, after recycling. The quantity of office paper discarded by City Agencies is as high as 4,343.45 tons.

In response to the *Mayoral Directive*, City Agencies have implemented office paper reduction initiatives similar to those outlined in the *Mayoral Directive:*

- Require double-side printing and copying of all Agency materials.
- Enhance common access to documents.
- Circulate memoranda and information via electronic mail or bulletin board.
- Eliminate fax cover sheets.
- Access print-on-demand systems for forms and stationery.
- Require Requests for Proposals to be double-sided and request proposals to be submitted double-sided.

City Agency efforts to reduce the quantity of paper purchased reduce both purchasing costs and the cost to manage paper as a waste and/or recyclable material. Measuring a reduction in paper purchasing costs may be easier for those Agencies that purchase paper from one source, the DCAS Central Storehouse, although the Storehouse tracks Agency expenditures by dollars, not products purchased. Based on information gathered through the *NYCitySen$e* project and related seminars, it is apparent that Agencies purchase paper from multiple sources. Staff at several City Agencies reported the purchase of paper from Staples and other retail outlets such as Office Max. They also use City-issued credit cards to order and pay for paper to be delivered from other vendors. These multiple purchasing points may make it more difficult for Agencies to develop the baseline data necessary to support a claim of successfully reducing the purchase of paper.

When collecting data Agency-wide, all of the purchasing points within an Agency need to be identified and the quantity of paper purchased by all staff must be determined. Paper obtained from outside sources, must be added to the quantity of paper purchased and delivered from the City's Central Storehouse. This may be difficult, and the methodology may be more appropriately applied to single sites or operations.

[8] U.S. EPA, *Characterization of Municipal Solid Waste in the United States: 1998 Update*. July 1999.

[9] *Ibid.*

A. Data Needs

Before program implementation, it is necessary to determine how much paper is purchased during a six-month period. This paper may be purchased from DCAS, Staples, or other sources. It may require extensive effort to locate records for all sources of paper purchases. In addition to purchasing data, you also will need to inventory the paper currently in stock at your location. This includes stockroom supplies, as well as paper distributed to individual copy machines and printers. Finally, it is necessary to determine what percentage of paper is filed in-house as documents and records, sent to other Agencies, or discarded/recycled in-house. This may be an estimate. Note that these calculations only account for paper purchased and used within the Agency and do not take into consideration out-sourced printing or copying jobs.

A.1. Complete Table 5 for each of six months and total the information recorded. The table should be completed for six months before program implementation and for six months after program implementation.

Table 5. Office Paper Purchasing Records

Office Paper Purchasing Records for January *(Example)*				
Date	**Paper Size and Weight**	**Quantity Purchased**	**Cost Per Unit**	**Weight of Unit (lbs.)**
1/6/00	Letter size 20 lb. Legal size 20 lb.	20 cartons 15 cartons	$24.50/carton $30.00/carton	50 lbs. 75 lbs.
1/20/00	Letter size 20 lb.	20 cartons	$24.75/carton	50 lbs.
1/29/00	Legal size 20 lb.	5 cartons	$29.00/carton	75 lbs.
Total for 1/00	Letter size 20 lb. Legal size 20 lb.	40 cartons 20 cartons	N/A N/A	

A.2. Complete Table 6. Fill in the table at the beginning of the six-month period and again at the end to determine what was at your location when data recording begins and how much remains at the end of the data-recording period.

Table 6. Office Paper Inventory

Date	Location of Paper in Stock	Quantities	Estimated Price per Unit	Weight
1/6/00	Storage Room	25 cartons of letter size 10 cartons of legal size		
1/6/00	First Floor Copy Center			
1/6/00	Third Floor Copy Areas			
Total at Start of Data Recording				

Date	Location of Paper in Stock	Quantities	Estimated Price per Unit	Weight
6/30/00	Storage Room			
6/30/00	First Floor Copy Center			
6/30/00	Third Floor Copy Areas			
6/30/00	Second Floor Printer			
Total at End of Data Recording	N/A			

A.3. Determine a rough estimate of the percentage of paper going to each of the following:

Filed in-house: %

Sent to other Agencies or outside organizations: %

Discarded/Recycled in-house: %

A.4. Complete these tables both before and after implementation of a paper use reduction program. Data should be kept for six months during each period to gather enough accurate data to calculate reductions.

A.5. Record the number of employees working at the Agency or location during the time periods when data were collected and recorded.

B. Baseline Calculations

For each type of paper purchased before implementation of the program, calculate:

B.1. Quantity Purchased and Used:

(Weight per carton x Number of cartons purchased) x 2 = Total weight of paper purchased annually

Larger of the total weights from paper inventory – Smaller of the total weights from paper inventory = Additional weight of paper used

Total weight of paper purchased + Additional weight of paper used = Total paper use for location

Total paper use for location x Percent of paper discarded or recycled in-house = Quantity of paper that could be reduced

Total paper use for location / Number of employees during time period = Quantity of paper used per employee

B.2. Cost:

(Cost per carton x Number of cartons purchased) x 2 = Total amount spent on paper before implementation

C. Waste Prevention Calculations

For each type of paper purchased before implementation of the program, calculate:

C.1. Quantity Purchased and Used:

(Weight per carton x Number of cartons purchased) x 2 = Total weight of paper purchased annually

Larger of the total weights from paper inventory – Smaller of the total weights from paper inventory = Additional weight of paper used

Total weight of paper purchased + Additional weight of paper used = Total paper use for location

Total paper use for location x Percent of paper discarded or recycled in-house = Quantity of paper that could be reduced

Quantity of paper that could be reduced before implementation – Quantity of paper that could be reduce after implementation = Actual quantity of paper reduced

Total paper use for location / Number of employees during time period = Quantity of paper used per employee

C.2. Cost:

(Cost per carton x Number of cartons purchased) x 2 = Total amount spent on paper after implementation

Total amount spent on paper before implementation – Total amount spent on paper after implementation = Total cost savings

IV. Electronic Employee Telephone Directory Program

Each City Agency develops its own internal employee telephone directory. These directories are distributed to staff members and often are revised at least once per year. Several Agencies have reduced paper purchases and use by developing and disseminating the employee directory electronically. For example, the Departments of Environmental Protection and Design and Construction both use an electronic directory.

According to the DEP Division of Facilities Management and Construction, in the past, DEP printed 2,500 telephone directories annually for its 5,495 employees. Each directory included 115 double-sided pages with front and back covers, and a heat binding. By replacing the printed directory with an electronic version, DEP reduced paper use by 230,010 sheets of 20 lb. paper and 5,000 sheets of 110 lb. cover stock. This represents an annual waste reduction of approximately 2,300 pounds of 20 lb. paper and 275 pounds of 110 lb. cover stock, or 1.29 tons of total paper reduction. Developing an electronic employee telephone directory has saved DEP an estimated $14,628/year in purchasing costs.

The Department of Design and Construction formerly printed 1,200 copies of a 50-page paper directory for its 1,272 employees and then revised it once during the year. By eliminating the paper copy and putting the directory online, the Department avoided paper waste generation of 120,000 sheets of paper per year and reduced paper purchases by approximately $600. This does not include other cost savings, such as printing, labor, and other supplies.

Based on these examples, once individual Agencies provided data, it will be possible to estimate overall reduction and savings potential for all City Agencies. Based on DEP and DDC directories, information for approximately 24 staff are included on one side of a sheet of paper (or 48 per sheet of paper). Each individual Agency would need to determine the number of employees for whom the directory will include information and the number of copies of the directory printed annually to arrive at a figure for the total paper use in producing an Agency directory.

To determine the specific paper waste prevention and cost savings that an individual City Agency can achieve, each Agency can gather the data below and perform the recommended calculations.

A. Data Needs

A.1 Each Agency needs to determine:

Number of hard copy telephone directories currently printed.

Number of pages in each directory.

Cost per carton of 20 lb. paper.

Cost per carton of cover stock paper (110 lb. paper), if used.

Cost per copy made.

Cost for black ink.

Method of binding of directories, (*e.g.*, heat binding, GBC binding, 3-ring binder, etc.)

Cost of other supplies associated with binding.

Cost of labor for printing and binding directory.

Number of times per year the directory is updated and reprinted.

B. Baseline Calculations

B.1. Paper Costs:

Number of directories printed x Number of Pages per directory = Sheets of paper used

Sheets of paper used / 5000 sheets per carton = Cartons of paper used

Cartons of paper x Cost per carton = Paper purchasing costs

Number of directories x 2 = Number of cover sheets used

Number of cover sheets reduced / 2500 sheets per carton = Cartons of cover stock

Cartons of cover stock x Cost per carton = Cover stock purchasing costs

C. Waste Prevention Calculations

C.1. Paper Costs

Number of directories printed after electronic version implemented x Number of pages per directory = Sheets of paper used

Sheets of paper used before – Sheets of paper used after = Sheets of paper reduced

Sheets of paper reduced / 5000 sheets per carton= Cartons of paper reduced

Cartons of paper x Cost per carton = Paper purchasing costs reduced

Number of directories x 2 = Number of cover sheets used after

Number of cover sheets used before – Number of cover sheets used after = Number of cover sheets reduced

Number of cover sheets reduced / 2500 sheets per carton = Cartons of cover stock

Cartons of cover stock x Cost per carton = Cover stock purchasing costs reduced

C.2. Labor Cost Savings

Before:
Number of hours to print and bind directories x Number of times per year printed = Annual labor hours before

After:
Number of hours to print and bind directories x Number of times per year printed = Annual labor hours after

Annual labor hours before – Number of labor hours after = Annual labor hours reduced

Annual labor hours reduced x Hourly rate = Labor cost savings

C.3. Other Supplies Savings

Before:
Cost of each material x Number of pieces used = Cost of binding materials before

Cost of ink per container x Number of containers used = Cost of ink before

After:
Cost of each material x Number of pieces used = Cost of binding materials after

Cost of ink per container x Number of containers used = Cost of ink after

Cost of binding materials before – Cost of binding materials after = Cost of binding materials reduced

Cost of ink before – Cost of ink after = Cost of ink reduced

Cost of ink reduced + Cost of binding materials reduced = Cost of other supplies reduced

C.4. Total Cost Savings

Cost of paper purchases reduced + Costs of cover stock reduced + Cost of labor reduced + Cost of other supplies reduced = Total annual savings

V. Furniture Relinquishment Program

City Agency sites often have excess or unwanted furniture as a result of an office relocation or reassignment of a portion of the workforce. They have several options for managing usable furniture, including: 1) transferring the furniture to another Bureau within the Agency, 2) transferring the furniture to another Agency, 3) relinquishing the furniture to Materials for the Arts (MFA), or 4) relinquishing and delivering the furniture to the DCAS Surplus Warehouse.

A considerable quantity of furniture is transferred among City Agencies through these methods. Agencies or sites that find reuse opportunities within their own facility avoid disposal costs, transportation costs to move the furniture to a new location, and the cost of purchasing new furniture. MFA may be able to accept for donation usable furniture that cannot be reused internally. City Agencies wishing to donate furniture to MFA must complete a relinquishment form and submit the form to the Salvage Unit in the Department of Purchase. A relinquishment form also is required when Mayoral Agencies deliver unwanted furniture to the DCAS Surplus Warehouse.

Donating or transferring furniture, rather than discarding it, saves the City a tremendous amount of money and valuable resources. Reusing furniture avoids the need to purchase new furniture. Diverting measurable quantities of material from disposal prevents the use of valuable landfill space for usable, repairable furniture. The furniture diversion and the avoided purchasing and the avoided disposal costs can be tracked and reported as waste prevention and cost savings successes for City Agencies or individual sites.

At this time, a uniform system to track and calculate these savings does not appear to exist. DOS may want to consider proposing a system that the City can consider implementing to record and track furniture diversion and reuse. The data entered into the system can generate overall cost savings and waste prevention figures for the Mayor's Management Report. This approach does not provide calculations for individual Agencies or locations to perform, but describes a Citywide computer tracking system that could be used by each Agency to perform the necessary calculations.

Proposed Approach

As the City prepares to upgrade its computer technology and enhance its electronic communication systems, DOS may wish to approach DCAS and the Mayor's Office of Operations about establishing and building a framework for City Agencies to track furniture as it moves through the relinquishment process.

Using the existing relinquishment form as a starting point may help to simplify the new system. Currently, all City Agencies with furniture or equipment that they no longer have use for must relinquish the materials by completing and submitting a Relinquishment Form. The Form is used for items to be donated to the Surplus Warehouse, as well as items to be discarded.

Training on the new Relinquishment procedure may be minimal, depending on how each Agency elects to alter its current procedures and personnel to use the new system. Designing a program that performs the calculations and simplifies reporting formats will reduce the need to invest significant money and staff in training Agency staff who will be using the new system.

Relinquishment Officers, or the person completing the form, will need to select the item from a pick list that most closely matches the item they are approving for relinquishment. Establishing the pick list of pre-selected furniture items to include in the pull down menu can be as general or as specific as DOS or DCAS wishes. For each of the furniture items entered into the system, an assigned weight and replacement value can be established and entered into the database. This process can be as simple as offering up to ten different options for each category and asking Relinquishment Officers to select the items that most closely match the description of the items they are listing on the form. Or the list can include hundreds of items based on the list of furniture items available from registered vendors. Using a less complicated list will reduce the length of time it will take to program the database and the need to update the database each time new furniture selections are made available to City Agencies.

The obvious challenge to implementing this type of tracking system is the level of effort and computer programming resources required to build the program. Once the program is developed and tested, the next challenge will be entering the average weight and value of furniture items in the City's possession. Developing a comprehensive database can be time consuming and costly. Reviewing the capabilities of the City's new FMS computer system and the plans to update the electronic communication capabilities of City Agency staff may offer opportunities to duplicate, in some ways, an existing or planned tracking system. DOS may want to consider meeting with the City's Management Information System experts to discuss developing a system to track the cost savings and waste prevention. There may be opportunities to save program or software development costs by using existing new systems or by tailoring a system that is under current development.

Sample Potential Data Entry Screens

Many computer-based entry forms are used on the Internet to track and record on-line purchases, personal financial investment accounts, and other electronic commerce applications. The technology to record and track information on-line exists and has been tested by both public and private sector entities. Government procurement officials are testing systems to purchase goods and services, as well as request and receive bids on-line. DOS and DCAS have the opportunity to establish an on-line waste prevention data tracking system that could be replicated by other local and state leaders seeking a method to capture cost savings and waste prevention information.

For purposes of this report, the focus is on tracking and quantifying furniture re-distribution throughout City Agencies. The data entry screens could be tailored so the user could select a form to relinquish vehicles and vehicle parts, electronic equipment, or other items, as necessary.

The main screen for furniture relinquishment, Exhibit 1, is based on the current relinquishment form format. Key information entered into each field on the form can be used to track and measure the waste prevention and cost savings achievements for all City Agencies. The information would be collected in a database that could then be sorted depending on the type of report the user wishes to prepare. Furniture disposition could be quantified in terms of tons of waste diverted, avoided purchasing costs, or as reporting requirements dictate. Data from individual Agencies also could be compiled into a Citywide report.

The format of the data entry screens used by all Agencies would be the same, with the exception of those used by the DCAS Surplus Warehouse. The Surplus Warehouse would have an additional reporting format to measure and track the fact that furniture relinquished from an Agency would be accounted for in the submittal by the relinquishing Agency. Once the furniture reaches the Surplus Warehouse, additional information would be necessary to complete the tracking process. These additional data entry fields would allow DCAS to track material in the Surplus Warehouse as it is removed for reuse, sold at City auction for reuse, sold as scrap, or disposed.

City Agency staff would access the relinquishment tracking forms and use the form specific to the material or items they are relinquishing. Users would enter the information required for all fields on the form. DOS may want to consider designing a system that would automatically assign a system tracking number. Tracking numbers could contain an Agency designator that could be used as sort criteria to track waste prevention and cost savings at the Agency level.

Data from the completed relinquishment forms would be used in conjunction with spreadsheets designed to calculate the avoided waste disposal and replacement cost of a new furniture item. Exhibit 2 provides an example of the type of information that would be embedded in the spreadsheet program. For example, the weight of various furniture items would be programmed into the system. Once the user enters the item into the relinquishment form, the system would assign a weight to the item.

Using the example provided in the formats offered in the attached exhibits, the system would calculate the data and provide the following summary:

City Agency X (will be identified by the tracking nos. assigned to the relinquishment form)

Total Returns to DCAS Warehouse:

	1,555 lbs. (10 x 155 lbs. each)
	3,200 lbs. (40 x 80 lbs. each)
Total	**4,755 lbs. or 2.37 tons**

Total Direct Donations to MFA:

2 Desks	310 lbs. (2 x 155 lbs.) $550 (2 x $275)
10 Chairs	800 lbs. (10 x 80 lbs.) $4,500 (10 x $450)
Total	**1,110 lbs. or 0.55 tons**

Total Trash Relinquished:

5 Chairs	400 lbs. (5 x 80 lbs.)
Total	**400 lbs. or 0.20 tons**

Once items reach the Surplus Warehouse, the number of possibilities for redistribution increases to include removal by Mayoral Agencies or the Board of Education, sale through a City auction, sale as scrap and disposal. The data entry screen developed for the Surplus Warehouse to track final disposition may have additional fields. The other major system addition for the Surplus Warehouse entry screen is the ability of the system to track the replacement value of furniture removed for use by City Agencies and the Board of Education. Although DCAS

currently tracks the dollar value of items sold at auction, the system may be used to capture the sales at auction and as scrap. Pulling all of the information into one system may help to streamline the measurement and tracking process for DCAS and the City.

The system would track the following from the Surplus Warehouse:

1) Replacement value of items removed for reuse by Mayoral Agencies and the Board of Education. This value represents the avoided purchasing cost to the City. The weight of diverted material is captured in the data entered into the system by the relinquishing agency and calculates the weight of avoided disposal.

2) Price paid for furniture sold at auction and the weight of the furniture. This data represents revenue for the City. The weight of the items was captured in data entered into the system by the relinquishing agency and was calculated to record the weight of avoided disposal. The weight figure captured through this entry serves only to report on the weight of material sold through auction.

3) Price paid for furniture sold as scrap and the weight of the furniture. This data represents revenue for the City. The weight of the items was captured in data entered into the system by the relinquishing agency and calculated to record the weight of avoided disposal. The weight figure captured through this entry serves only to report on the weight of material sold as scrap.

4) Furniture deemed to be unusable and discarded as trash would need to be entered into the system. This step captures the furniture that was entered into the system and the weight was recorded as avoided disposal by the relinquishing agency and is now going to be discarded as trash.

The Surplus Warehouse would need to begin the process by conducting an initial warehouse inventory and inputting the existing inventory into the database system. This would ensure that the data compiled is more reliable, since the Warehouse currently has an extensive and valuable inventory.

The attached example forms do not include a screen format for entering items sold at auction or as scrap. DOS may want to review the existing forms and reporting structure to develop a proposed screen format based on existing reporting formats.

Exhibit

Department of Purchase XX-X-XX-Rev. X/2000	**RELINQUISHMENT**	Of supplies, obsolete or unrepairable equipment, material, or supplies, to the Department of Purchase, for sale, transfer, or other disposition	
Relinquishing Agency Name and Address of Main Office	Material Located at Address	Name and Telephone of Employee at Location	Internal Tracking No. Agency Relinq No. Electronically Assigned System Tracking No. 12345-XXXX
DESCRIPTION			Date of initial submittal: Date of approval by Agency Head: Date of approval by Dept. of Purchase:
Using the pull down menu, click on the appropriate furniture category for the item to be entered on each line. Under the category, select the proper item and double click. The item will be entered on the line. Indicate the quantity of each item. Click here to access pull down menu (BUTTON).			**Disposition**

Item	Quantity	DCAS	MFA	Trash	Relinq. No.
Ex. Desk Laminated Particleboard 42W x 30D x 28H	10	8	2		XX
Ex. Hardwood/Fabric Executive chair	45	30	10	5	YY

I certify above items are obsolete or beyond repair: (Enter Salvage Officer password) I certify above items are not required by this Agency: (Enter Salvage Officer password)	Approval by Agency Head In accordance with Section (XX) of the New York City Charter I surrender the items listed above and shall dispose of them as authorized by the Commissioner of the Department of Purchase. (Enter Agency Head Name/Password)	Electronic original of this document is on file with the Salvage Unit, Department of Purchase. Hold material until authorization for disposition of property is received from Dept. of Purchase. Dept. of Purchase (Enter Code)

Instructions: Enter all information. Provide complete description including; size, model, serial number, etc. Once form is complete, send to Department of Purchasing for approval by clicking on the Send button. You will receive notification of authorization of approval via on-line approval system. For assistance contact: XXX-XXXX. **Click here to SEND**

Example Pull-Down Screen for City Agencies

Clicking on BUTTON brings the user to a screen listing the furniture categories and options within each category. Clicking on the item will automatically add it to the next available line on the relinquishment form. Select the item description that most closely matches the item you are relinquishing. Remember to indicate the quantity of each item after you have selected the proper item.

Desks
- ☐ Laminated Particleboard 42W x 30D x 28H
- ☐ Laminated Particleboard Secretarial 60W x 30D x 28H
- ☐ Metal 45W x 30D x 29H
- ☐ Metal Double Pedestal 60W x 30D x 29H

Etc.

Seating
- ☐ Plastic/Fabric/Chrome Basic chair, no arms
- ☐ Plastic/Fabric/Chrome Basic chair with arms
- ☐ Hardwood/Fabric Executive chair

Etc.

Casegoods
- ☐ Wood bookcase with four shelves
- ☐ Metal bookcase with two shelves
- ☐ Metal lateral file cabinet, three drawer

Etc.

Programmed System Information Tracked Through City Agency System

The system will automatically calculate the weight of the items based on the average weight of the item. Information for this example is based on the Corcraft Products, Pricing and Specification Guide, effective June 1, 1998, NYS Department of Correctional Services, Division of Industries.

Desks	Average Weight
Laminated Particleboard 42W x 30D x 28H	155 lbs.
Laminated Particleboard Secretarial 60W x 30D x 28H	350 lbs.
Metal 45W x 30D x 29H	240 lbs.
Metal Double Pedestal 60W x 30D x 29H	350 lbs.

Etc.

Seating	Average Weight
Plastic/Fabric/Chrome Basic chair, no arms	30 lbs.
Plastic/Fabric/Chrome Basic chair with arms	30 lbs.
Hardwood/Fabric Executive chair	80 lbs.
Etc.	

Casegoods	Average Weight
Wood bookcase with four shelves	150 lbs.
Metal bookcase with two shelves	80 lbs.
Metal lateral file cabinet, three drawer	200 lbs.
Etc.	

The furniture items managed by the DCAS Surplus Warehouse can be tracked by entering the following data into the system:

FURNITURE REMOVED FOR REUSE AND REFURBISHMENT

For furniture claimed for re-use and refurbishment by other City Agencies and the Board of Education, DCAS staff can access the same pull-down menu accessed by all City Agencies and click on the items that are being removed. They can select the item that most closely matches the furniture piece(s) being removed. If DOS wishes, the name and location of the Agency or entity removing the furniture for reuse also can be entered into the system.

Pull-Down Menu for the Surplus Warehouse

Clicking on BUTTON brings the user to a screen listing the furniture categories and options within each category. Clicking on the item will automatically add it to the next available line on the reporting form. Select the item description that most closely matches the item that is being removed. Remember to indicate the quantity of each item after you have selected the proper item.

Desks
- ☐ Laminated Particleboard 42W x 30D x 28H
- ☐ Laminated Particleboard Secretarial 60W x 30D x 28H
- ☐ Metal 45W x 30D x 29H
- ☐ Metal Double Pedestal 60W x 30D x 29H

Etc.

Seating
- ☐ Plastic/Fabric/Chrome Basic chair, no arms
- ☐ Plastic/Fabric/Chrome Basic chair with arms
- ☐ Hardwood/Fabric Executive chair

Etc.

Casegoods
- ☐ Wood bookcase with four shelves
- ☐ Metal bookcase with two shelves
- ☐ Metal lateral file cabinet, three drawer

Etc.

Programmed System Information in the Surplus Warehouse Portion of the Tracking System

The system will automatically calculate the weight of the items based on the average weight and replacement cost of the item. Information for this example is based on the Corcraft Products, Pricing and Specification Guide, effective June 1, 1998, NYS Department of Correctional Services, Division of Industries.

Desks	Average Weight	Replacement Cost
Laminated Particleboard 42W x 30D x 28H	155 lbs.	$275
Laminated Particleboard Secretarial 60W x 30D x 28H	350 lbs.	$410
Metal 45W x 30D x 29H	240 lbs.	$270
Metal Double Pedestal 60W x 30D x 29H	350 lbs.	$350
Etc.		

Seating	Average Weight	Replacement Cost
Plastic/Fabric/Chrome Basic chair, no arms	30 lbs.	$125
Plastic/Fabric/Chrome Basic chair with arms	30 lbs.	$145
Hardwood/Fabric Executive chair	80 lbs.	$450
Etc.		

Casegoods	Average Weight	Replacement Cost
Wood bookcase with four shelves	150 lbs.	$700
Metal bookcase with two shelves	80 lbs.	$90
Metal lateral file cabinet, three drawer	200 lbs.	$260
Etc.		