



# OFFICE OF THE CITY AUDITOR

City and County of Honolulu  
State of Hawai'i



## Audit of the 2003-04 Mililani Curbside Recycling Pilot Project

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A Report to the  
Mayor  
and the  
City Council of  
Honolulu

Report No. 08-04  
November 2008

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# **Audit of the 2003-04 Mililani Curbside Recycling Pilot Project**

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Mayor  
and the  
City Council  
of Honolulu

Submitted by

**THE CITY AUDITOR**  
CITY AND COUNTY  
OF HONOLULU  
STATE OF HAWAII

Report No. 08-04  
November 2008



## Foreword

This is the report of the *Audit of the 2003-04 Mililani Curbside Recycling Pilot Project*. The city auditor initiated this audit pursuant to the authority of the Office of the City Auditor as provided in the Revised Charter of Honolulu. This audit was also conducted pursuant to Resolution 04-48, CD1, *Requesting a Financial and Performance Audit of the Mililani Curbside Recycling Pilot Project*, to determine if the pilot project was efficiently and effectively operated, cost effective, and successful in causing the recycling, not disposal, of most of the designated recyclable materials collected from residences served.

We wish to acknowledge the assistance and cooperation of the officials and staff of the Environmental Services Department, the Department of Budget and Fiscal Services, and others who we contacted during this audit.

Leslie I. Tanaka, CPA  
City Auditor



# EXECUTIVE SUMMARY

## ***Audit of the 2003-04 Mililani Curbside Recycling Pilot Project***

Report No. 08-04, November 2008

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This *Audit of the 2003-04 Mililani Curbside Recycling Pilot Project* was conducted pursuant to the authority of the Office of the City Auditor as provided in the Revised Charter of Honolulu, and was included in the City Auditor's Annual Work Plan for FY2007-08. This audit was also conducted pursuant to City Council Resolution 04-48, CD1, *Requesting a Financial and Performance Audit of the Mililani Curbside Recycling Pilot Project*, to determine if the pilot project was efficiently and effectively operated, cost effective, and successful in causing the recycling, not disposal, of most of the designated recyclable materials collected from residences served. This audit focused on reviewing the department's performance of curbside recycling operations during the 2003-04 Mililani curbside recycling pilot project, and the cost of the project.

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### **Background**

The 2003-04 Mililani curbside recycling pilot project was a curbside recycling collection project conducted by the city's Environmental Services Department over an initial four month period from November 2003 through February 2004. The project covered 11,000 single-family homes in Mililani, with city crews providing alternating weekly scheduled pickups of selected mixed recyclables and green waste. According to the department, the pilot project was intended to provide information on design elements, costs, and feasibility of integrating curbside collection of mixed recyclables and green waste with the city's residential refuse collection operations, with an ultimate goal of expanding the most workable curbside collection system island-wide.

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### **Summary of Findings**

1. Design flaws hampered the department's ability to fulfill the pilot project's operational goals.
2. Failure to isolate or separately identify costs for the recycling pilot project from other departmental operations prevented the determination of the project's cost benefit.

**Finding 1: Design Flaws Hampered the Department's Ability to Fulfill the Pilot Project's Operational Goals.**

- Project design contributed to implementation problems, which impacted the effectiveness and efficiency of the pilot project. For example, the pilot project permitted the use of existing gray refuse containers for storing both refuse and recycling for collection, rather than requiring all participants to use a separate container for recycling collections. This resulted in collection problems and contamination. In part, due to these problems, the department did not realize its project goals and objectives, particularly material recovery and contamination rates, to effectively demonstrate the operational feasibility of the curbside recycling collection system employed.
- Departmental control operations did not reduce contamination. The department developed control operations to enhance the effectiveness and efficiency of curbside recycling collection operations and to encourage household compliance with separation requirements. However, the control operations were ineffective in limiting the contamination of recycling materials collection during the project, due to insufficient staffing of control roles and non-targeted use of public education to correct problems observed during implementation.
- As designed, the pilot project did not answer substantive questions regarding conducting curbside recycling as a part of the city's solid waste management. The previous pilot project and study were inconclusive on whether the city should perform curbside recycling collection operations, due to their finding of substantial start-up costs and the negligible impact of removing recyclable materials using curbside collection versus other more cost-effective alternatives such as community drop-off recycling. This fundamental issue remained unaddressed by the 2003-04 Mililani pilot project because it was designed to evaluate the parameters of the system implemented, rather than address the substantive questions such as the operational and cost effectiveness of curbside recycling collection.

**Finding 2: Failure to Isolate or Separately Identify Costs for the Recycling Pilot Project from Other Departmental Operations Prevented the Determination of the Project's Cost Benefit.**

- Pilot project operations were supported by existing departmental operations and service contracts. This provided needed support

services and goods to support project activities, at limited apparent additional costs. However, this distorted the department's ability to assess the costs of the project because of their similarity to ongoing operations and services, and lack of differentiation in billings from contracted service providers.

- The department prematurely incurred costs for an island-wide curbside recycling collection. Contrary to the intent of conducting a pilot project, the department incurred costs during the project, such as those to extend curbside operations beyond the initial four month period and purchasing containers to support an island-wide system.
- The pilot project was not optimized for cost efficiency. Since the project was directed by the council's budget proviso, the department pieced together the supporting services to implement and support the project. As such, certain design elements were cost unfavorable, such as the *pay for processing* arrangements with processors that had no revenue offset provisions. Also, the project was not designed to assess the cost benefit of the operations, such as comparing the material recovery versus the cost to operate the collection system.

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## Recommendations and Response

The director of the Environmental Services Department should:

- a. conduct curbside recycling projects according to current ordinance requirements, including project design and reporting requirements, assessment of cost benefit, and implement best practices, as appropriate;
- b. set up pilot projects independently, with adequate funding and staffing so that current contracts or operations are not impaired;
- c. not use pilot projects as a vehicle for unfunded administrative priorities; and
- d. adhere to funding restrictions for use of pilot project funds, use of contract funds and operational funds, and seek council authorization, when appropriate.

In its response to our draft audit report, the Environmental Services Department characterized our report as having found nothing new or

different than the findings in their 2003 pilot evaluation report, and provided brief comments related to our findings. The department took issue with our point that the pilot project did not achieve goals and objectives because its design contributed to problems. They noted the *trial and discovery* value of conducting pilot projects, where problems with curbside recycling collection designs could be identified, and later contribute to the future improvement of programs. While we acknowledge the value of learning from the experience of a pilot project, we stand by our report that the department did not meet its planned goals and objectives because it did not meet its own planned outcome measures regarding material recovery, contamination rate, and reducing disposal. These issues were promoted by design problems found by our report, and prevented the attainment of planned goals and objectives.

The department responded to our comments regarding the limited available data and accounting available to review during the audit, indicating that it made its best efforts, given the time that had passed since its own project evaluation and the state of their records. We appreciate and acknowledge the cooperation of departmental staff in providing available information on the project, but stand by our assertions that certain aspects of the project were not reviewable due to the state of the records.

Lastly, the department asserts that due to the short term nature of the project, it used existing resources and contracts where possible to minimize costs. We stand by our finding that project costs were difficult to determine due to the use of existing resources and contracts, and therefore cannot agree with the assertion that this aspect of project management resulted in minimized costs. There were no substantive changes made to the report based on the department's response.

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# Chapter 1

## Introduction

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This audit was conducted pursuant to the authority of the Office of the City Auditor (OCA) as provided in the Revised Charter of Honolulu. The audit was also conducted pursuant to Resolution 04-48, CD1, *Requesting a Financial and Performance Audit of the Mililani Curbside Recycling Pilot Project*, which was adopted by the Honolulu City Council on March 24, 2004. It is included in the OCA's Proposed Annual Work Plan for FY2007-08, which was communicated to the mayor and the city council on June 1, 2007.

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## Background

On March 24, 2004, the city council passed Resolution 04-48, CD1, which requested a financial and performance audit of the Mililani curbside recycling pilot project by the city auditor. The council indicated its support of the administration's intent to establish an island-wide curbside recycling program, perceived the environmental benefits of such a program including conserving landfill space, and sought assurances that the pilot project would be well planned and transfer lessons learned to an island-wide program. The council sought an audit to determine if the pilot project was efficiently and effectively operated, cost-effective, and successful in causing the recycling, not disposal, of most of the designated recyclable materials collected from residences served.

### ***2003-04 Mililani Curbside Recycling Project***

The Mililani Curbside Recycling Pilot Project was a curbside recycling project conducted by the city's Environmental Services Department over an initial four-month period from November 2003 until February 2004. The project covered 11,000 single-family homes in Mililani, with city crews providing alternating weekly scheduled pickups of selected mixed recyclables (e.g., aluminum cans, glass bottles and jars, plastic bottles and jugs, newspaper, corrugated cardboard) and green waste. According to the department, the pilot project would provide information on design elements, costs and feasibility of integrating curbside collection of mixed recyclables and green waste into the city's residential refuse collection operations, and its goal was the island-wide expansion of the most workable curbside recycling collection system.

The department planned to incorporate curbside collection of mixed recyclables and green waste into its regular twice-a-week collection of

trash pickup, using existing automated refuse trucks to collect both refuse and recycling containers set out curbside by residents. During the pilot project, Mililani residents could elect to use their existing gray, 96-gallon refuse container for all three separate collections, or they could request a second green, 96-gallon container to be dedicated only to green waste and mixed recyclables. The department set a trash and recycling collection schedule for the pilot project by sections of Mililani: Central, Northeast, Southwest, and Upper Mililani Mauka.

There was an additional collection day added per week for recycling collection during the pilot project. The schedule for collecting recycling was once per week, with alternating collection of green waste and mixed recyclables every other week on the designated collection day. Regular trash pickup also continued on a twice per week basis, according to the following schedule.

**Exhibit 1.1  
Mililani Curbside Recycling Pilot Project  
Refuse and Recycling Collection Schedule  
November 2003 – February 2004**

<i>Pilot Project Areas Served</i>	<i>Refuse Collection</i>	<i>Recycling Collection*</i>
Northeast Mililani and Upper Mililani Mauka	Monday and Thursday	Wednesday
Central Mililani	Tuesday and Friday	Thursday
Southwest Mililani	Wednesday and Saturday	Friday

\* Note: On recycling collection days, green waste and mixed recyclables were collected on alternating weeks (every other week by material).

Source: Environmental Services Department; Office of the Mayor, 2003

The project was conducted in two phases to test recycling and refuse collection alternatives. During the first phase, city crews performed twice per week regular curbside trash collection. On the day after the

first trash pickup, they collected green waste or mixed recyclables, depending on the week. Halfway through the project, the department initiated a second phase, where participating households were asked to try once, rather than twice, per week trash collection. Participants were given the option to continue twice per week refuse collection, if they reported that they still required two pickups per week. Those requesting a second day of collection were provided with a second day garbage collection sticker to apply to their container, so that it would be collected when set out on the second refuse collection day.

During the pilot project, Environmental Services Department's Recycling Branch staff were tasked with conducting in-field monitoring, such as noting the number of containers per collection (i.e. setout rates) in the neighborhoods, inspecting containers prior to collection, and observing the unloading of materials by collection trucks at composting and recycling facilities. These staff operations were intended to ensure participant compliance with the program, and limit the contamination collected during the project.

In March 2004, at the end of the four-month pilot, the former administration provided a report to the city council, based on surveys of project participants and observed field results. The city administration deemed the pilot project successful, and announced curbside recycling would continue on a month-to-month basis, while they negotiated a labor agreement with the United Public Workers to establish an island-wide curbside recycling program. However, the city and the union could not reach an agreement and curbside recycling operations stopped in August 2004.

### **Project Contractors**

The department engaged four contractors during the Mililani Curbside Recycling Project to provide services, such as mixed recycling and green waste processing, public education consulting, and pilot project evaluation.

Island Recycling sorted and processed the mixed recyclables collected during the pilot project. Initially, the department had planned for mixed recyclables to be delivered to all interested, local, multi-material recycling facilities in rotation to allow for first hand experiences of handling and marketing the materials collected, and sought an exempt procurement of these required services. The city's purchasing division authorized the non-competitive purchase of recyclable materials processing services,

and three local permitted facilities were solicited to participate in the project. However, only Island Recycling accepted the city's solicitation to process the mixed recyclables collected from the 2003-04 Mililani curbside recycling pilot project.

Hawaiian Earth Products agreed to process the collected green waste from the pilot project under an existing three year mulching contract with several city departments. In the contract, Hawaiian Earth Products had agreed to accept and process green waste from current manual curbside collection and drop-off collection from the Leeward O'ahu area. During the pilot project, city refuse trucks delivered collected green waste to Hawaiian Earth Product's Leeward composting facility.

Hastings & Pleadwell (Hastings) worked with the department to develop community educational materials and website information under an existing consultant contract for public outreach services related to the department's wastewater programs. Its original contract was amended, so that Hastings could provide public outreach on solid waste issues, including the curbside recycling pilot project. Hastings subcontracted with SMS Research to develop and analyze phone and written surveys which evaluated public education and household participation during the pilot project.

Lastly, the department selected R. W. Beck to evaluate the results of the curbside recycling pilot project due to their extensive experience with curbside collection systems nationwide. R. W. Beck had developed knowledge of Honolulu's waste and recycling system through previous work for the city, including refuse operations cost studies and evaluating the feasibility of applying the San Francisco *Fantastic Three* recycling program as a model for Honolulu recycling. R. W. Beck was procured on a sole source basis, because the department determined that there were no local consultants with the required expertise in evaluating curbside collection issues.

### **Pilot Project Budget**

The city council budgeted \$340,000 in FY2003-04 for the department to conduct a curbside recycling pilot project. In March 2004, the department reported to the city council that it had spent \$249,475 on the four-month pilot project.

## **Background and organization**

The Environmental Services Department is charged with administering the collection and processing of recyclable materials, and was

responsible for conducting the 2003-04 Mililani Curbside Recycling Pilot Project. The project was administered for the department by its recycling coordinator, who established and implemented the curbside recycling pilot program.

### **Environmental Services Department**

The Environmental Services Department plans, directs, operates and administers the City's wastewater and solid waste programs. This includes operation and maintenance of the waste water collection, treatment and disposal system, the collection and disposal of solid waste, and management of the storm water program. The department's mission is to protect public health and the environment by providing effective and efficient management of these systems for the City and County of Honolulu.

The department indicated that the initiation of an island-wide residential curbside green waste and recyclable materials collection program was a major budget initiative for FY2004-05. It also sought approval for a residential solid waste collection fee to promote departmental self-sustainability and fund island-wide curbside recycling.

### **City recycling coordinator conducts city recycling pilot projects**

In 1989, the city council passed three ordinances to establish recycling operations within the city. One authorized the creation of a city recycling coordinator with staff who are all now within the Environmental Services Department. Another enabled the conduct of recycling pilot projects; and the last created a mandatory program of city government recycling. Section 9-1.9, Revised Ordinances of Honolulu (ROH), placed the functions of the city recycling coordinator within the department. The coordinator is enabled by ordinance to conduct and implement recycling demonstration and pilot projects, and is responsible for establishing and implementing recycling programs, education, and promotion of recycling by the city government. The department initiated three curbside recycling pilot projects since the enactment of the ordinance: the 1990-91 curbside recycling pilot project, which tested different collection systems, was implemented in Kailua and Kaneohe; a second pilot project was conducted in Mililani in 2003-04; and the most recent recycling pilot project in Hawai'i Kai and Mililani in 2007-08.

***Previous city recycling pilot project was inconclusive***

The department conducted a curbside recycling project under the recycling pilot project ordinance in 1990-91. This project had three elements, including Kailua and Kaneohe residential curbside recycling, and school community recycling drop off. This pilot project was subject to the requirements of Section 9-1.10, ROH. The required purposes of the project were to test the feasibility and cost-effectiveness of recycling, rather than disposing, certain materials introduced into the disposal system. During the project, the department was required to meet these requirements:

- select areas of the city where the pilot project shall be implemented;
- specify to the owners or occupants of residences and businesses within selected areas to separate specified recyclable refuse, which will be collected, from refuse or other recyclable refuse;
- collect the recyclable refuse under procedures separate from the procedures for collection of other refuse, noting that recyclable refuse may be collected at lesser intervals than for collection of other refuse;
- collect recyclable refuse at no charge;
- may transport the recyclable refuse to a designated disposal facility or other city facility for storage prior to sale or cause the recyclable refuse to be transported directly to the facility of a person engaged in the business of recycling or in the conversion of recyclable refuse to new products;
- sell the recyclable refuse to a person engaged in the business of recycling or conversion of recyclable refuse to new products, with revenues from the sale directed to the general fund;
- not dispose of the recyclable refuse by incineration or placement in a landfill except in an emergency situation or when no viable markets are available;
- may impose the fine, after at least two warnings, upon an owner or occupant who refuses or neglects to separate recyclable refuse in the manner established by the department;

- may contract with a private person to collect, store, sell or transport the recyclable refuse on behalf of the department; and
- if the department makes any authorized alteration or waiver, the department shall notify the city council at least 30 days prior to the effective date of the alteration or waiver.

There was also a reporting requirement at the end of the pilot project. The department was required to prepare and submit to the council a final report, including a recommendation on the future status of recycling. The report was required to evaluate:

- the difference in the cost of collection and disposing of recyclable refuse by incineration or placement in a landfill and the cost of collecting and recycling the recyclable refuse;
- the cost-benefit of recycling the recyclable materials compared to disposal;
- the degree of compliance by owners and occupants of residences with the recyclable refuse separation procedures;
- the efficiency and effectiveness of the mandatory and voluntary source separation of recyclable materials in removing recyclable refuse from solid waste;
- the amount of landfill space saved by recycling the recyclable refuse; and
- the impact on the H-power project of removing the recyclable refuse from the disposal system.

After the completion of the project, the department reported that the pilot project had significantly narrowed variables for implementation and showed the cost-effectiveness of commingled collection, but community drop off centers appeared to be the most cost-effective method to collect residential recycling. The report concluded that further testing was required, but project results generally pointed to a curbside recycling collection system which integrates monthly commingled collection into the existing refuse collection system, and residents should be provided with 96-gallon wheeled containers to set out recyclable materials for collection. The start-up cost of an island-wide curbside

recycling collection system was estimated to be between \$12 and \$15 million, with a significant start-up cost to purchase the 160,000 containers required.

Two collection methods were tested, commingled and curb-sort. In the commingled method, residents placed recyclables unsorted by materials into bags for collection. Whereas, in the curb-sort method, residents were provided with three bins for glass, plastic, newspaper and aluminum to sort their recycling prior to collection. At curb-sort collection, the materials were further sorted into six categories. The report found that commingled collection was more cost efficient than curb-sorted collection. Despite the revenue potential of curb-sorted material, the collection costs associated with curb-sorting were significantly higher than commingled collection, resulting in a higher overall net operating cost — \$463 per ton for curb-sorted versus \$265 per ton for commingled. It was further noted that many large cities (e.g., Los Angeles, Phoenix, San Diego, San Jose, etc.), where the goal is the highest recovery rate for the lowest cost, have implemented single-stream (commingled) curbside recycling collection systems, using fully or semi-automated collection systems. However, none of the collection methods tested during this pilot project were more cost-effective than the then-current refuse collection in disposal cost per ton.

The department estimated that island-wide residential curbside recycling collection would reduce the waste stream by no more than 3 percent. At the time, commercially generated waste was the largest contributor to the city's waste stream. As such, the report recommended that island-wide curbside recycling collection should be implemented only if it made economic sense, and that school and community drop off centers could provide sufficient collection service for residential communities. School and community drop off centers were reported as promisingly cost efficient, with recycling collection costs at the end of the project of \$136 per ton, compared to \$147 per ton for regular refuse collection at the time.

***1999 consultant studies support curbside green waste rather than recyclables collection***

In 1999 the department hired R.M. Towill to study six areas of the city's waste collection and diversion programs, including:

- a solid waste composition analysis;
- a study of managed competition in collection and transfer services;

- an evaluation of green waste collection, processing, and marketing;
- an evaluation of curbside recycling collection from single family dwellings;
- an evaluation of emerging waste management technologies; and
- an evaluation of market subsidies for recyclable materials.

These studies were intended to determine the composition of the solid waste stream for O‘ahu, evaluate various disposal and diversion alternatives for city refuse and recycling operations, and assess the methods and technologies for providing collection services.

At the time of the 1999 studies, the consultant indicated that it did not perceive the value of re-assessing curbside recycling collection, due to the results of the 1990-91 recycling pilot project and the recovery effectiveness of the city’s existing refuse and recycling collection systems. It noted that the previous recycling pilot project showed that curbside recycling was successful in terms of participation but not cost beneficial, while the city’s community recycling drop-off program was a well participated and effective alternative. However, the city still requested that the consultant examine curbside recycling as a part of the study.

In 1999, R.M. Towill completed the *Oahu Municipal Refuse Disposal Alternatives Study* for the department, which included the separate analysis of residential curbside recycling collection and collection of green waste. It concluded that the study results do not support a conclusion that curbside recycling of mixed recyclables should be implemented on O‘ahu, because of increased solid waste management costs, the effectiveness of existing recovery systems, and the insignificant impact on landfill use.

However, the report did endorse expansion of the city’s curbside green waste collection program on O‘ahu, on an increased basis to twice monthly using automated collection, despite higher collection costs. It found that green waste constituted a significant percentage of the overall solid waste stream, about 29 percent of the residential stream at the time. Despite increased operational costs, the city could offset these costs by using processed compost resulting from collections on its managed lands, adjusting tip fees with processors, and environmental benefits.

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## Objectives of the Audit

1. Review and assess the 2003-04 Mililani Curbside Recycling Pilot Project's operations, costs, and results.
2. Make recommendations as appropriate.

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## Scope and Methodology

This audit focused on the 2003-04 Mililani Curbside Recycling Pilot Project conducted by the Environmental Services Department from November 2003 through February 2004. Our review focused on the planning, the costs, and the results of the pilot project. We also reviewed the six month extension of curbside operations for costs and application of project results as lessons learned. The 2007-08 Hawai'i Kai and Mililani curbside pilot project is beyond the scope of this audit.

We reviewed project files held by the department and the Department of Budget and Fiscal Services to assess the efficiency and effectiveness of the city's recycling pilot project. We reviewed city ordinances, policies, procedures, rules, practices and other documentation to determine operational, monitoring, reporting, and evaluation requirements pertaining to the project. We note that the current recycling pilot project ordinance did not apply to the 2003-04 Mililani curbside recycling pilot project, but the original form of the ordinance provides worthwhile criteria for assessment of operational feasibility and cost benefit.

We also reviewed contract terms and agreements with project contractors for performance criteria, and departmental planning documents for goals, objectives, and management criteria. We assessed Environmental Services Department's efforts to implement and report on the pilot project in accordance with its own planning goals and objectives. We used spreadsheets to compile and analyze the data obtained. We also assessed the department's planning and the project management for its effectiveness in controlling the costs and promoting effective recycling results, in order to determine if planned goals and objectives were attained. In addition to document reviews, we interviewed pertinent departmental and consultant staff to obtain information on the pilot project.

The audit was conducted in accordance with generally accepted government auditing standards.

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# Chapter 2

## **The City's 2003-04 Mililani Curbside Recycling Pilot Project Did Not Meet Its Goals and Objectives, Due to Design Flaws and an Inability to Assess Project Costs**

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By 2005, approximately 9,000 municipalities nationwide had implemented a curbside recycling program. However, the City and County of Honolulu had not yet implemented an island-wide residential curbside recycling collection system because previous curbside recycling pilot operations and studies in Honolulu found that it was not cost beneficial. We found that the 2003-04 Mililani curbside recycling pilot project was not designed to answer the substantive questions about whether the city should conduct curbside recycling as a part of its solid waste management system, and also did not provide the information to facilitate that decision.

The city's 2003-04 Mililani curbside recycling pilot project was a by-product of the city's budgetary process. The former administration intended to implement an island-wide curbside recycling collection system in FY2003-04, but did not receive the approval of the city council. The city council instead authorized a curbside recycling pilot project to facilitate its decision making to fund an island-wide curbside recycling collection system for the following fiscal year.

With no applicable ordinance to guide its design and implementation, the Environmental Services Department designed and implemented the Mililani curbside recycling pilot project to meet its own goals and objectives, and included testing of the former administration's refuse collection initiatives. However, the pilot project did not meet them, due to design flaws and an inability to assess project costs. During the pilot project, certain project design elements contributed to implementation problems, such as contamination controls which were not completely effective because they could not be implemented as designed. As a result, the department did not realize its project goals and objectives, particularly in recovery and contamination rates, to demonstrate the effectiveness of curbside recycling operations during the pilot project. Moreover, it did not report the information necessary to facilitate decision making on an island-wide curbside recycling collection program.

The department also could not assess pilot project costs because project operations were not separate from ongoing departmental operations. This rendered the department unable to determine the costs of the Mililani curbside recycling pilot project or show the cost efficiency or effectiveness of the operation. We also found that the department incurred costs for an island-wide curbside recycling project while conducting the pilot project, which was incompatible with the intent of conducting a curbside recycling pilot project.

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## Summary of Findings

1. Design flaws hampered the department's ability to fulfill the pilot project's operational goals.
2. Failure to isolate or separately identify costs for the recycling pilot project from other departmental operations prevented the determination of the project's cost benefit.

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## Design Flaws Hampered the Department's Ability to Fulfill the Pilot Project's Operational Goals

Efficient design elements are vital to the success of a residential curbside recycling project. The Environmental Services Department designed the 2003-04 Mililani curbside recycling pilot to assess the viability of a curbside collection system for mixed recyclables and green waste from single-family homes in Honolulu. To support the design, it created control operations to enhance the efficiency and effectiveness of the curbside recycling operations implemented, reduce the contamination of recyclables collected, and to encourage participants to comply with separation requirements.

However, during the pilot project, certain project design elements contributed to problems with implementation and control operations. As a result, contamination rates were substantial and showed little improvement over the project, which led to increased processing costs and need for disposal. The department also did not realize its project goals and objectives, or demonstrate the viability of the curbside collection system employed.

### *Project design contributed to implementation problems*

The design of the 2003-04 Mililani curbside recycling pilot project contributed to implementation problems, which impacted the effectiveness and efficiency of the project. For example, the pilot project allowed the use of existing gray automated collection containers, used for

refuse collection, to also be used for recycling collection, rather than requiring that all participants use a separate green container for the collection of recyclable materials. This resulted in collection problems and contamination. Also stemming from the use of those containers, the close placement of recycling collection days to refuse collection days resulted in higher contamination overall. In part, due to these problems, the department did not realize its project goals and objectives, particularly recovery and contamination rates, to effectively demonstrate the operational feasibility of the curbside recycling collection system employed.

### **Curbside recycling process for pilot project**

Based on the results of the 1990-91 recycling pilot project and evaluation of other jurisdiction's best practices, the department designed and implemented a single stream, commingled collection system, where mixed recyclables or green waste would be placed in a container for automated pickup on the scheduled collection day. The stated benefits of the design were compatibility with the existing system of automated refuse collection; higher participation and recovery rates observed in communities employing the method; reduced collection costs when compared to the previous 1990-91 pilot project's curb-sorting experience; and decreased litter.

Mixed recyclables such as newspaper, cardboard, glass, plastic, and aluminum, and green waste were collected from the participating households in Mililani on an alternating weekly basis, on the day after the first trash pickup of the week. Participating households were to separate mixed recyclables and green waste from their refuse, bag them if necessary, then place them in the containers for collection. On collection days, households were to leave their containers curbside prior to 6:00 a.m. for pickup.

On recycling collection days, the department had staff from their Recycling Branch meet at the base yard in Wahiawa by 5:30 a.m. The staff would form two teams, with each team going by van to two collection routes, 30 minutes prior to the automated collection trucks arriving. The teams would inspect containers set out for collection for unacceptable items and contamination. Upon finding these conditions, the teams would move the containers off the curb, leave a correction tag indicating the error, and the container would not be collected. Additionally, for containers with 25 percent or more contamination, a letter would be sent to the resident to indicate the contamination observed and advise them of the separation for recycling collection.

### Exhibit 2.1 Automated Collection of Recycling Container



*An automated collection truck collects a recycling container.*

Source: Environmental Services Department

On mixed recyclable collection days, the trucks took their loads to Island Recycling. At the facility, the trucks were initially weighed with their loads. The trucks would then dump their loads, and be weighed empty. The net weight of each load was charged to the city for processing. A departmental staff member was assigned to observe the dumping and sorting, and provide an estimate of contamination. This information was collected so that follow-up inspection could occur on routes with substantial contamination to reduce contamination and improve compliance with separation requirements.

On green waste collection days, the trucks delivered their loads to the Hawaiian Earth Products Leeward yard. The same weighing process was employed as for recyclables, with the net weight of each load charged to the city for processing. Similarly, an observation process was employed to inspect unloading operations and identify routes with substantial green waste contamination.

#### **Use of the gray refuse containers for recycling materials resulted in collection problems and contamination**

The department permitted the use of existing gray refuse containers for setting out mixed recyclable items and green waste for recycling

collection during the pilot project. It did not mandate the use of a separate container for refuse and recyclable materials collection during the project. The dual use of gray refuse containers created a requirement that recyclable materials be bagged to prevent contamination by refuse, which created inspection problems because bags were not opened prior to processing.

Prior to the project, the department offered participating households the option to request a green container for recycling which would be rotated between storing mixed recyclables and green waste for collection, and limit the use of their existing gray container to refuse collection only. Approximately 80 percent of participants requested a green container for recycling collection. The department indicated that this design element of rotating one container only for all collections was intended to explore whether separate containers were required, since the purchase of additional containers was expensive and residents were concerned about storing multiple large containers.

### **Exhibit 2.2 Automated Collection Containers**



*At left, the gray refuse container used for both refuse collection, and bagged recyclables and green waste collection. At right, green recycling container used for recyclables and green waste, with gray refuse container for refuse collection only.*

Source: Environmental Services Department

The recycling teams used visual inspection of containers prior to automated pickup to prevent the collection of contaminated loads, and provide an opportunity to correct households with citation tags or letters. The teams also collected data on the number and color of containers set out on a given collection day. During our fieldwork, we found that there were only two months of inspection data collection forms available for our review, covering November and December 2003. The following exhibits show the contamination estimates of green and gray containers for both months. From this limited data set, contamination of recyclables increased over the prior month for both colors of containers, but comparatively, green containers were less contaminated on average.

**Exhibit 2.3  
Mixed Recyclable Collection, Contamination of Green and Gray Containers**

<i>Month</i>	<i>Green Containers Collected</i>	<i>Green Containers Contaminated</i>	<i>Percent Contaminated</i>	<i>Gray Containers Collected</i>	<i>Gray Containers Contaminated</i>	<i>Percent Contaminated</i>
November	1256	47	3.74%	386	43	11.14%
December	1209	64	5.29%	250	89	35.60%
Total	2465	111	4.50%	636	132	20.75%

Source: Environmental Services Department

**Exhibit 2.4  
Green Waste Collection, Contamination of Green and Gray Containers**

<i>Month</i>	<i>Green Containers Collected</i>	<i>Green Containers Contaminated</i>	<i>Percent Contaminated</i>	<i>Gray Containers Collected</i>	<i>Gray Containers Contaminated</i>	<i>Percent Contaminated</i>
November	1016	52	5.12%	333	58	17.42%
December	1265	145	11.46%	339	70	20.65%
Total	2281	197	8.64%	672	128	19.05%

Source: Environmental Services Department

The pilot project evaluation report acknowledged the contamination problem of using existing gray containers for both refuse and recycling collection during the pilot project. It found that green containers

appeared substantially less contaminated during field inspections, 10 percent for green waste and 7 percent for mixed recyclables, compared to an average of 30 percent for both materials in gray containers. On the other hand, the contamination of recyclables in gray containers decreased over the project's duration, while contamination of recyclables in green containers increased. Overall, materials collected from gray containers had a 20 percent higher contamination rate compared to green containers. From these results, the report concluded that alternating the same container, whether gray or green, for recyclables and green waste makes it difficult to keep residents from cross-contaminating materials.

An unforeseen contamination issue resulted from the requirement of having gray container users bag their recyclable materials. Anticipating a contamination problem with storing recyclable materials in the gray refuse containers, the department required the bagging of recyclable materials prior to storage in these containers. Departmental project supervisors and its consultant concluded that this was a major cause of contamination because bagged materials could not be visually inspected prior to collection, and would only be observable at the time of processing. We further note that refuse collection rules also require that refuse be bagged prior to placement for collection in gray containers, so there was some probability that participant error could also result in contamination of recycling collections.

However, this relationship could not be independently reviewed or verified using the data available to us. We found that this caused the project evaluation report and recycling staff to indicate that accurate field inspections are prevented by bagging, with the contamination often being the wrong item for the scheduled day, and that the practice of bagging materials for collection should be prohibited if the project is implemented island-wide.

### **Close placement of recycling collection days to refuse collection days resulted in occasional high contamination**

The close placement of recycling collection days to refuse collection days resulted in occasional high contamination. During the project, recycling collection days were scheduled on the day after the first refuse pickup of the week. The department's evaluation report indicated that there was a significant contamination problem with the gray containers collected during the ninth week of the project, which followed the Christmas and New Year holidays. These holidays are refuse worker holidays, and there are no collections of refuse or recycling. The department attributed

the contamination problem to participant confusion, indicating that participants set out their refuse on these holidays expecting pickup, then left their gray containers curbside expecting a make up collection rather than recycling collection. Refuse collection days that are skipped due to holidays are not collected on the following day, so these gray bins containing refuse were instead collected as recycling.

Departmental staff also described the difficulty of inspecting on days following the first refuse pickup of the week, since bags precluded inspection and gray refuse containers could be used to set out recyclables. One recommended that setting recycling days more than a day apart from refuse collection or providing separate containers could have prevented this situation. The pilot project report similarly noted that additional containers for recycling items could resolve these issues. The department also noted that there were not enough staff to inspect all the routes on collection days, which prevented identification of gray containers with refuse in them rather than recyclables.

### **Project goals and objectives were not realized**

The 2003-04 Mililani curbside recycling pilot project did not realize its project goals and objectives, and could not demonstrate the viability of the curbside collection system employed. The department expected to collect 80 percent of the total generation of recyclables and green waste from participating households. The department's consultant evaluated the project's impact on recycling; participation/setout rates and container preference; composition and contamination levels; customer satisfaction; and willingness to reduce the frequency of refuse collection.

The consultant reported that 68 percent of eligible households participated during the project, with a container set out rate per collection of between 30 and 40 percent. The city recycling coordinator indicated that participation is considered a key element to evaluate the viability of a curbside recycling system. However, there was no effort to connect participation with the results of the projects; in particular, how project participation relates to recovery rate of the project.

Recovery rate is the estimated percentage of the total generation of mixed recyclables or green waste captured by a collection system. Total generation is derived from the department's solid waste statistics. The analysis of the previous 1990-91 pilot project, involving Kailua and Kaneohe, emphasized that participation measured in the context of recovery rate is a more accurate measure than set out rates. The 2003-04 Mililani curbside recycling pilot project assumed an 80 percent

recovery rate for all mixed recyclables and green waste generated by the households involved, or a total of 1,065 tons of mixed recyclables and 1,778 tons of green waste. However, the pilot project collected only 319.66 tons of mixed recyclables. Also, we were only able to verify 423.45 tons of green waste collected from records available, but ENV self-reported collecting 501.48 tons during the project. This was less than 25 percent recovery of the estimated total generation of green waste and 50 percent of mixed recyclables collected, both below the lowest level estimates expected for the number of households involved.

In addition to the low recovery rate, the department's analysis of pilot project participation prompted the conclusion that the project did not influence many non-recycling families to start recycling. While 68 percent of eligible households participated in the project, nearly all reported that they were already recycling prior to the pilot project, using the community drop-off and school recycling bins. Although there was a modest participation gain due to convenience, the report admits that these participants would have still recycled through other school and drop-off recycling bins in the absence of curbside recycling.

With respect to contamination rate, the pilot project did not meet contract performance criteria for contamination or fall in the range of contamination rates experienced by similar jurisdictions, cited as examples for switching to single stream processing. By scope of work and contract, the department agreed to provide loads of mixed recyclables and green waste within specified contamination rates or face additional processing fees. The project experienced an overall contamination rate of 25.5 percent for mixed recyclables, and 27 percent for green waste, exceeding the contracted maximum of 15 percent for mixed recyclables and 3 percent for green waste.

One of the reasons the department selected the commingled, single stream collection method for the Mililani curbside recycling pilot project, rather than a curb sort method, was that jurisdictions which converted to single stream collection, experienced contamination rates in the range of 1-2 percent to 19 percent. The evaluation consultant, R. W. Beck, conceded that communities that convert to single-stream recycling initially experience somewhat increased contamination rates. However, when the increase of recyclables diverted from disposal is considered, most communities achieve a net increase in the quantity of recyclables recovered. The 2003-04 Mililani pilot project did not generate the estimated diversion quantities of an 80 percent recovery rate, so the

assumption of increased net recyclables was not met due to the lack of volume of recyclables collected, as compared to planning estimates.

***Departmental control operations did not reduce contamination***

The department's control operations were ineffective in limiting the contamination of recycling materials collected during the pilot project. The control operations were used to enhance the efficiency and effectiveness of the curbside recycling operations and to encourage household compliance with separation requirements. However, designed control operations were ineffective in limiting contamination due to insufficient staffing levels and the use of public education during the project.

**Department set up control operations to reduce contamination of recycling collected**

To support the effectiveness of pilot project collections, the department created control operations, such as inspection, observation, and public education: to enhance the efficiency and effectiveness of the curbside recycling operations implemented; to limit the contamination of recycling collected; and to encourage compliance with separation requirements during the pilot project.

Inspection of recycling containers prior to their pickup by collection trucks was employed to prevent the collection of contaminated loads, and provide an opportunity to correct incorrect participation with citation tags or letters. Observation of recycling loads at processing facilities was used to assess contamination of specific loads, and link them back to source routes for follow-up inspections. Public education was utilized to ensure correct materials separation during the project and limit contamination of materials collected, by communicating basic information about the pilot project (i.e. collection days, separation requirements, etc.) via direct mail flyers, community newsletters, and newspaper articles.

**Staffing levels prevented effective inspection and observation**

Insufficient staffing of control roles may have prevented the effective implementation of the inspection and observation controls during the project. Departmental staff were unable to perform inspection and correction of all routes prior to automated collection by the trucks, due to lack of coverage of all collected routes. Also, staff did not always attend unloading and observation of processing of materials collected.

These factors may have rendered the inspection and observation process partially ineffective to consistently reduce contamination.

During the project, inspection of containers by recycling teams prior to collection was intended to prevent the collection of contaminated recycling loads, and provide an opportunity to address incorrect participation. On a given recycling collection day, automated collection would occur on six routes. However, departmental staff were only able to perform inspection and correct four of the six routes prior to automated collection by the trucks, due to lack of staffing to cover all collected routes. The inability to tag and set off all offending containers may have additionally contributed to the contamination observed, and limited the effectiveness of the inspection control during the pilot project.

After collection, a staff member went to the recycling facility or green waste site, observed the unloading of materials, and reported on a visual estimate of load contamination. The collection route of a contaminated load could then be identified, and further inspection or corrective action could be taken. However, the mixed recyclables processor reported in January 2004, that the departmental observer had not attended unloading and observation for several weeks, which calls the observations during the early portion of the project into question. We also noted that observers did not always report route or vehicle information on their observation forms, so the control's effectiveness as feedback on routes with contamination problems was diminished without this basic information. We believe these factors limited the effectiveness of the observation process to reduce contamination.

### **Public education was conducted primarily to inform of project, not correct implementation issues**

Public education as a control was ineffective because it was not used actively to improve pilot project effectiveness or enhance correct participation. Educational materials were geared primarily toward announcements about the project. During the project, mass mailings and articles for public education were not used as a control to correct user participation issues observed during inspection or observation.

Prior to the start of the project, households in the pilot area were sent a direct mail flyer informing them of the duration of the project, use of containers, collection schedule based on location in Mililani Town, and the appropriate materials to separate for recycling. Around the midpoint of the project, the department informed participants that refuse collection would be reduced to once per week, but also of the option to continue

with twice a week refuse collection upon request. At the end of the project, the department mailed short questionnaire surveys to assess household participation and satisfaction.

The Environmental Protection Agency suggests that one of the key elements in designing and implementing a municipal recycling project is to regularly communicate with participants, and modify the project to address observed issues. During the pilot project, the department utilized the education consultant to help produce informational materials for release at defined points during the project and develop content for the department's website. They were not used to advise strategic communications in response to results observed during the project.

Furthermore, the department did not use public education as an active control to correct problems observed during the project. The recycling coordinator indicated that to mass mail a correction message would not be timely enough to address immediate contamination problems, and the project's system of correction by inspection was appropriate. However, as discussed earlier, there were problems with inspection and corrective notice coverage during the project, which left two routes uninspected each recycling collection day. The department also did not use public education to communicate about or address user participation issues observed during implementation.

### **Contamination rates of recycling collected were substantial and showed little improvement over the project**

At the beginning of the pilot project, the department anticipated a certain amount of refuse to contaminate the recyclables collected, which would improve as the project progressed. However, contamination rates of recycling collected were substantial and showed little improvement over the project. During the project, the contamination rate of mixed recyclables averaged 25.5 percent, while the average contamination rate for green waste was 27 percent. The trend for the monthly contamination rate of mixed recyclables increased for the first three months of the pilot project. The following exhibit shows the contamination of mixed recyclables collected during the pilot project period.

**Exhibit 2.5**

**Monthly Mililani Curbside Recycling Pilot Project Mixed Recyclables Contamination**

	<i>November 2003 (in pounds)</i>	<i>December 2003 (in pounds)</i>	<i>January 2004 (in pounds)</i>	<i>February 2004 (in pounds)</i>	<i>Total Weight (in pounds)</i>
Total Mixed Recyclable Collection	202,660	188,320	263,214	204,237	858,431
Contamination	26,893	30,960	109,686	51,575	219,114
Percent Contamination	13.3%	16.4%	41.7%	25.3%	25.5%

Source: Environmental Services Department

The department managed to keep contamination of mixed recyclables under the 15 percent contamination rate for the first month of the project. However, over the next two months, the contamination rate showed a trend of increasing each month, before declining in February 2004 yet still exceeding the contracted contamination rate.

There were no records available from the department to document the monthly load contamination for green waste collection. The pilot project evaluation report indicated that the average contamination rate of green waste during the project was 27 percent, substantially exceeding the contracted rate for green waste delivered which was 3 percent.

The amount of contaminated materials collected during mixed recyclables collection during the pilot project was 219,114 pounds, or 25.5 percent of the mixed recyclables collected. The project evaluation report indicated an average of 27 percent contamination of green waste collected. However, the amount of contamination of green waste reported by the department could not be verified due to lack of records from the post-collection processor regarding load contamination. Using this percentage to generate an estimate of contamination, the amount of contaminated materials collected during green waste collection was approximately 270,799 pounds. These contamination amounts are significant because contaminated material is refuse that requires disposal or incineration.

The department indicated that contamination is unrecyclable and must be disposed as refuse or incinerated at H-Power. The scope of work for the mixed recyclables processor, Island Recycling, permitted the

disposal of unrecyclable materials from the pilot project at no charge to the processor at the Keehi Transfer station. The mixed recyclables processor reported the disposal of 158,940 pounds using this method. However, 219,114 pounds of contamination was reported by Island Recycling, which is an additional 60,174 pounds of contamination that also required disposal, but there were no records to establish its disposal.

The contract with the green waste processor, Hawaiian Earth Products, had no provision allowing the disposal of unrecyclable materials from the pilot project, because the contract existed prior to the project and had its own disposal terms for excess contamination. When a green waste load is more than 3 percent contaminated, the terms of the existing contract permitted either the processor to charge up to the cost per ton (\$50/ton) for sorting or disposal costs, or the city could sort and dispose of the contamination itself. In this case, an estimated 270,799 pounds of contaminated material required disposal.

The department indicated that there was no disposal of specified recyclable materials. However, the significant amount of contamination requiring disposal, over 25 percent of all material collected or an estimated 245 tons, caused by the inefficiency or ineffectiveness of controls goes against the intent of collecting the materials so that they may be diverted from disposal or incineration to preserve landfill or incineration capacity. Not only did the contamination increase the disposal required, it increased the processing costs of recycling collected.

### **Contamination increased processing costs of recycling collected**

During the pilot project, the city's agreements with both recycling material processors were based on a set price per ton of materials delivered. The greater the amount of contaminated material contained in a given load at the materials processing facility, the higher the processing cost per load, since contamination would increase the weight of the load. This gave some incentive to the department to reduce contamination using its system of controls because the weight of contamination in a load of materials would add to the cost of processing.

Both the mixed recycling scope of work and green waste processing contract had acceptable loads provisions, which provided limits of contamination of 15 percent for mixed recyclables and 3 percent for green waste, respectively. Using the pilot project controls, staying within these tolerances could have been a cost control purpose for the pilot

project. However, due to ineffective controls, green waste loads were contaminated at an average rate of 27 percent, resulting in approximately 135 tons of contamination being charged at \$50 per ton, adding to collection costs. Additionally, mixed recyclables loads were contaminated at an overall rate of 25.5 percent, resulting in approximately 110 tons of contamination being charged at \$55 per ton, also adding to collection costs.

Although we discovered that inspection and observation were partly ineffective and increased project costs, we also found that the pilot project was not designed to gather data or report on the substantive questions regarding incorporating curbside recycling operations as a part of the city's solid waste management system. Previous studies and pilot project experience indicated concern that residential curbside recycling was not the most cost-effective method to collect residential recyclable materials.

***As designed, the project does not answer substantive questions regarding conducting curbside recycling operations as a part of the city's solid waste management***

The department placed emphasis on testing the former administration's refuse initiatives during the pilot project. These initiatives had failed to gain the approval of the city council during the budget process. Instead, the pilot project appeared instead to implement the former administration's vision of a curbside collection system, rather than assessing the viability of a curbside recycling collection operation. The fundamental question of whether the city should perform curbside recycling collection was raised by the previous 1990-91 pilot project and 1999 consultant studies, as both found that the start-up costs and negligible impact of removing recyclables from the city's waste stream operation were not economical in light of other more cost-effective alternatives. These questions remained unanswered by the 2003-04 Mililani pilot project because it was designed to evaluate the parameters of the curbside collection system implemented, rather than substantive questions about the city conducting such an operation.

### **Previous studies and pilot project were not supportive of the city conducting regular curbside recycling operations**

The 1991 curbside recycling pilot project report and 1999 curbside recycling study were not supportive of the city conducting regular curbside recycling operations. They both cited the issue of economy, or cost-effectiveness, of the city conducting such an operation because costs exceeded the benefits. In terms of recovery, space in the city's landfill is a notable concern, but as evaluated curbside recycling would not divert enough materials when compared to the operational costs of

this type of collection. Moreover, there were more cost-effective measures to collect these items already in place, specifically community drop off centers and ongoing green waste collection.

The evaluation of the previous pilot project in Kailua and Kaneohe of 1990-91 found the city would incur substantial start-up costs to establish and operate a curbside recycling collection system, which should be considered versus its impact on reducing the waste stream. The department estimated that island-wide curbside recycling collection would reduce the waste stream by no more than 3 percent, and it would not be the most productive option in reducing the overall solid waste stream, especially when compared to the significant volume of commercial waste generation on O'ahu.

Alternatively, it found that schools and community drop off centers could provide sufficient recycling collection service for residential communities. School and community drop off centers were indicated as promisingly cost efficient, with costs after the conclusion of the 1990 program at \$136 per ton, which were less than the \$147 per ton for refuse collection. Therefore, the report concluded that curbside collection should be implemented only if it made economic sense.

Similarly, in 1999, the department contracted a consultant to evaluate the viability of curbside recycling collection of mixed recyclables and green waste. The consultant's report did not support the implementation of curbside recycling of mixed recyclables on O'ahu, because of increased solid waste management costs, the cost-effectiveness of existing school and community recovery systems, and the insignificant impact on reducing landfill disposal. However, the report did endorse expansion of the city's curbside green waste collection program.

Thus, there was no decisive support for the city conducting curbside recycling collection coming from the previous pilot project or the 1999 studies. Instead, there was still a need for the demonstration of the feasibility and cost-effectiveness of a curbside recycling collection system. However, the 2003-04 Mililani pilot project was designed to test the feasibility of certain parameters of the eventual implementation of curbside recycling, rather than show that a curbside recycling collection system now made operational and economic sense.

### **Recycling pilot project ordinance did not apply to this project**

The recycling pilot project ordinance at Section 9-1.10, ROH, which provided guidelines for establishment, implementation, and reporting on a

recycling pilot project did not apply to this project. Ordinance 89-115 contemplated a single, one year pilot project that was to be implemented and reported on by the end of FY1990-91. The substance of the ordinance's objectives for conducting a recycling pilot project was to assess operational feasibility, cost-effectiveness, user effectiveness, program efficiency and effectiveness, and context within the city's solid waste management system. These requirements existed to facilitate decision making on the future of recycling by the city council. The 1990-91 pilot project, which consisted of Kailua and Kaneohe residential curbside recycling and community drop-off recycling at schools, was subject to the requirements of the ordinance. Therefore, the department was not technically required to follow the section when designing, implementing, or reporting on the 2003-04 Mililani curbside recycling pilot project.

Since the assessment of the operational and cost viability of a curbside recycling program had yet to be determined from the previous pilot project and consultant studies, we inquired whether the department consulted the pertinent criteria in the ordinance for the 2003-04 Mililani curbside recycling pilot project to answer these substantive questions related to cost-effectiveness of the city operating a curbside recycling collection operation as part of its solid waste management system. The department indicated that the recycling pilot project section of the ordinance was not consulted to guide its activities in designing, implementing, or reporting, and further commented that the section did not apply.

Departmental staff further indicated this pilot project was an unwanted by-product of the budget process, where the former administration planned to implement an island-wide curbside recycling program among other refuse collection initiatives, but the council instead approved money for a curbside pilot project and required an island-wide curbside program in the following fiscal year. So, the department implemented the former administration's planned curbside collection program to fit the smaller scale of the pilot project, and also used the project as a vehicle to test the former administration's refuse collection initiatives which failed to meet council's approval.

### **Department tested unrelated refuse collection initiatives of the former administration via the pilot project**

In its FY2003-04 budget, the former administration proposed a fiscal sustainability plan for the Environmental Services Department. One of its goals was to advance departmental self-sustainability via the initiation of

a solid waste residential collection fee to partly fund the implementation of an island-wide automated green waste and curbside recycling collection program.

The former administration introduced Bill 17 (2003), in support of its budgetary initiatives to authorize city collection of green waste and designated recyclable materials; to increase the unit charge at disposal facilities; and to establish a user fee for twice-a-week refuse collection. The operative refuse initiatives in the bill were to:

- provide once-per-week refuse collection, but permit a household to choose a second refuse collection during a week for a charge; and
- impose mandatory separation and collection of recyclable materials and green waste.

In 2003, the refuse collection system picked up refuse twice-per-week from single family households. The former administration proposed substitution of one of the refuse collection days with an alternating weekly green waste or recycling collection day. According to the proposal, residents who desired the continuation of twice-per-week refuse collection had to pay \$8 per month. The city council did not approve either refuse initiative. However, it approved a proviso of \$340,000 so that the department could conduct a recycling pilot project, with the directive that an island-wide curbside recycling program should be in place by the beginning of FY2004-05.

The following exhibit compares the refuse and recycling collection schedule proposed by the former administration, with the one employed by the pilot project:

**Exhibit 2.6  
Comparison of Refuse and Recycling Collection Systems**

<b>Collection System</b>	<b>Refuse Collection</b>	<b>Recycling Collection</b>
Mayor's Proposal	<p><b>Preferred system</b> Reduce regular trash collection to once per week.</p> <p><b>Variance permitted</b> Upon request, twice per week trash collection continued for a monthly fee.</p>	<p>Once per week.</p> <p>Separated green waste and mixed recyclables collected on alternate weeks.</p>
Mililani Pilot Project	<p><b>Preferred system</b> During 2<sup>nd</sup> phase of the project, reduce regular trash collection to once per week (to allow for adjustment period to separation requirements).</p> <p><b>Variance permitted</b> Upon request, twice per week trash collection continued using a designated sticker.</p>	<p>Same as mayor's proposal.</p>

Source: Environmental Services Department; Office of the Mayor, 2003

In its design of the Mililani curbside recycling pilot project, the department's schedule mirrored the one proposed by the former administration. The second phase of the project asked participants to reduce their refuse collection to once per week, similar to the previous budgetary proposal of the former administration. Also, in the evaluation of the project, participants were surveyed on the selected implementation and the issues of their willingness to reduce refuse collection or pay for an additional refuse collection, similar to the former administration's unapproved proposals.

**Pilot project evaluation assessed public response to former administration's collection initiatives**

The evaluation of the pilot project assessed participant responses to the former administration's collection initiatives and did not appear to assess the substantive issues of operational feasibility or cost-effectiveness. Instead, evaluation centered on the former administration's preferred

implementation, participation and satisfaction with the refuse and recycling collection implemented, and willingness to reduce refuse collection to once per week/willingness to pay a fee for a second day of trash pick up.

For example, prior to the pilot project, surveyors identified the key question in their pre-survey as:

*Suppose the City provided a weekly curbside recycling program, with green waste collected one week and recyclable containers/paper collected the following week, would you be willing to reduce the frequency of your garbage collection to once a week?*

In this case, prior to the project, the survey solicited public reaction to the preferred implementation of the former administration. Throughout the project, the survey evaluated other questions related to the former administration's initiatives such as:

- *Are you willing to reduce the frequency of your garbage collection to once a week?*
- *If keeping the second day of garbage pick up meant paying a fee, would you prefer to keep the second day and pay the fee, or reduce pick up to once a week?*
- *If trash pick up occurred only once a week, but you could use two containers to set out your trash, would that work for your household?*

These questions have no obvious relationship to curbside recycling collection, and instead are an assessment of household preferences of refuse collection or paying for refuse collection, both of which reflect the fiscal sustainability and operational initiatives that were not approved by council in FY2003-04 budgeting. Moreover, there were no evaluation of the underlying assumption that a second refuse collection day becomes unnecessary due to the reduction of refuse quantity created by separating the appropriate recyclable materials for recycling collection. Querying on this assumption would constitute a good faith attempt to assess the apparent *whys* for reducing refuse collection or charging for additional refuse collection. Instead, there were no post-project questions asking participants whether a second refuse collection

day became unnecessary due to their experiences with separating recyclables from trash.

Instead, participants were asked about the suitability of the implementation. Several questions on the size of containers for recycling collection, need for additional containers, and whether one would pay for extra containers, were asked of participants. These questions appear premature to the intent of a pilot project, and more suitable to assessing reactions to a preferred implementation. The purpose of a recycling pilot project is to assess whether the department should even be conducting such an operation, and these kinds of questions are secondary to an assessment of viability. These questions are assessing participant reaction towards reducing refuse collection and willingness to pay for an extra collection. In this respect, the pilot project was more the product of implementation creep and polling residents, rather than to provide information to facilitate the city council's decision making on an island-wide curbside recycling collection system.

The pilot project's evaluation also did not answer substantive questions regarding the city operating a curbside recycling collection system as a part of its solid waste management system. Instead, the pilot project evaluation reported on implemented variables such as impact on recycling; participation/set out rates and container preference; composition and contamination levels; customer satisfaction; and, willingness to reduce the frequency of refuse collection. As such, the city council did not receive information to facilitate its decision making on funding an island-wide curbside recycling collection program.

Apart from its testing the former administration's refuse collection initiatives, the department focused on the design and reporting on variables geared towards assessing participation and satisfaction rather than issues such as: operational cost differences; cost benefit of the operation; landfill or H-Power impact. Thus, the department derived information that was more appropriate for its own decision making about implementation, rather than to facilitate external decision making. For example, there is evaluation of the container-related implementation issues, such as the appropriate size of a container, the appropriate fee to charge for a container, and whether there should be a single or multiple containers. These issues are appropriate for a planned implementation, rather than to assess whether curbside recycling collection operations are appropriate.

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**Failure to Isolate or Separately Identify Costs for the Recycling Pilot Project from other Departmental Operations Prevented the Determination of the Project's Cost**

The department failed to separately identify costs for the pilot project as well as differentiate the project from existing operations, which prevented the determination of the pilot project's cost. Previous studies and pilot project experience highlighted concerns over the cost of a residential curbside recycling collection operation, and requires further exploration. However, prior to the conclusion and assessment of the pilot project, the department had already incurred costs for an island-wide curbside recycling project.

***Pilot project operations were supported by existing departmental operations and service contracts***

The pilot project was largely supported by existing departmental operations and service contracts. The department separately procured only the mixed recycling processing services and the design and evaluation services to support only the pilot project. The remaining required goods and services were supplied from existing service contracts and reallocation of previously purchased goods.

A consequence of using existing contracts and goods to support pilot project activities was increased costs. Refuse worker labor was provided at an overtime rate because their labor agreement with the city did not cover recycling collection. Another consequence of supporting aspects of the pilot project with existing contracts, goods, and operations was that some project costs were difficult to determine because of similarity to and funding from ongoing operations.

**Department used existing contracts to support pilot project activities**

The department used existing contracts and goods to support pilot project activities. This provided needed support services and goods to the project, at limited apparent additional cost to the project. However, the use of existing contracts and goods to support the pilot project distorted the ability of the department to assess the costs of the Mililani pilot project.

Costs of green waste processing were applied to an existing contract which the department had with Hawaiian Earth Products to process and mulch green waste for Leeward O'ahu. The department paid \$50 per ton to Hawaiian Earth Products for the processing service. The contract

was for a specified quantity of green waste processing from regular city curbside collection of green waste. In fiscal reports, the curbside pilot project was charged nothing for the processing of green waste collected because it was billed to an existing contract.

The department also amended the contract services with its public education consultant for wastewater and water quality to provide services for the pilot project. Under the contract amendment, the consultant would provide solid waste outreach, to support the public outreach needs of the curbside recycling pilot project.

Lastly, the pilot project received 5,800 automated collection containers that were previously purchased to supply its needs for recycling collection containers. Due to the reallocation, the department charged nothing to the project for the containers. Previous reports regard the purchase of containers as one of the most significant expenses to start-up automated curbside recycling collections, with the purchase of an island-wide supply formerly regarded as cost prohibitive without demonstration of the cost benefit in conducting collection operations. Excluding the cost of the containers from the report on pilot project costs results in the project staying within the \$340,000 budgeted for it. Although it may have been intended to limit costs, the department instead accrued higher than normal costs by applying existing contracts.

### **Department used labor at an overtime rate to cover needed activities**

The department applied refuse worker labor at an overtime rate to cover recycling collection activities, increasing the collection costs of the pilot project. An overtime rate was charged for because it was extra work outside of the existing collective bargaining agreement. The city and the refuse worker union concluded a supplemental agreement to cover the labor required for the pilot project, and even modified the agreement to extend operations. However, the understanding did not include the normalization of labor costs. As a result, the pilot project used recycling collection labor at a premium for 42 weeks. The 17 weeks of the pilot project, plus the 25 weeks of extended operations were charged at overtime rates because there were no collective bargaining agreement terms in place to provide recycling collections.

### **Some costs were difficult to determine because of similarity to and funding from ongoing operations**

Some pilot project costs were difficult to determine because of similarity to and funding from ongoing operations. The department approved the payment of costs attributable to the pilot project, which were not separately itemized to identify their contribution. This diminished the ability to verify actual costs of services billed, and their contribution to overall pilot project costs.

The department applied the costs of green waste processing to an existing contract which it had with Hawaiian Earth Products to process and mulch green waste in Leeward O'ahu. It was billed for the processing of green waste loads delivered based on the service area in Leeward O'ahu from which loads were received. The bills for processing did not separately identify loads as attributable to the 2003-04 Mililani curbside recycling pilot project. The Department of Budget and Fiscal Services confirmed that there were no separate billings for the pilot project regarding green waste processing. As such, an aggregate total cost of green waste processing was charged in billings to Mililani-Wahiawa division, which included costs for the ongoing, bagged green waste curbside collection from Mililani and Wahiawa. Without itemization or narrative to describe costs attributable to the pilot project, the project's green waste processing costs cannot be verified or identified from existing green waste collection operation costs.

Another example of difficulty in determining project related costs concerned the public education services rendered to the department by its consultant for the pilot project versus its services for ongoing departmental outreach initiatives. The department initially contracted with Hastings & Pleadwell for public education and outreach consulting regarding a strategic plan and public outreach in FY2002-03, to promote the development of a public outreach strategic plan and provide support for communications about waste water issues. The department amended the contract with the firm in November 2003, to provide solid waste outreach in three areas, including for the curbside recycling pilot project.

The contract category in which pilot project work was placed was Solid Waste outreach. This category of services included two other major activities. The category was billed lump sum, and did not identify costs attributed to each activity. Without itemization or narrative to describe work attributable to the pilot project, it is difficult to verify or account for service costs. The lack of itemization in billing and the subsuming

additional duties into an existing public outreach contract hindered the identification and reporting of public education costs for the pilot project.

***The department incurred costs for an island-wide curbside recycling project***

Contrary to the intent of conducting a pilot project, the department incurred costs for an island-wide curbside recycling project, such as extending the operations using pilot project funds and purchasing containers to support an island-wide project. These activities and costs to support an island-wide curbside recycling project were not authorized by the pilot project budget authorization of the city council or the department's operating budget.

**Department purchased containers for the expanded curbside recycling project prior to the project**

The department purchased containers for an island-wide curbside recycling project prior to the pilot project. Using FY2002-03 encumbered funds, 40,000 green 96-gallon recycling containers costing \$58.03 per container were procured. The department did not charge this cost to the project in its report to the city council. The amount of containers was eventually reduced to 21,604 containers at a total cost of \$1,253,680, due to lack of operating funds.

The problem with the purchase is that the curbside recycling pilot project had not begun, so there was no assessment of the viability of the city conducting curbside recycling operations to base the purchase upon. Large recycling containers are a substantial start-up cost for any curbside recycling program, and the past pilot project and study suggested that the step to purchase them should not be taken without developing an economical design for curbside recycling. It was an unwarranted purchase prior to letting the pilot project results facilitate decision making on comprehensive curbside recycling program.

**Department conducted curbside operations for an additional five months to ramp up for the expanded project**

Although the pilot project period concluded in February 2004, the curbside recycling operations continued for an additional five months to ramp up for an expanded island-wide curbside recycling program. Curbside recycling operations were continued through August 19, 2004, despite the union's complaint that there was no authority to provide labor for the pilot project past March 31, 2004. The extension of curbside operations incurred an estimated \$37,575 in collection service costs; an estimated \$24,447 in inspection, observation, supervision, and project

development; and an estimated \$69,288 for processing collected materials. The total additional costs of extending curbside recycling operations were an estimated \$131,310 through August 2004. The cost of curbside recycling operations plus related purchases, covering the pilot period and extension through August 2004, was an estimated \$1.94 million.

***The pilot project was not optimized for cost efficiency***

The pilot project was not optimized for cost efficiency. Since the pilot project was directed by council's budget proviso, the department pieced together the required supporting services to implement the pilot project, and did not design the project to assess elements that impacted pilot project costs. As such, certain design elements were cost unfavorable when implemented, and there were no designed revenue offsets of operational costs. Lastly, the department did not assess the low recovery rate for the pilot project versus the operational costs of the pilot project.

**Project costs were more than reported by the department**

Project costs were higher than reported by the department. The department reported costs and expenditures of \$249,475 for the curbside recycling pilot project. However, the department did not possess many of the documents to verify project cost data, including some contracts and billing records. As a result, we consulted with the Department of Budget and Fiscal Services to obtain expenditure records, contracts, and billing records. The budget and fiscal services department produced missing contracts, supplied us with expenditure records, but could not provide a comprehensive set of billings. As such, some project costs were not verifiable and reasonable cost estimates were developed to promote a total pilot project cost estimate.

We found that costs and expenditures were \$560,364 during the pilot, and our calculation of costs largely differs because the department did not cost the 5,800 recycling containers from a previous purchase which were used for the pilot project. The following table contains the estimated total cost for the Mililani curbside recycling pilot project:

**Exhibit 2.7**

**Estimated Total Cost for Mililani Curbside Recycling Pilot Project  
November 2003 – February 2004**

<i>Item</i>	<i>Cost</i>	<i>Description</i>
Containers	\$310,815	<ul style="list-style-type: none"> <li>• 5,800 96-gallon green collection carts distributed to households.</li> <li>• Department previously purchased 10,000 carts at \$51.28 per cart, price includes tax and shipping charges.</li> </ul>
Collection Service	\$25,551	<ul style="list-style-type: none"> <li>• Automated pickup; three recycling collection days per week</li> <li>• Operators at overtime rate: \$1375 per week, 17 weeks = \$23,375</li> <li>• Supervisors at overtime rate: \$128 per week, 17 weeks = \$2,176</li> </ul>
Opala Team and Staff	\$32,236	<ul style="list-style-type: none"> <li>• Field Inspections: 288.5 hours, \$23 per hour = \$6,636</li> <li>• Recycling Staff (phones, survey data) @20% = \$15,600</li> <li>• Supervising/Project Development Staff ~ estimated \$10,000</li> </ul>
Materials Processing Costs	\$48,762	<ul style="list-style-type: none"> <li>• Mixed Recyclables: \$55 per ton, 430.69 tons = \$23,688</li> <li>• Green Waste: \$50 per ton, 501.48 tons = \$25,074</li> </ul>
Community Education and Outreach	\$50,000	<ul style="list-style-type: none"> <li>• Instructional brochures (mailed);</li> <li>• “Opalagies” cart hangers (correction tags);</li> <li>• 2<sup>nd</sup> Day refuse surveys (mailed);</li> <li>• 2<sup>nd</sup> Day refuse stickers;</li> <li>• Media coordination; and</li> <li>• Community publication ads</li> </ul>
Public Surveys	\$43,000	<ul style="list-style-type: none"> <li>• Three phone surveys; and</li> <li>• Written and online final survey</li> </ul>
Project Evaluation	\$50,000	<ul style="list-style-type: none"> <li>• Data collection;</li> <li>• Program monitoring; and</li> <li>• Evaluation report</li> </ul>
<b>TOTAL</b>	<b>\$560,364</b>	

Source: Environmental Services Department, Department of Budget and Fiscal Services

We also found additional costs during our review that were curbside recycling related but not reported. There were costs to extend the curbside recycling operations in Mililani through August 2004, and costs to purchase containers for an island-wide expansion of curbside recycling. The total additional costs of extending curbside recycling operations through August 2004 were an estimated \$131,310. The cost of purchasing containers for an island-wide expansion of curbside recycling operations prior to the conclusion of the pilot project was \$1,253,680. The cost of curbside recycling operations plus related purchases, covering the pilot period and extension through August 2004, was an estimated \$1.94 million.

**As contracted, the materials processing cost of the project increases with more participation**

As contracted, the materials processing cost of the pilot project increased with more participation. The post-collection processors of the materials collected were paid by the department for each ton of unprocessed material delivered during the pilot project, which included recyclable material and load contamination. Under the processing contracts for the pilot project, the greater the amount of materials collected during the pilot project, the higher the price per load to process the materials.

The department indicated that the *pay for processing* arrangement resulted from the constraints of the pilot project, expediency of the project, unwillingness of all eligible processors to participate, and the short duration of the project. The city recycling coordinator noted that more favorable terms may be possible in a long term agreement with processors, and that there are more favorable arrangements available than *pay for processing* that can be negotiated.

The department had agreements with two post-collection processors to process the materials collected. The mixed recyclables processor, Island Recycling, charged \$55 per ton of materials delivered, while the green waste processor, Hawaiian Earth Products, charged \$50 per ton of materials delivered. During the pilot project, 430.69 tons of material was delivered to Island Recycling for processing, for which the city was billed \$23,688, and 501.48 tons of green waste material was delivered to Hawaiian Earth Products for processing, for which the city was billed \$25,074.

If the pilot project collected at the expected 80 percent recovery rate of the total generation of the participating households, it would have

collected 1,065 tons of mixed recyclables and 1,778 tons of green waste. This would have cost the city \$58,575 to process the mixed recyclables and \$88,900 to process the green waste. Compared to the less than 25 percent recovery rate observed during the pilot project of green waste and less than 50 percent of mixed recyclables collected, this demonstrates that the greater the amount of materials collected during the pilot project, the higher the price per load to process the materials.

### **Excess contamination levels are costly in a pay for processing system**

Excess contamination levels are costly in a pay for processing system. The greater the amount of contaminated material received in a given load, the higher the price per load because contamination adds to the total load weight to be processed. The increase in processing costs is dependent on participation and unavoidable in a pay per load processing system, so there is an incentive for the city to reduce avoidable contamination.

Both recycling processing agreements had acceptable loads provisions, limiting contamination to 15 percent or less for mixed recyclables and 3 percent or less for green waste, respectively. Assuming a 15 percent contamination rate for mixed recyclables collected during the pilot project, the maximum acceptable contamination is 65 tons, with \$3,575 in estimated processing costs. Assuming a 3 percent contamination rate for green waste collected during the pilot project, the maximum acceptable contamination is 15 tons, with \$752 in estimated processing costs.

However, there was an average of 25.5 percent mixed recyclable contamination during the pilot project. This resulted in approximately 110 tons of contamination, which was processed at \$55 per ton, or \$6,026 in contamination processing costs for mixed recyclable loads. During the pilot project, there was an average of 27 percent green waste contamination. This resulted in approximately 135 tons of contamination, which was processed at \$50 per ton, or \$6,770 in contamination processing costs for green waste.

### **There were no cost recapture or revenue provisions to offset city operational costs**

There were no cost recapture or revenue provisions applied during the pilot project to offset or reduce the operational costs to run the project. Selling collected materials could have offset some operating costs. In the

context of solid waste collection and ownership, the city owns the materials collected, and the materials collected have value. Therefore, the sale of the material is established in recycling ordinance criteria as a prudent revenue generating activity to offset operational costs. If there was no market for the materials, the department could assess this aspect of the viability of curbside recycling, in light of no revenue offset for operating costs. However, the department did not establish revenue or cost recapture provisions, so the cost benefit of selling recyclable materials collected during the pilot project was not determined. The department indicated that only one processor agreed to participate for the short duration of the project, so it had limited flexibility in seeking revenue or cost recapture provisions.

### **Unmet material collection estimates raises the issue of operational cost-effectiveness**

Unmet material collection estimates raises the issue of operational cost benefit for the curbside recycling collection system used during the project. The recovery rate of materials was less than 25 percent of the estimated total generation of green waste and 50 percent of mixed recyclables for participating households, below the lowest estimated rates for both materials. Total mixed recyclable collections underperformed project planning estimates by 745 tons and green waste collection underperformed project planning estimates by 1,276 tons. The following exhibits compare planning estimates and actual mixed recyclables and green waste collected during the pilot project:

**Exhibit 2.8**  
**Mixed Recyclables Collections**  
**Estimates Compared to Results Observed for**  
**2003-04 Mililani Curbside Recycling Project**

<i>Item</i>	<i>Estimated Net Weight (in tons)</i>	<i>Actual Net Weight (in tons)</i>	<i>Difference (in tons)</i>
Aluminum	74	10.35	-63.65
Glass	155	42.88	-112.12
Plastic	74	14.58	-59.42
Newspaper	460	186.54	-273.46
Cardboard	302	65.31	-236.69
Contamination	—	109.56	109.56
Total (in tons)	1,065	429.22	-635.78
Less: Contamination	—	-109.56	-109.56
Net Total (in tons)	1,065	319.66	-745.34

Source: Office of the City Auditor

**Exhibit 2.9**  
**Green Waste Collections**  
**Estimates Compared to Results Observed for**  
**2003-04 Mililani Curbside Recycling Project**

<i>Item</i>	<i>Estimated Net Weight (in tons)</i>	<i>Actual Net Weight (in tons)</i>	<i>Difference (in tons)</i>
Green Waste	1,778	501.48	-1,276.52
Contamination	—	135.40	135.40
Total (in tons)	1,778	636.88	-1,141.12
Less: Contamination	—	-135.40	-135.40
Net Total (in tons)	1,778	501.48	-1,276.52

Source: Office of the City Auditor

The collections estimates were contingent on an 80 percent recovery rate of total generation of the participating households. However, project results indicated less than a 25 percent recovery rate for green waste and

50 percent for mixed recyclables collected. As discussed earlier, if the recovery rate estimate was met, this would increase operational costs since the city paid processors per load of material. Also, given previous concerns about the cost-effectiveness of the city operating a curbside recycling collection system, an assessment of what low recovery rate meant in terms of the collection costs experienced by the project would have been pertinent information to report. However, the department did not report on this issue, or the cost-effectiveness of the curbside collection system employed by the project.

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## Conclusion

The 2003-04 Mililani curbside recycling pilot project was not designed to answer the substantive questions about whether the city should conduct curbside recycling as a part of the city's solid waste management system, and it did not demonstrate the cost-effectiveness of the city employing a curbside recycling collection operation. The goals of the project as implemented were designed to test and implement the former administration and department's refuse initiatives, and to establish the former administration's design of a curbside recycling program without evaluating its merits substantively.

The Mililani pilot project did not meet the goals and objectives of the department because its design contributed to implementation problems. Issues such as use of gray refuse containers for recycling as well as refuse collection, the collection schedule, and understaffed or ineffective control roles contributed to the contamination problems of the project. Ultimately, the project did not come close to recovering the amount of recyclable materials it projected, and instead created a substantial need for disposal due to its operations.

Also, the department could not assess operational costs because the pilot project was not adequately set apart from existing departmental operations or existing contracts. From our estimate, the cost of the project was more than reported, and the total cost of the pilot project and related operational costs were substantial. This is largely because the department also incurred costs for an island-wide curbside recycling project, such as continuing operations beyond the pilot period and purchasing recycling containers during the pilot project. There were also elements of the project that increased the project's costs while nothing was set up to offset project costs.

However, the results of the 2003-04 Mililani curbside recycling pilot project notwithstanding, the issue of whether or not the city will have a comprehensive curbside recycling collection system is settled. In 2006, the city charter was amended to require a comprehensive curbside recycling collection system. Moreover, the conforming amendment to the *Collection and Disposal of Refuse* ordinance section now requires a report on the future program of curbside recycling, rather than the future of curbside recycling.

Whether recycling pilot projects remain necessary in light of mandated island-wide curbside recycling collection is a policy issue to be decided by the administration and the city council. The amended recycling pilot project ordinance indicates council's intent that the recent pilot projects in Hawai'i Kai and Mililani were subject to its establishment and reporting requirements. As such, the recent pilot project must evaluate the specified criteria in the ordinance, even if the department already plans to continue rolling out curbside residential recycling operations in several communities over the next few years. Although a comprehensive curbside recycling collection system may be inevitable by law and current implementation, the required reporting on these pilot projects may help facilitate the city council's consideration of the future island-wide program, and minimize problems experienced during this pilot project related to administration's island-wide curbside recycling implementation creep outside of the city council's review.

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## Recommendations

The director of the Environmental Services Department should:

- a. conduct curbside recycling pilot projects according to current ordinance requirements, including project design and reporting requirements, assessment of cost benefit, and implement best practices, as appropriate;
- b. set up pilot projects independently, with adequate funding and staffing so that current contracts or operations are not impaired;
- c. not use pilot projects as a vehicle for unfunded administrative priorities; and
- d. adhere to funding restrictions for use of pilot project funds, use of contract funds and operational funds, and seek council authorization, when appropriate.

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## Response of Affected Agency

### Comments on Agency Response

We transmitted a draft of this report to the Environmental Services Department on October 8, 2008. A copy of the transmittal letter is included as Attachment 1. The city auditor granted the department an extension to submit its response to the draft report to October 29, 2008. The department submitted a written response to the draft report on that day, which is included as Attachment 2.

In its response to our draft audit report, the Environmental Services Department characterized our report as having found nothing new or different than the findings in their 2003 pilot evaluation report, and provided brief comments related to our findings.

The department took issue with our point that the pilot project did not achieve goals and objectives because its design contributed to problems. They noted the *trial and discovery* value of conducting pilot projects, where problems with curbside recycling collection designs could be identified, and later contribute to the future improvement of programs. While we acknowledge the value of learning from the experience of a pilot project, we stand by our report that the department did not meet its planned goals and objectives. To clarify, we identified during fieldwork that the project was designed to demonstrate by specific outcome measures that curbside recycling collection would recover specified quantities of collected items, provide these items to recycling processors at a specified quality, and ultimately minimize the disposal of collected materials. However, the results of the project fell far short of material recovery estimates, and there was significant contamination of collected materials which increased processing costs and ultimately required disposal. These issues were promoted by design problems found by our report, and prevented the attainment of planned goals and objectives.

The department responded to our comments regarding the limited available data and accounting available to review during the audit. It indicated that it had made its best efforts to provide us with information, explaining that not all records and forms were retained after its project evaluation, and that our audit took place three years after the project. We appreciate and acknowledge the cooperation of departmental staff in providing available information on the project, but stand by our

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assertions that certain aspects of the project were not reviewable due to the state of the records.

Lastly, the department asserts that due to the short term nature of the project, it used existing resources and contracts where possible to minimize costs, and that it had separately calculated costs for the project even though it may not have been obvious from historical accounting documents. We stand by our finding that project costs were difficult to determine due to the use of existing resources and contracts, and therefore cannot agree with the assertion that this aspect of project management resulted in minimized costs.

We acknowledge the department's important role in developing recycling programs and education which preserve the quality of our environment, and its efforts to make improvements to the curbside collection system soon to be employed island-wide. There were no substantive changes made to the report based on the department's response.



LESLIE I. TANAKA, CPA  
CITY AUDITOR

**OFFICE OF THE CITY AUDITOR**  
CITY AND COUNTY OF HONOLULU  
1001 KAMOKILA BOULEVARD, SUITE 216, KAPOLEI, HAWAII 96707 / PHONE: (808) 768-3134 / FAX: (808) 768-3135

October 8, 2008

*COPY*

Dr. Eric S. Takamura, Director  
Environmental Services Department  
1000 Uluohia Street, Suite 308  
Kapolei, Hawai'i 96707

Dear Dr. Takamura:

Enclosed for your review are two copies (numbers 12 and 13) of our confidential draft audit report, *Audit of the Mililani Curbside Recycling Pilot Project*. If you choose to submit a written response to our draft report, your comments will generally be included in the final report. However, we ask that you submit your response to us no later than 12:00 noon on Wednesday, October 22, 2008.

For your information, the mayor, managing director, and each councilmember have also been provided copies of this **confidential** draft report.

Finally, since this report is confidential, still in draft form, and changes may be made to it, access to this draft report should be restricted to those assisting you in preparing your response. Public release of the final report will be made by my office after the report is published in its final form.

Sincerely,

A handwritten signature in cursive script that reads "Leslie I. Tanaka".

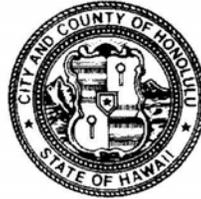
Leslie I. Tanaka, CPA  
City Auditor

Enclosures

DEPARTMENT OF ENVIRONMENTAL SERVICES  
**CITY AND COUNTY OF HONOLULU**

1000 ULUOHIA STREET, SUITE 308, KAPOLEI, HAWAII 96707  
TELEPHONE: (808) 768-3486 • FAX: (808) 768-3487 • WEBSITE: <http://envhonolulu.org>

MUFI HANNEMANN  
MAYOR



October 28, 2008

ERIC S. TAKAMURA, Ph.D., P.E.  
DIRECTOR

KENNETH A. SHIMIZU  
DEPUTY DIRECTOR

ROSS S. TANIMOTO, P.E.  
DEPUTY DIRECTOR

IN REPLY REFER TO:  
RR 08-058

Mr. Leslie I. Tanaka, CPA  
Office of the City Auditor  
City and County of Honolulu  
1001 Kamokila Boulevard, Suite 216  
Kapolei, Hawaii 96707

'08 OCT 29 A11 :47

C & C OF HONOLULU  
CITY AUDITOR

Dear Mr. Tanaka:

We have reviewed your report, "Audit of the Mililani Curbside Recycling Pilot Project," and found nothing substantially new or different from the findings that were presented in our 2003 pilot evaluation report.

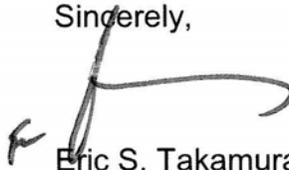
We might take issue with comments indicating the pilot did not achieve goals and objectives because its design contributed to problems. The problems were indicators for improving the design. The purpose of pilot programs is to probe various system designs to determine best directions. This pilot provided clear confirmation that a successful curbside recycling system would need to employ separate, color-coded carts for refuse and recycling, and that implementation would require a financial commitment from the City to purchase these containers. The pilot further probed the extent to which residents might be willing to forgo the second refuse pickup, which paved the way to the next pilot program which was implemented recently in Mililani and Hawaii Kai to much success.

Your report made several comments regarding limited available data and accounting. It would be important to note that your audit was conducted more than three years following the close of the 2003-04 pilot program. Our department staff did its best to gather original data for your review, but all forms and records were not retained once the evaluation was completed. Further, this short-term, four-month pilot was conducted using existing resources and contracts where possible to minimize costs. Separate costs were calculated at the time, but may not have been reflected in separate accounting documents for historical review.

Mr. Leslie I. Tanaka, CPA  
October 28, 2008  
Page 2

The City is currently rolling out an islandwide curbside recycling program which utilizes three automated carts—gray for refuse, green for green waste, and blue for mixed recyclables. The twice-weekly refuse collection service is shifting to once-per-week refuse and once-per-week recycling, alternating weekly between the blue and green recycling carts. The 2007-08 pilot programs in Mililani and Hawaii Kai, upon which the expansion is based, proved successful with more than 90% of the surveyed households reporting that they liked the program and found it easy to do. Getting to this point of success has required a great deal of hard work and resolve.

Sincerely,

A handwritten signature in black ink, appearing to read 'Eric S. Takamura', with a large, sweeping horizontal stroke extending to the right.

Eric S. Takamura, Ph.D., P.E.  
Director