



The Barriers Impeding Recycling Participation in the Borough of Croydon

An Interactive Qualifying Project proposal to be submitted to the faculty of Worcester Polytechnic Institute in partial fulfilment of the requirements for the Degree of Bachelor of Science

Submitted by:

Haley Conde

Stacey Mohr

Nathaniel Wright

Submitted to:

Project Advisors:

Prof. Wesley Mott

Prof. Guillermo Salazar

Project Liaisons:

David Groves

Peter McDonald

Paul Vincent



April 26th, 2007

Abstract

Due to recycling rates below national expectations, the London Borough of Croydon's Energy and Sustainability Team recognized the need for increased resident recycling participation in the borough. Observation of kerbside recycling program participation, and interviews conducted with residents about both the kerbside program and the borough's numerous neighbourhood recycling sites enabled production of recommendations for recycling program improvement. Recommendations of methods for the Croydon Council to increase recycling participation accompany an updateable photographic database of the borough's neighbourhood recycling sites and recommendations for site improvement.

Executive Summary

Combined, England and Wales produce about 30 million tons of municipal and household waste annually. In combination with industrial and commercial waste, the annual amount of landfilled waste in the UK is truly staggering; around 106 million tons (Department of the Environment, 2006). In the year 2000 the British Government recognized this inadequacy, and introduced a new waste strategy to increase national recycling participation. The strategy proposed that by the year 2010, 30% of waste would be recycled or composted nationally.

This project aims to increase recycling participation in the Borough of Croydon and to assist the local community in reducing the environmental and economic impact of its current waste disposal habits. Through observation and analysis of the methods used for recycling collection in Croydon, as well as surveys of residents, we proposed recommendations designed to help the Croydon Council increase participation in the borough's current recycling programs. In addition we have provided the Council with a complete photographic record of each of the borough's neighbourhood recycling sites, and a list of recommendations for improvements to these sites.

We observed Croydon's kerbside recycling collection and recorded data about the presentation of green recycling bins placed out for collection. Upon compilation of this data, we selected neighbourhoods with particularly poor recycling rates to return to and interview residents about their knowledge of, and thoughts about, the kerbside recycling program.

Data collected from interviewing residents along route C illustrated that the majority of Route C residents are aware of kerbside collection, use kerbside collection, and would like to see a greater variety of materials collected. Many times plastic and cardboard collection was specifically mentioned.

Results display that the Route I recycling participation level was lower than the participation level along Route C. Route I data shows that 54% of the residents observed either did not place a bin out for collection, placed their bin incorrectly, or placed a bin out that was contaminated with the wrong materials. Some individuals interviewed along Route I were not able to speak English well enough for us to obtain useful answers to our

survey questions. This language barrier, however, could be one of the more useful results that we were able to obtain about promotional materials in this area. If a number of residents are unable to speak English fluently, then promotional materials containing instructions written in English may be less effective than materials with more graphically illustrated instructions, or fewer words.

Many of Croydon's neighbourhood recycling sites are in need of maintenance and refurbishment. We took numerous photographs of all of the site containers, landmark signs near the sites in order to provide directions to the sites for individuals trying to locate them, and made note of:

- Whether or not the sites were easy to find.
- The types of containers at the sites.
- The fullness of each of the containers at the sites.
- Site cleanliness.
- Whether or not the sites appeared to be well used.
- Types of repairs and upgrades that needed to be made at the sites.

We also conducted interviews with individuals using the recycling sites. The results from these interviews were:

- Whether or not site users had kerbside recycling collection available to them.
- Whether or not they used the kerbside collection service.
- What materials they recycled at the site.
- If they thought it would be beneficial to have the recycling site accept any other recyclable materials.

Along with the observations of site usage and condition, we have provided the Croydon Council with an online photographic database on *Websites*. The database contains a photographic record of each recycling centre. Within the database are 24 photo albums; each one named for the recycling centre that it depicts. In each of the albums there is a picture of the nearest bus stop to the site, an overall picture of the centre, and labelled pictures of each of the individual containers at the recycling site.

Upon completion of the aforementioned photographic database, we returned to each recycling site a second time to conduct interviews with sites users regarding their recycling site usage habits. After a thorough evaluation of Croydon's neighbourhood recycling sites we were able to compile a list of recommendations for site improvement.

It is our hope that our compiled data, observations, and recommendations will assist the Croydon Council in improving the recycling participation rate within the borough, and that our suggestions will prove useful in helping Croydon to achieve its target recycling rate in the near future.

Acknowledgements

Without the support from our colleagues, guidance from our advisors and sponsors, and street directions from the good people of Croydon, this project would not have been such a success. We would like to extend thanks to our sponsors, David Groves, Peter McDonald, and Paul Vincent. Their expertise on the subject matter helped guide us in the right direction. We would also like to thank Keith Turner and Wayne Grinham for introducing us to the recycling crews of Route C and Route I. Sincere thanks to the men of Route C and Route I for allowing us to follow them on their collection routes.

A special thanks as well to our advisors, Professors Wesley Mott and Guillermo Salazar. Their constructive feedback and constant support and guidance over the course of the fourteen week project have been greatly appreciated.

Authorship

<i>Abstract</i>	Nathaniel
<i>Executive Summary</i>	Nathaniel
<i>Acknowledgments</i>	Stacey
<i>Introduction</i>	Haley
<i>Background</i>	
<i>History of Recycling</i>	Nathaniel
<i>Importance of Recycling</i>	Nathaniel and Stacey
<i>Recycling in the UK</i>	Haley
<i>Recycling in Croydon</i>	Haley
<i>Kerbside Recycling Program Improvements</i>	Stacey
<i>Methodology</i>	Haley, Nathaniel and Stacey
<i>Results and Analysis</i>	Haley and Nathaniel
<i>Recommendations</i>	Stacey
<i>Conclusion</i>	Nathaniel

Table of Contents

Abstract	ii
Executive Summary	iii
Acknowledgements	vi
Authorship	vii
Chapter 1 Introduction	1
Chapter 2 Background	6
<i>History of Recycling</i>	7
<i>Importance of Recycling</i>	8
<i>Examples of Successful Recycling Programs</i>	11
<i>Recycling in the UK</i>	17
<i>Recycling in Croydon</i>	19
<i>Kerbside Recycling Program Improvement</i>	21
<i>Types of Collected Materials</i>	22
<i>Physical Containers</i>	22
<i>Collection Schedules</i>	23
Chapter 3 Methodology	25
<i>Kerbside Recycling Program</i>	25
<i>Use of Recycling Sites</i>	27
<i>Promotional Materials</i>	29
Chapter 4 Results and Analysis	33
<i>Kerbside Recycling Program</i>	33
<i>Kerbside Recycling Program Surveys</i>	45
<i>Recycling Centre Observation</i>	51
<i>Recycling Centre Surveys</i>	58
Chapter 5 Recommendations	63
<i>Plastics</i>	63
<i>Recycling Bin Placement with Rubbish Bins</i>	66
<i>Kerbside Recycling Program</i>	67
<i>Uniform Collection Criteria</i>	67
<i>Stickers</i>	68
<i>Door Hangers</i>	69
<i>Paint</i>	70
<i>Recycling Sites</i>	70
<i>Update Signs/Bins</i>	71
<i>Paint</i>	72
<i>Rubbish Bins</i>	73
<i>Sainsbury Plastic Carrier Bag Assistance</i>	74
<i>Recycling Site Cost Analysis</i>	74
<i>“Adopt-a-Recycling Site”</i>	76
<i>Promotional Materials</i>	76
<i>Clear Message</i>	77
<i>Facts Sheets</i>	77
<i>Green Bin & Lorry Signs</i>	79

Chapter 6 Conclusion	80
References	81
Appendix A: Methodology Idea Web	84
Appendix B: Solution Cycle	85
Appendix C: “Wrong Stuff” Door Hanger	86
Appendix D: Helpful Ideas for Improving Kerbside Recycling Participation	87
Appendix E: Kerbside Observation Log Sheet	89
Appendix F: Christmas Tree Collection & Green Waste Flyer	90
Appendix G: Library Posters	91
Appendix H: Recycle Leaflet	92
Appendix I: Recycling Calendar	93
Appendix J: Recycling Calendar Week 2	94
Appendix K: Green Waste Flyer	95
Appendix L: Motivation and Education sections (removed)	96
Appendix M: References (with annotations)	98
Appendix N: Project suggestions	104
Appendix O: Proposed Project Timeline (as given by Sponsor)	109

Table of Figures

Figure 1-1: Methane Gas Emissions by Source.....	2
Figure 1-2: Household Waste in London.....	2
Figure 1-3: Materials Sent to Landfills by Households in England.....	4
Figure 2-1: Waste Products in the United Kingdom.....	6
Figure 2-2: Composition of Household Waste in the UK from 1892 to 2002.....	7
Figure 2-3: Universal Recycling Symbol	8
Figure 2-4: NJ Recycling Payouts	12
Figure 2-5: Proposed Change in the UK’s Waste Production Process for the Next 10-15 Years	18
Figure 2-6: Household Incentive Plan	19
Figure 2-7: Number of Recyclable Materials Accepted in UK Kerbside Programs.....	22
Figure 4-1: Compilation of Total Resident C Presentation (n=417).....	33
Figure 4-2: Route C: Angelica Gardens (n=11).....	34
Figure 4-3: Route C: Basil Gardens (n=5).....	34
Figure 4-4: Route C: Betony Close (n=10).....	34
Figure 4-5: Route C: Burdock Close (n=5)	35
Figure 4-6: Route C: Cheston Avenue (n=120).....	35
Figure 4-7: Route C: Cornflower Lane (n=19).....	35
Figure 4-8: Route C: Cottongrass Close (n=9)	36
Figure 4-9: Route C: Crocus Close (n=5).....	36
Figure 4-10: Route C: Daisy Close (n=10).....	36
Figure 4-11: Route C: Firsby Avenue (n=68).....	37
Figure 4-12: Route C: Parkfields (n=13)	37
Figure 4-13: Route C: Ridgemont Avenue (n=46)	37

Figure 4-14: Route C: Verdayne Avenue (n=83)	38
Figure 4-15: Compilation of Total Route I Presentation (n=761)	38
Figure 4-16: Route I: Arundel Street (n=61)	39
Figure 4-17: Route I: Burdett Road (n=25)	39
Figure 4-18: Route I: Clarence Road (n=26)	39
Figure 4-19: Route I: Gloucester Road (n=51)	40
Figure 4-20: Route I: Grenaby Avenue (n=27).....	40
Figure 4-21: Route I: Grenaby Road (n=51	40
Figure 4-22: Route I: Limes Road (n=82)	41
Figure 4-23: Route I: Milton Road (n=38)	41
Figure 4-24: Route I: Neville Road (n=21).....	41
Figure 4-25: Route I: Selhurst Place (n=35)	42
Figure 4-26: Route I: St. James Road (n=45)	42
Figure 4-27: Route I: Strathmore Road (n=24)	42
Figure 4-28: Route I: Sydenham Road (n=107)	43
Figure 4-29: Route I: Tavistock Grove (n=17).....	43
Figure 4-30: Route I: Thornhill Road (n=48)	43
Figure 4-31: Route I: Torrington Square (n=42)	44
Figure 4-32: Route I: Westbury Road (n=4).....	44
Figure 4-33: Route I: Willis Road (n=14.....	44
Figure 4-34: Route I: Windmill Road (n=27).....	45
Figure 4-35: Route C: Residents Knowledge of Kerbside Program (n=9).....	46
Figure 4-36: Route C: Residents Use of Kerbside Program (n=9)	46
Figure 4-37: Route C: Residents Awareness of Recyclable Materials (n=9)	46
Figure 4-38: Route C: Resident Awareness of Green Box Placement (n=9)	47
Figure 4-39: Route C: Requested Recyclable Materials (n=9).....	47
Figure 4-40: Route C: Residents That Throw Away Recyclable Materials (n=5)	47
Figure 4-41: Route C: Changes Residents Would Like to See for the Kerbside Program (n=5).....	47
Figure 4-42: Route I: Residents Knowledge of Kerbside Program (n=6)	49
Figure 4-43: Route I: Residents Use of Kerbside Program (n=6)	49
Figure 4-44: Route I: Resident Awareness of Recyclable Materials (n=6).....	49
Figure 4-45: Route I: Resident Awareness of Green Box Placement (n=6).....	49
Figure 4-46: Route I: Requested Recyclable Materials (n=6)	50
Figure 4-47: Route I: Residents That Throw Out Recyclable Materials (n=6)	50
Figure 4-48: Observed Use of Recycling Sites (n=24).....	51
Figure 4-49: Content of Materials at Recycling Sites (n=24).....	52
Figure 4-50: Observed Label Appropriateness (n=24)	52
Figure 4-51: Condition of Labels (n=24).....	52
Figure 4-52: Level of Site Cleanliness (n=24).....	53
Figure 4-53: Container Condition (n=24).....	53
Figure 4-54: Observed Contamination of Containers (n=24)	53
Figure 4-55: Accessibility to Site (n=24).....	54
Figure 4-56: Safety of Sites (n=24)	54
Figure 4-57: Example of Webshots Database.....	56
Figure 4-58: Example of Publisher Database	57

Figure 4-59: Rubbish Found at Recycling Centres (n=24).....	57
Figure 4-60: Residence of Recycling Site Users (n=27)	58
Figure 4-61: Kerbside Program (n=20)	59
Figure 4-62: Kerbside Program Users (n=20)	59
Figure 4-63: User Distance from Recycling Site (n=24).....	59
Figure 4-64: Recycling Site Usage as Part of Another Errand (n=21)	60
Figure 4-65: Most Popular Materials as Noted by Residents (n=27)	60
Figure 4-66: Materials Requested at Recycling Sites (n=27)	60
Figure 4-67: Cleanliness of Recycling Sites (n=23).....	61
Figure 4-68: Problems with the Current Recycling Sites (n=24)	61
Figure 5-1: Plastics 1 – 7	64
Figure 5-2: Plastic Bottles in a.....	65
Figure 5-3: Camden Lock Sign.....	66
Figure 5-4: Recycling Bin at Camden Lock	66
Figure 5-5: Proper Kerbside Bin Placement	67
Figure 5-6: Improper Kerbside Bin Placement.....	67
Figure 5-7: Recycling Bin Placed Misplaced by a few Meters	69
Figure 5-8: Example of a Door Hanger	69
Figure 5-9: Green Bin Paint.....	70
Figure 5-10: Sign on Paper Bin at Ashburton Park	71
Figure 5-11: Clothing Bank at Monks Green Orchard	71
Figure 5-12: Outdated Signs at Fairfield Car Park	71
Figure 5-13: Clothing Bank Graffiti at Ashburton Park Car Park	72
Figure 5-14: Clothing Bank Graffiti at Co-Op Car Park	72
Figure 5-15: Shoe Banks of Ashburton Park Car Park, Co-op Car Park, and Lion Green Road	73
Figure 5-16: Plastic Carrier Bags left at Clocktower Site.....	73
Figure 5-17: Clothing and Shoe Bank of Granville Gardens.....	73
Figure 5-18: Refuse Bin at Forestdale Shopping Centre	73
Figure 5-19: Sainsbury Plastic Carrier Bag Recycling Machine	74
Figure 5-20: Reduce Junk Mail Poster.....	77
Figure 5-21: Exit Sign.....	77
Figure 5-22: Cigarette Warning Labels	78
Figure 5-23: Sainsbury - Whitehorse Lane Inkjet Bin.....	78
Figure 5-24: Green Bin	79

Chapter 1 Introduction

Thousands of tons of waste are generated daily worldwide. Many current waste disposal programs are heavily dependant on the use of landfills to deal with the massive levels of waste generation, though a number of problems with this strategy are becoming increasingly apparent.

One of the most immediately visible problems with a landfill centred waste strategy is that room for landfill site location is quickly diminishing. In addition to space constraints, landfills can be detrimental to the environment and surrounding communities. Landfills have the potential to contaminate local drinking water, and also to pollute the air with unpleasant and potentially flammable gases such as methane. Worldwide, many governments have devised plans for safer landfills that collect released gases, and design improvements that help to prevent pollutants from contaminating groundwater supplies (Bluewater Recycling Association, 2004). Although these landfills are cleaner and less harmful to the environment than older designs, there is still not adequate space to use landfills to cope with the steadily increasing global waste stream.

The need for better recycling programs is highlighted also in the finite supply of many of our natural resources. The earth has only a limited supply of the resources necessary to manufacture many of the materials that are in daily use worldwide. With increased recycling rates, the amount of virgin material that is processed annually would decrease substantially. This is an important result to achieve in the quest for environmental sustainability. While many countries are working diligently to create improved recycling programs designed to reduce the amount of waste sent to landfills, recycling levels are still not as high as they should be considering the variety of materials in the waste stream that are potentially recyclable.

On a more local and immediate front, high methane gas emissions from decomposition in landfills have been particularly visible in London, England. Though there have been significant drops in methane levels over the past 14 years, decreasing the amount of waste sent to landfills will help to further decrease methane levels (Figure 1-1). According to the Department for Environmental, Food, and Rural Affairs (DEFRA), the UK hopes to decrease methane gas emissions 12.5% by the year 2008

(2004 UK climate change sustainable development indicator and greenhouse gas emissions final figures.2006).

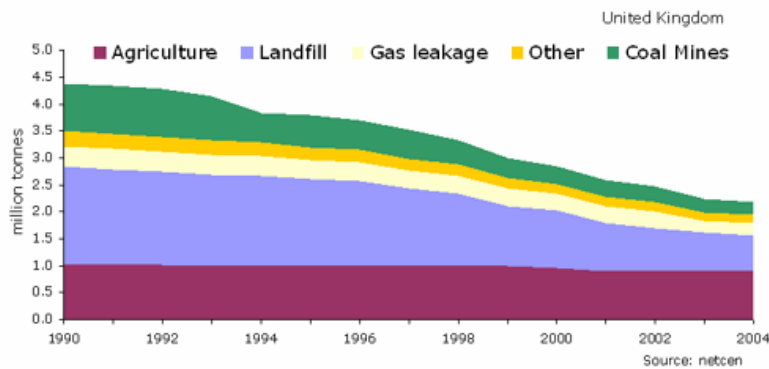


Figure 1-1: Methane Gas Emissions by Source
<http://www.defra.gov.uk/news/2006/060123b.htm>

Due to these problems with current waste disposal policy, many of London’s boroughs have devised new or improved recycling plans. As shown below in Figure 1-2, there has been a slight increase in recycling rates since the implementation of the Waste Strategy in 2000, though the amount of recycled waste is still well below the United Kingdom’s goal of 30% by 2010 (Department of the Environment, 2006).

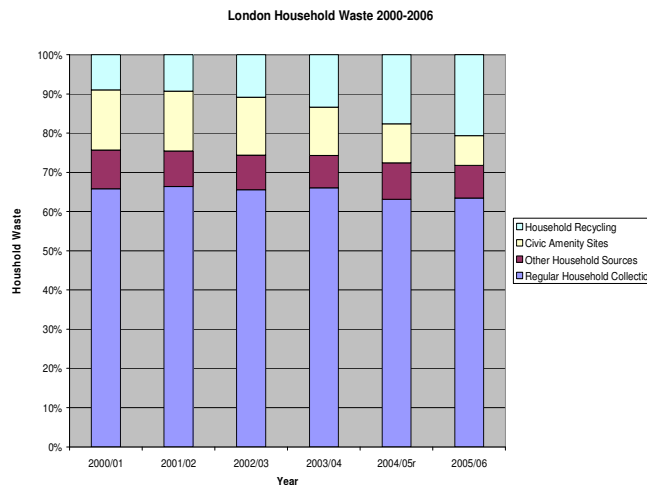


Figure 1-2: Household Waste in London (Defra)

Since 1995, the UK has been taking an annual survey of collection and disposal of municipal waste from local city authorities. This survey has been viewed as a reliable resource for the government to determine current waste disposal habits and serves as the

basis for new recycling level targets. In 1998 approximately 85% of municipal waste was sent to landfills in England (Department of the Environment, 2006). This was regarded as an unsatisfactory level of participation, and since then programs and incentives designed to increase recycling rates have been implemented throughout the UK.

Certain boroughs, such as the Borough of Croydon, have particularly low levels of recycling participation. New programs and methods for reducing waste and increasing recycling participation are being implemented in many lower participation areas, though these programs are not currently reaching desired success rates. The most successful method that the borough has implemented for increasing recycling participation has been kerbside recycling collection. Though a kerbside recycling program seems simple to successfully implement, there are a number of aspects that must be carefully planned to ensure both the economic and participatory success of a kerbside collection program. Croydon uses both kerbside recycling and recycling centres to encourage home owners and apartment dwellers to become involved in the movement away from landfills, however, data shows that the current recycling programs are not experiencing the level of success that they should (*Recycling and reuse.*).

Municipal waste is defined as waste that is controlled and collected by local authorities. This includes household and street waste, recycled products, park and garden refuse, commercial waste, and council and civic amenity waste (Department of the Environment, 2006). A large portion of the municipal waste stream that is sent to landfills is composed of materials that could possibly be recycled. Paper is one of the most common recyclable products sent to landfills; in fact it has been documented that approximately 32% of landfilled waste is made up of paper products (Figure 1-3). This is an area with large potential for improvement simply because paper is one of the least complicated materials to recycle.

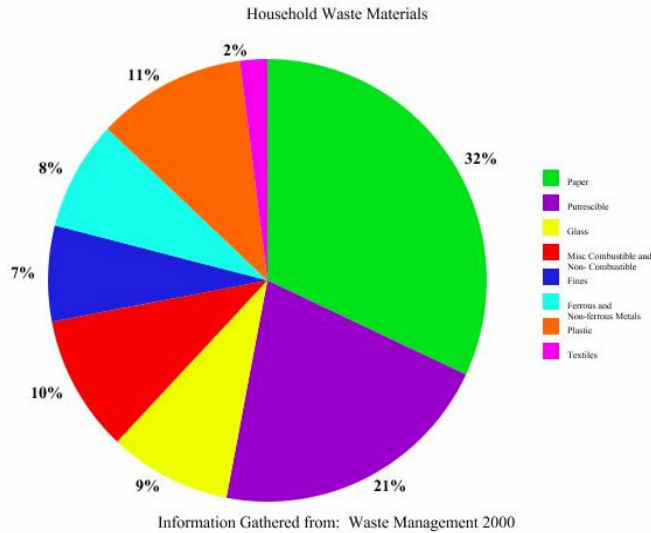


Figure 1-3: Materials Sent to Landfills by Households in England

Croydon has dedicated much time and effort to raising participation in their recycling program. They have initiated a kerbside recycling program, where residents receive a green box that is collected fortnightly. The box must be placed in the correct place, however, and boxes that are not directly on the kerb outside of the house are not collected. This means that proper education about Croydon’s kerbside pickup policy is extremely important to gaining the desired levels of participation. Individuals who do not understand the policy may become discouraged when their recyclables are not collected, and stop participating in the program altogether. The kerbside program is funded by a yearly council tax that residents are required to pay, so participation in the program is also important to improving the efficiency of resident tax dollars.

The borough also contains over 30 recycling sites primarily for residents who live in flats. The participation of individuals living in flats is not particularly strong, and the borough has been working on new ways to give these residents information pertaining to the use of the recycling sites. Both the green boxes and the recycling sites collect paper, glass, textiles, and food and drink cans (*Recycling and reuse*).

Even with all of the recycling programs available to borough residents, Croydon’s recycling rate is still about 16%. The problem of local participation has been attributed to both a lack of public awareness and also lack of motivation to recycle. Although there have been many initiatives to inform the community about the benefits of recycling and the proper

utilization of current programs, the Croydon Council has continually observed that many residents are unclear about where and when they should put out their green boxes.

Our mission was to work with the Borough of Croydon to discover what is inhibiting resident recycling participation and to provide suggestions of how to best inform the community about the importance of utilising current recycling programs. We collected data on Croydon's current program, and observed the collection process in several areas of the borough. We also collected data about recycling box placement in order to create recommendations for an improved method of informing residents how to present their green boxes for pick-up. In addition to this, we researched aspects of external recycling programs that have been both successful and unsuccessful. This research allowed us to gain a better understanding of what has been done, and generate ideas for Croydon to improve upon past methods. We believe that an effective way of determining why participation is lacking in several areas of the borough is to talk to residents about their opinions of the recycling program. From this collective research and data we have recommended several methods for Croydon to increase recycling participation, and to improve other aspects of their current recycling programs.

Chapter 2 Background

In this section we analyze the origins and importance of recycling as an integral part of any waste disposal strategy. This analysis takes into account both the economic and social benefits of a thriving recycling program, and also touched on the demographic issues associated with differing levels of recycling participation within a community. We also enumerate potential strategies for increasing recycling participation that have been successfully implemented in other cities. This section then describes the current waste disposal problem in context of the United Kingdom, and more specifically the Borough of Croydon. Lastly the section discusses specifics pertaining to the design of a successful kerbside collection program.

With the production of excessive waste, proper methods for managing waste build-up must be devised. Currently, Greater London utilizes Reuse and Recycling Centres and fortnightly kerbside recycling collection. Both Eastern and Western London currently have adequate waste management programs, while Central London's program is slightly deficient.

Greater London is spread across an area of 1,586.7 square kilometres accommodating a rising population of 7 million people in 3.1 million households (Oxford Internet Consultants, 2006). Enormous waste is produced on a daily basis. London as a whole produces approximately 17 million tons of waste per year, comprising household, business and industrial, construction and demolition, and hazardous waste. Figure 2-1 shows a breakdown of the estimated total annual waste by sector for the year 2004.

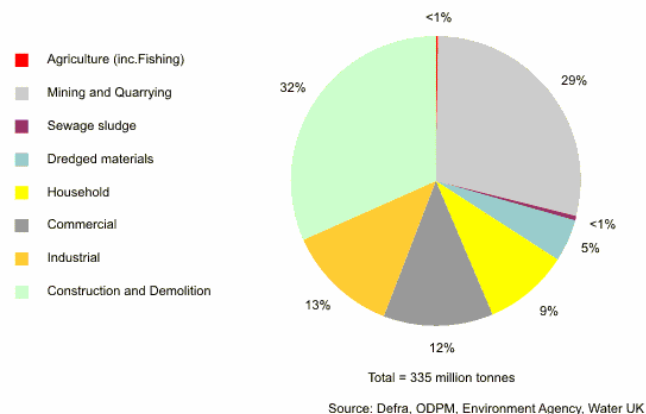


Figure 2-1: Waste Products in the United Kingdom

In 2003/2004 the kerbside pickup method was implemented throughout London, reaching out to over 2.137 million collecting 167,000 tons of recycling and 10,000 tons of wastes throughout the Boroughs (Oxford Internet Consultants, 2006). This process, along with aid from organizations such as the “London Recycling Fund” and the “Recycle for London Campaign” has helped to increase the amount of support for recycling in the boroughs. If the current population growth trend continues, however, that increase will be accompanied by a rapidly increasing level of waste production; this reiterates the need for new methods of waste management to be developed.

History of Recycling

For as long as human beings have existed, they have produced waste. In early nomadic societies waste could simply be left behind when humans moved on; with the beginning of permanent civilization, however, more organized waste removal became imperative for the maintenance of societal health and cleanliness. In the beginning of waste removal, very little reusable material was thrown away, but as human society evolved towards the consumerism of today, disposal of reusable products increased dramatically. A larger scale organized system of recycling and reuse is vital to controlling the size of landfills and trash dumps.

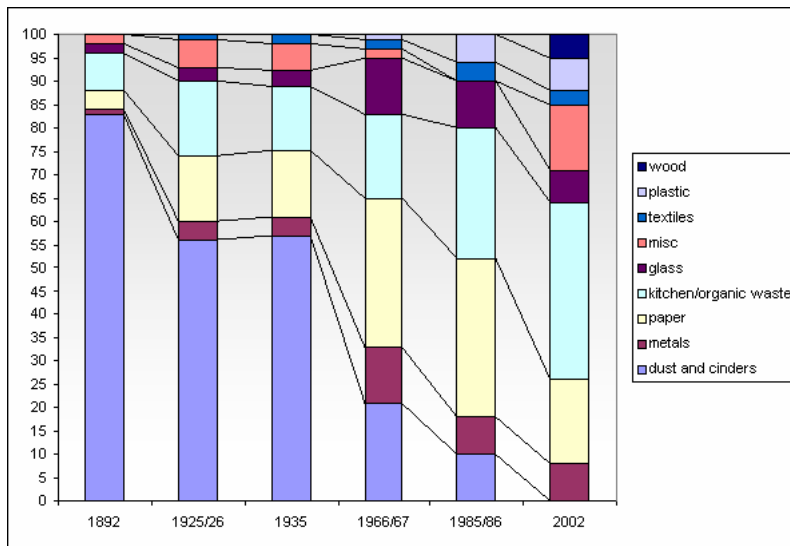


Figure 2-2: Composition of Household Waste in the UK from 1892 to 2002
<http://www.wasteonline.org.uk/resources/InformationSheets/HistoryofWaste.htm>

Figure 2-2 illustrates the change in composition of waste over the last century, and provides an idea of areas to target in a recycling program to most effectively decrease the amount of inorganic waste being put into landfills. As is evident from the graph, both paper and plastic waste production has been increasing since the 1960s. From this it is logical that recycling programs that are in place today focus on the reuse of these materials.

Importance of Recycling

Cans, bottles, Styrofoam products, and almost all plastic containers display the triangular recycling symbol somewhere on them (Figure 2-3). This symbol indicates that someone somewhere is willing to take the product, process it into raw material, and reuse it for another application.



Figure 2-3: Universal Recycling Symbol

This reduces the amount of new material created each year, and decreases the environmental impact of landfill dumping by slowing landfill growth. In contrast, disposing of recyclable materials in trash dumps contributes to the problem of landfill size and growth while simultaneously increasing the need to use virgin materials for packaging purposes.

Energy concerns should also be considered when examining the importance of recycling. Coal and oil, two of the most widely used energy sources in the world, are finite in quantity. The human race is close to having depleted all of the fossil fuel supplies readily available through drilling and mining processes, and therefore it is in our best interest to find ways to minimize the use of these fuels.

Petroleum is one of the most widely used resources on the planet, and has a number of different applications. In addition to being used in a large number of energy generation and transportation applications, most of the plastic products people use every day are created using petroleum. Reuse and recycling of petroleum-based products is a good step towards cutting down oil consumption.

While scientists and engineers are busy working to develop new methods to efficiently extract energy from alternate sources, the population at large should also work to conserve energy by recycling as much as possible.

Economic Benefits of Recycling

In most cases, waste that is not recycled is sent either to a landfill, or to be incinerated. Ideally, recycling capabilities would be fully realized, and the result would be a substantial decrease in the amount of trash sent to landfills or incinerators. This would lead to a net decrease in the energy required for manufacturing goods that contain *recyclate* (recycled material) and an increase in the economic efficiency of waste disposal in general.

At one point in time, incineration was considered to be a great solution for trash disposal. Heat generated from the incineration process can be used to drive steam turbines in order to recover energy from waste. Recently, however, worries over the release of toxins from incineration, as well as global climate change issues deriving from carbon-dioxide emissions, have made it a less attractive waste disposal option despite its energy-generation potential. In addition to these worries, the cost of constructing and operating an incineration site is significant. Eventually the costs of less than optimal waste disposal strategies will affect all individuals, both by reduced air quality and increased waste disposal costs.

One possible way to effectively promote recycling and to encourage people to recycle is to make recycling have a direct economic effect on the general population. Systems that introduce a fee for non-recycled waste collection are widely used in many locations. In Worcester, Massachusetts, for example, individuals must purchase trash bags for the kerbside collection of waste. This fee for waste disposal helps motivate people to recycle whatever they can in order to reduce the number of trash bags that they must purchase.

One case that demonstrates good recycling practices is that of New York City. Since 1989, the recycling program in New York City has been efficiently running and has been expanded to include more neighbourhoods. The collection of recyclable materials costs far less than the exportation of rubbish to landfill sites or incinerators out of state. The cost of recycling is lower than other forms of waste disposal, and over time it is expected to become even cheaper. The current recycling program is already saving New York millions of dollars. During 2003, the recycling program helped NYC to save \$40 million in waste disposal costs (Natural Resources Defence council, 2006).

Recycling Program Efforts

As more information is gathered relating to the negative effects increasing amounts of waste disposal has on the environment, greater efforts have been made attempting to persuade citizens to recycle. Whether organizing drop-off points for recyclable materials, providing kerbside pick-up, or implementing waste removal fees, new and improved methods are being used to help reduce waste tonnage. Recycling programs have found success by creating ways for the public to recycle without inconveniences. Most successful programs have also worked by ensuring public knowledge of how to recycle and what items are recyclable. Recycling programs resulting in failures were ones that made it difficult for their citizens to recycle without having to go out of their way, consuming their time and energy in an effort to be environmentally conscious. Poor program success also resulted from citizens not being educated about the importance of recycling, and the long term environmental and economic effects that failing to recycle can have on the community.

Demographic studies of recycling patterns show that differing recycling rates within certain areas often result to the programs implemented in those areas. For instance, dropping off recyclables at a local collection point would be easier for a family who owned a home and had space to let recyclables gather than it would for a family who lived in a small apartment with little to no room for storage.

Examples like this illustrate that the best way to increase recycling in an area is to first understand why people are not recycling. Once that evidence is gathered, finding a solution becomes more directed towards the underlying issue. With the issue identified, a successful recycling program must include the following four stages as described in the Environmental Protection Agency's "Promoting Source Reduction and Recyclability in the Marketplace" (Richard Kashmanian, 1989):

- The recyclable material must be recovered from the municipal solid waste stream
- The material must be delivered to a manufacturer for processing
- Manufacturers must use reclaimed material in their production processes; and
- Consumers must purchase the finished product containing the recycled material

The main emphasis of research and policy focuses on the first three stages. The fourth stage relates primarily to household consumer demand in the final stages of the recycling process.

Examples of Successful Recycling Programs

The following are three case studies discussing successful recycling programs in the United States, and one from London's borough of Merton. All of the US locations were at one time considered to have recycling programs among the worst in the country. Each study demonstrates a different solution that may be useful in the improvement of recycling program aspects in Croydon or other locations with lacking recycling participation.

New Jersey

With a population reaching 8 million people, New Jersey consists of 565 municipalities which facilitate only 22 solid waste districts. Because of this New Jersey must export approximately 2.2 million tons of solid waste per year, primarily to Pennsylvania. In the early 1980's New Jersey was forced to shut down over 300 unsafe or unregulated landfills (not uncommon). These closures put a severe handicap on the waste management efforts of the state, and increased waste disposal costs by nearly 800%. The economics of this situation caused a governmental push towards the practice of recycling; an alternative to landfill waste disposal.

The 1987 mandatory recycling law required each of New Jersey's counties to develop and submit a recycling plan as part of its solid waste management program for approval by the New Jersey Department of Environmental Protection.

Along with the mandatory recycling of at least three materials, the program had to recycle a minimum of 15% of all waste within the first year. This baseline increased to a minimum of 25% by the second year. In total, each municipality was required to:

- Designate a recycling coordinator
- Provide for collection
- Require source separation of its designated recyclables
- Develop recycling plans for new development
- Submit tonnage grant reports

- Publicize the recycling program at least every 6 months
- Require separate leaf collection during fall months

This Recycling Act was amended again in 1992, increasing New Jersey's recycling goals to 50% of the municipal solid waste stream and 60% of the total solid waste stream as a requirement by December 31, 1995. New Jersey exceeded the original goal of 60% recycling rate by recycling over 10 million tons of the approximate 17 million tons of solid waste generated (United States Environmental Protection Agency, Aug 1999).

The huge success of this program is owed to the networking of the state, county, and municipal recycling coordinators stimulating activity, inner program support, and promoting the exchange of information among the counties to inform one another of new and improved ideas.

Another contributor to the success of these recycling efforts is the New Jersey recycling payout incentive program. The incentives program received financial support from New Jersey's mandatory recycling law providing for the funding of state, county, and municipal efforts from a \$1.50 per ton surcharge on all waste products. This surcharge produced revenue of approximately \$12 million that was allocated according to Figure 2-4 providing financial incentives for the economy. These incentives added additional motivation for the counties and public to participate in the program. A breakdown of the New Jersey Recycling Payouts is shown in Figure 2-4 (United States Environmental Protection Agency, Aug 1999).

NJ Recycling Payouts*	
40%	Tonnage grants to counties and municipalities
35%	Low-interest loans to businesses for research and market development
10%	Public education and awareness programs
8%	Program grants for counties
7%	Administration
*Note: The Recycling Tax sunset December 31, 1996. The Department is currently waiting for the state legislature to reauthorize the tax. Until reauthorized, recycling payouts have been temporarily suspended.	

Figure 2-4: NJ Recycling Payouts

Seattle, Washington

Seattle, Washington, is currently home to approximately 580,000 people stretching over an area of 142.5mi² (City of Seattle, 2007). The city managed all aspects of its waste disposal until 1986 when the city was required to shut down both of the city's landfills due to explosive levels of methane gas leaking from the sites costing the city \$76 million. As a result, the city could no longer take care of their waste without outside help and contracted with surrounding King County for landfill disposal. With Seattle's new contract, disposal rates skyrocketed from \$11/ton to \$31.50/ton forcing the city to think of alternative ways to manage their waste; recycling.

In 1988 Seattle initiated two separate collection strategies using private collectors reaching over 147,000 households across the city. The reason for using two different strategies was to test which strategy proved more efficient.

In the southern part of the city, 78,500 households utilized a kerbside collection program run by Recycle Seattle, a subsidiary of Rabanco, Inc. During designated times throughout the month, an old rear-loading truck collected recyclables placed on the kerbside relocating them to a new recycling facility where they were processed. The recycling facility processed both commercial wastes, containing a high volume of recyclables, along with the municipal waste collected from the kerbside program. To participate in the program, residents were required to sign up - free of charge - and received a wheeled plastic container equipped with a lid that could be stored outdoors. Program participants also received a complimentary calendar informing them of when recyclables would be picked up.

The northern part of the city consisted of 69,800 households whose recycling program was maintained by Recycle America, a division of Waste Management Inc. The program in the north was similar to the one in the south, with the exception that the north was allocated 4 recycling bins so that they could separate recyclables: one bin was for glass and metal containers, another for mixed scrap paper, a third for newspaper, and a fourth for number one and two plastics. Recyclable cardboard would be set next to the bins on the side of the road for kerbside pickup. Instead of a truck with bulk storage for mixed wastes, a compartmentalized truck was utilized. The government paid the company per ton removed, and the payment per ton of the recyclable material was based

on the market price for secondary material. In 1995, when the market was high, Seattle was paying \$50.22/ton whereas in 1996 when the market dropped, the city paid \$89.15/ton.

Across the city in both the northern and southern regions, it was required that all yard waste be separated from household trash. A program for kerbside pickup of yard waste was available for a fee of \$4.25 a month. This program would remove grass clippings, leaves, branches, brush, and sod to a composting facility.

Combined, the two-zone program collected 2,600 tons of material from February 1988 to August. Also by August, 72.1% of eligible households in the north end and 48.7% of households in the southern end had signed up, accumulating a voluntary sign-up rate of over 90% citywide (United States Environmental Protection Agency, Aug 1999).

The quick results attained by Seattle's program are credited to extensive promotion and responsive customer service representatives in the city's solid waste utility. The program was initiated with two all city mailings asking residents to sign up so that they could receive a free recycling container. Afterwards, continued advertisement encouraging participation in the program included booths at street fairs, working crowds at festivals, and bus placards around the city. Media coverage also publicized the program.

Worcester, Massachusetts

The mission of the City of Worcester, Massachusetts' Department of Public Works (DPW) is to "maintain the City's water, sewer and street and traffic systems for the protection of the public's safety and improvement of the quality of life for the citizens of Worcester" (Worcester, 2007). It is the Worcester DPW who oversees the collection and disposal of residential solid waste. Services provided by the DPW include kerbside pickup for all residents, resident access to yard waste sites for the disposal of brush and its like, bulky waste pickup (by appointment) for objects such as furniture or construction debris, and resident access to municipal drop off sites.

In addition to the DPW's efforts to increase recycling tonnage, the city has also implemented other programs in attempts to increase the public's knowledge of the

importance of recycling, and the different methods available for recycling municipal waste.

Educating children in the classroom from elementary school to high school is an important strategy used to share the importance of recycling with the community's youth and the adverse effects that failing to recycle can have on the environment. Ideally the children will not only share this information with their families, but also grow to be informed members of society proactive in recycling. City meetings with neighbourhood or community groups is another method used to spread the word about how, when, and where to recycle solid wastes. Programs like these have produced higher levels of actual program participation, increasing voluntary recycling levels through more widespread knowledge of the issues associated with recycling.

Worcester uses general waste collection fees to motivate residents to recycle. In place of free waste kerbside pickup, Worcester has a program where residents must place waste in yellow town bags that can be purchased at local convenience and grocery stores. The fee for these bags funds the recycling kerbside pickup program. Charging a fee for waste removal provides an incentive to recycle since recycling is free to residents after the purchase of a recycling bin.

London Borough of Merton

The London Borough of Merton has been very proactive about improving waste management since the European Landfill Directive of 1999. In 2002 Merton published an initial draft waste recycling plan for the years 2002-2008, and in 2006 they published the finalized waste management strategy that will be used to reform Merton's waste management program from 2006 to 2021.

The portions of Merton's new waste management program that are most notably successful, as well as most relevant to our work in Croydon are the improved kerbside recycling program and the 'recycling from flats' recycling initiative.

Merton's kerbside recycling collection program differs from Croydon's current program in a few key ways. The most significant difference between the two programs is that Merton collects recyclables on a weekly basis, while Croydon still collects fortnightly. Advantages of a weekly collection as opposed to a fortnightly schedule are:

- Residents do not have to store or transport very large quantities of recyclables as the collection takes place more frequently. This increases the convenience factor of the recycling program.
- More space is provided per unit time. This has the potential to greatly increase the amount that residents utilize the recycling program due to increased storage available for recyclable items that might be otherwise discarded in the rubbish when the green box is full.

Merton also distributes two distinct receptacles to residents to use for recyclables. Paper and glass are placed in one receptacle, while plastic bottles, tins, and card are put out for collection in the second receptacle. This is advantageous in the following ways:

- Residents will be more psychologically motivated to recycle all types of materials that are collected because the bins are more explicitly indicated for the collection of specific items.
- Residents will have increased space for accumulating recyclables. This has the same benefits mentioned under the section about weekly collection schedules.
- The time that the collection crew must spend sorting each recycling bin will be decreased as each bin is already separated into more easily recognized sub-categories.

Merton also has recently implemented a “recycling from flats” program in which certain blocks of flats are outfitted with community recycling bins. This means that individuals living in these flats who would like to recycle do not have to travel to a neighbourhood recycling centre to do so.

The added convenience of these localized collection points is an important factor in convincing individuals to recycle, especially individuals who would not ordinarily take time to carry recyclable items to recycling sites.

A third aspect which sets the Merton recycling scheme apart from the scheme currently in place in Croydon is the issue of plastic recycling. Croydon has a few neighbourhood recycling centres which accept plastics from residents, though plastics are not accepted in the kerbside recycling collection, nor are they accepted at a majority of the neighbourhood sites. Merton, however, accepts #1 and #2 plastics in their weekly kerbside recycling collection. Since plastics are so widely used by many individuals, the ability to collect these materials at kerbside is vital to increasing the overall percentage of recycled material in Croydon.

Recycling in the UK

Combined, England and Wales produce about 30 million tons of municipal and household waste annually. In 1998 and 1999 83% of this waste was sent to landfills (Department of the Environment, 2006). Municipal waste accounts for only a small portion of the total waste that is sent to landfills annually, and in combination with industrial and commercial waste, the amount of annual landfilled waste is truly staggering at around 106 million tons (Department of the Environment, 2006).

The British Government has recognized this inadequacy and in the year 2000 it introduced a new waste strategy to increase national recycling participation. The strategy proposed that by the year 2010, 30% of waste would be recycled or composted in England and Wales.

This target was originally set in the 1999 draft of “A Way with Waste” published as a preliminary waste management plan in the United Kingdom. The draft was critically analyzed by Professor D. Taylor, (the chairman of the Environment, Health and Safety Committee of the Royal Society of Chemistry), in a paper titled “*DETR Consultation Paper: ‘A Way with Waste’ – a draft waste strategy for England and Wales*”. He notes that the logic in the draft seems to be politically motivated and unrealistic. He also comments that cost implications of the proposed waste reform are largely ignored in the text. Professor Taylor does comment that the draft is very good at setting goals and targets. He notes, however, that “*A Way with Waste*” is less a detailed plan for action than it is a list of goals to be achieved in the future (D Taylor, 1999).

Professor Taylor’s criticisms, as well as many other suggestions for revision, were taken into account in the revising of the draft, and in the year 2000 the United Kingdom published “*Waste Strategy 2000*”. The publication placed less emphasis on the previously offered suggestion that 165 new incineration facilities be constructed in the United Kingdom. The House of Commons issued a report on this change in the strategy regarding waste incineration, and discussed issues such as the health risks of dioxins and other toxics from incineration, as well as the propensity of an incineration strategy to make recycling materials for reuse less appealing (*House of commons - environment, transport and regional affairs - fifth report.*).

Along with pushing the “Energy from Waste” incineration strategy to the rear, *Waste Strategy 2000* suggests that the recycling and reuse of post-consumer waste is an important facet of waste management to consider. The proposal states that the current waste production model is a linear one in which raw materials are processed and eventually removed from the cycle through disposal to landfills or incineration. Ideally this process would be cyclical, and virgin materials would become less important to the manufacturing process as larger amounts of recycle would be used in the manufacture of packaging and other consumer products (Figure 2-5).

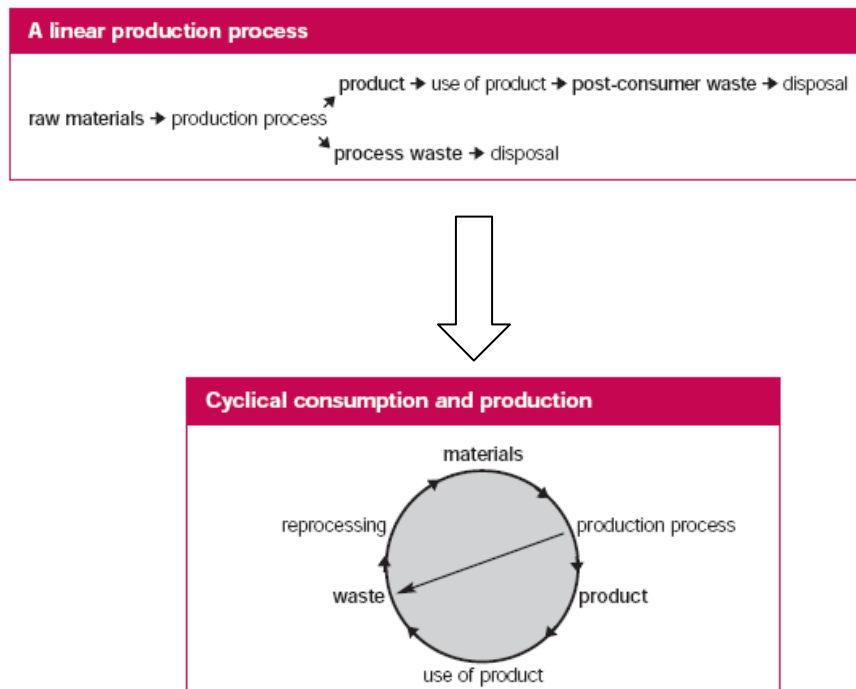


Figure 2-5: Proposed Change in the UK’s Waste Production Process for the Next 10-15 Years (Department of the Environment, 2006).

The successful implementation of this plan depends on the ability of the British government to drastically increase recycling levels. Though this is a seemingly broad and generalized task, it can be broken down into a few smaller, more deliverable steps. The proposal states that the recycled materials do not necessarily have to be re-used for the same purpose. This allows for a broader range of materials to be recycled. In order for recycling to be increased there must be a separation process, reprocessing capabilities and the use of recycled materials within the production process.

The government implemented the Waste and Resources Action Programme, which focuses on first creating “markets and end-uses for secondary material”. It will work on past initiatives such as the Environmental Technology Best Practice Programme, an initiative that was started to work on industrial waste and how to reduce wasted energy. There is also a projected incentive plan for households to recycle and re-use. Figure 2-6 shows the four main incentives for households in England.



Figure 2-6: Household Incentive Plan
(Department of the Environment, 2006)

Recycling in Croydon

Recycling participation in places like the Borough of Croydon must be increased in order to achieve the national recycling goals set forth by *Waste Strategy 2000* and other waste management initiatives. In September of 2006 a press release in the Borough of Croydon stated that the recycling rate was well below the standards the government had set (Croydon Council, September, 2006). In 2001/2002 Croydon produced 123,632 tons of waste and is said to be increasing by approximately 3% each year (*Recycling and reuse*). The community had only recycled approximately 16% of the waste it generated, while the government had hoped for 30% recycled waste by this time. This low number was attributed to lack of an efficient and easy recycling program.

The borough began to tackle this problem by initiating several improvements with the help of DEFRA and some government funding. They planned to build about 50 new recycling centres to make recycling more practical for residents of apartments and flats. Plans were made to update current recycling centres to make them easier for people to use and understand. This is important because centre misuse leads to the inability to

recycle the products that have been dropped off. Recyclables that cannot be processed then become part of the standard waste stream (Croydon Council, September, 2006). In 2006, another press release was issued informing people of a survey done to determine the effectiveness of the local kerbside recycling program. The survey was based on 115,000 houses observed by Waste Watch, a group of recycling consultants. It was noted that only 25% of the boxes were full on pickup day, a number far below the anticipated participation level. A door-to-door survey in the areas with the least amount of participation was planned to be performed later on in July. In the areas with better participation, the council distributed pamphlets that gave more details on the recycling program and also encouraged more people to take advantage of this environmentally friendly service (Croydon Council, 2006).

In the Borough of Croydon, geographical location is generally related to economic prosperity, and in turn this relationship seems to have an effect on recycling participation. The northern portion of Croydon shares both a lower average income, and a lower level of municipal waste recycling than the southern part of the borough. Our sponsor suggested that this discrepancy could be attributed to lifestyle, short housing turnover periods due to a more transient population, or language and literacy barriers.

As a result of the localized difference in recycling participation levels, the Council of Croydon's past efforts to increase recycling participation utilized pamphlets geared towards individual communities. Each pamphlet conveyed a different message targeted specifically to the area in which they were being distributed. For the more financially challenged northern region, the main message was that recycling could save money, while in the more prosperous southern portion of the borough the main message was that recycling was environmentally friendly. In addition to this, a variety of guides were created by the council and distributed to all residents receiving a green box. The guides contained information regarding national recycling guidelines, and included pictures and familiar symbols in an effort to avoid language barrier issues.

Across the entire Borough of Croydon, the council utilizes a fortnightly kerbside collection schedule to gather recyclable materials from the residents' homes. In order for the collection crews to pickup the recyclables, the bins need to be placed on the boundary between the road and the resident's property. If a resident is disabled or otherwise

physically incapable of bringing their recyclables to the kerb, he or she has the option to register with the council for a service in which the collection crew will pickup the bin closer to the front door.

The main difficulty the council has encountered with this program is that residents will place recycling bins in incorrect locations. If the bin is not placed on the boundary between the road and the resident's property, collection crews will not take the recyclables.

To inform residents of where to locate recycling bins for pickup, a calendar with detailed placement instructions is given to every resident along with other promotional materials (see Appendix J). Also, in an effort to reach those who have failed to place their bins in the proper place, a trial program of affixing stickers to misplaced bins was suggested by the council. One potential drawback of this solution is the implication that the collection crew was willing to walk up to the bin to place a sticker on it, but not to empty it.

Prior to the implementation of the kerbside recycling program, the council had a network of twenty-seven neighbourhood recycling sites across the Borough as the only means for recycling. These recycling sites were created in locations such as supermarkets and parks where people had easy day-to-day access. However, these sites have not been adequately maintained in recent years due to efforts being focused predominately on development of the kerbside recycling program.

Kerbside Recycling Program Improvement

Because evidence suggests that one of the most significant elements of a successful recycling program is convenience and ease of use for program participants, kerbside pickup services are very valuable in generating high levels of program participation. The logistical matters associated with this type of service, however, can be complicated. Determining the most effective strategy for kerbside pickup relies heavily on the collection of recycling data from communities with different methods of kerbside pickup.

Types of Collected Materials

One of the most important aspects of any recycling program is the type of materials that can be put out for collection. In order to collect a certain type of recyclable material, there must be a facility with appropriate processing capabilities to which the material will be sent and turned into reusable recycle. For this reason, not all recycling programs can accept all types of recyclable materials.

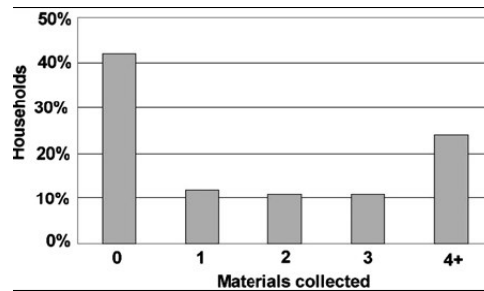


Figure 2-7: Number of Recyclable Materials Accepted in UK Kerbside Programs
(Harder et al., 20060401).

As Figure 2-7 illustrates, of the approximate 58% of UK households with available kerbside recycling collection, slightly under half are able to recycle four or more types of materials. Though over 40% of the UK does not have any kerbside collection program in place, this is often due to logistical problems like population density that is too high for an effective kerbside program. Places that do have an existing kerbside collection program, but are only able to accept one, two, or three types of recyclable material, present a substantial opportunity for recycling participation increase. Individuals who use kerbside collection are limited by the range of materials which are able to be presented for collection. These individuals would most likely be willing to recycle different types of material if these materials were collected at the kerb. Enabling kerbside programs to accept more diverse recyclables has the potential to greatly increase total recycling tonnage in the UK.

Physical Containers

Research has illustrated that a recycling program which provides a container for participants to use for their recyclables will see a larger amount of recyclable material collected than a program in which participants must provide their own container for recyclable material (Woodard, Bench, & Harder, 2005). The increased participation in

programs with provided containers can likely be attributed to a few factors. The increased convenience of having a bin that is only used for recyclables will motivate individuals to utilize the service rather than disposing of recyclables in the trash. A provided bin also can serve as a reminder for individuals to recycle as the container will often bear a recycling logo or other visual cues. It has also been suggested that standardized recycling containers may stimulate a constructive type of peer pressure in which non-recyclers will be recognized on collection day by the absence of a recycling bin on the kerb (Woodard et al., 2005).

Another important aspect of recycling containers is the size and type of container used. Among commonly used containers for recycling in the United Kingdom are 140L wheeled bins, 36L baskets, and reusable bags. Observations of recycling programs utilizing different container types have shown general benefits and drawbacks of each type of container. The most convenient and successful containment options were either of the rigid containers. The bins with wheels are practical in areas where storage space is not an issue, and residents do not have to carry them down many stairs. These bins are generally more expensive than other options, though in the right setting they can be worth the price. The smaller baskets prove to be more convenient in situations where residents have less available space to store recyclables, and where manoeuvrability of the container is important. Examples of this type of location may be multi-family houses or smaller apartment buildings. Reusable bags are the least desirable option, as they tend to have problems with durability, cleanliness, and moisture retention (Woodard et al., 2005).

Collection Schedules

Perhaps even more important than the physical means for presenting items for recycling collection is the schedule upon which the items are collected. Most recycling collection in the United Kingdom occurs fortnightly with collection of disposable waste occurring on a weekly basis. It has been hypothesized that this type of schedule adversely affects recycling participation because of the message about the secondary status of recycling. Though in reality recycling is often collected fortnightly because the yield of recyclables is not great enough to justify the costs of a weekly collection

program, it may appear that recycling is simply an extra service provided in addition to the weekly waste collection program (Woodard et al., 2005).

An effective strategy to combat this mindset would be to reduce the frequency of traditional waste collection while increasing opportunity for residents to remove recyclable material from their home. This would allow waste management programs to appear to be focused mainly on recycling, with a side service of residual waste disposal - an appearance that will most likely motivate people to recycle more and save less waste for the less frequent residual disposal times.

Chapter 3 Methodology

The span of this project has been to provide recommendations for increasing recycling participation in the Borough of Croydon and to assist the local community in reducing the environmental and economic impact of its current waste disposal habits. Through research of past recycling programs – both successful and less successful – and analysis of the current recycling methods in Croydon with resident feedback, we have developed several databases and recommendations for certain aspects of their recycling program. In order to accomplish this, it was important that we first obtain information through:

- Research and understanding of Croydon’s current recycling participation habits.
- Research and understanding of successful programs implemented in other communities in the UK and other countries.
- Observation of Croydon’s current kerbside recycling program and collect data on green box placement.
- Surveying residents from communities with both above average and substandard participation habits.
- Analyzing collected data to devise suggestions for improving recycling participation among the local residents.

Our sponsors provided a great deal of information and several suggestions regarding where to begin research and data collection upon our arrival to Croydon. The three main areas of focus for recycling participation increase included:

- 1 – Kerbside recycling program
- 2 – 24 recycling sites
- 3 – Promotional materials

The following chapter elaborates on our methodology. It details the steps taken during our seven weeks in London to gather the appropriate data needed for analysis.

Kerbside Recycling Program

The Borough of Croydon currently has a kerbside recyclables collection program for Croydon residents. Green plastic boxes with lids are provided to residents to fill with recyclables and leave on the kerb fortnightly. If the green box is not placed correctly on the kerb, however, the recycling crews are not obligated to collect them. “Quite often non-

collection of the boxes results in residents not continuing with the service and sometimes causes conflict between the collection teams and the resident” (Paul Vincent). To determine why residents are not putting the green boxes in the proper place as prescribed by the borough, we canvassed two areas set up by the council and Veolia Waste Management Systems of the borough. One route we shadowed, Route C, was identified as having a high number of residents participating in the kerbside program. The other route we shadowed, Route I, was known to have a lower level of recycling participation.

The first route that was shadowed was Route C. The goal was to organize the collection of data by specifying houses with green boxes placed in the correct area (where the end of their property meets the sidewalk), misplaced (not placed where the end of their property meets the sidewalk), and those boxes not put out for collection. The data was recorded in a notebook and later put in our results in Microsoft Excel (see Appendix E).

This method of data collection was then used throughout the roads on Route C. In order to not hinder the progress of the crews, a strategy was devised for the collection of the data. One member of the team recorded the data from one side of the road noting which boxes were placed correctly, misplaced, or not put out for collection, while another member walked on the opposite side of the road informing the group of the house numbers and their applicable green bin whereabouts. The third member of the group paid attention to which boxes the recycling men did not pick up due to bin misplacement or contamination. Such a method was suitable given that the roads were primarily side streets and fairly narrow so that communication among the team members did not become a problem. This also allowed us to keep all the data on one sheet, conserving paper and data.

This method of data collection proved to be efficient. However, we found that it could be accomplished with two people. When shadowing Route I we used the same procedure, only with two team members.

Following the observations that we made while accompanying the collection crews, we returned to the same areas to survey several residences that failed to present their green boxes correctly. We interviewed residents over the course of Weeks 3 and 4 between 5 P.M. and 7 P.M. expecting that most people would be at home during these hours. Unfortunately, this was not always the case. We had difficulty finding houses where people were home and willing to open their door to answer our questions. The original goal for the

interviews was to talk to about 40-50% of the people on the routes. Regrettably, it was only possible to speak with less than 5-10% of the residents on our two selected routes. This data was still useful in our evaluation of the program, since many of the residents had the same outlook on the current program.

The surveys were designed to establish the reasons for lack of participation:

- Were the residents aware of the current kerbside program?
- Did they utilize this program?
- Were they aware of the different materials that are collected in their area?
- Did they know where the boxes were supposed to be placed?
- How full did their box tend to get in a given collection period?
- If their box fills up, do they usually begin to throw away recyclables?
- What materials do they want to see collected in this program?
- Would they like to see any changes in the program, particularly in collection of materials and the collection schedule?

The surveys were done by two team members since it would be intimidating for the residents to have three students surveying them. During the interviews one member would primarily ask the questions, while the other recorded the houses that were visited and noted the answers from the residents. After completing each survey we would quickly compare the residents' answers to past interviews and make note of their demographics.

Use of Recycling Sites

Before the kerbside collection program was installed, Croydon's original recycling program utilized 30 recycling sites spread throughout the Borough. At these recycling sites residents had the option to drop off various recyclable items at certain sites that accepted those materials. However, with the implementation of the kerbside collection program, these sites "have suffered from a lack of investment" (Paul Vincent). Croydon Council asked that we develop an assessment of 24 of the 30 recycling sites around the borough and from that assessment conclude a set of recommendations for further site development.

To assess these sites, we made observations and took photographs of the area that were later used to create a photographic database. We then chose several sites, based on

their location in the borough and the amount of use the site appeared to receive, to return to and interview recycling site users.

Locating the Recycling Sites

In order to locate the sites, two team members used a map provided by the Croydon Council depicting general locations and landmarks of the 24 recycling sites along with a bus map to locate all sites. A street map was only useful in conjunction with the other maps, given that we did not know most of the recycling sites' street addresses.

Photographic Database

A photographic record was made of each site, taking care to show excess rubbish, graffiti, and sanitary conditions. Also while at the recycling sites observations were made regarding site usage, sanitation, and recyclables left that are not collected at the specific site. In order to determine site usage, as the flow of traffic was usually slow, we used a key provided by the council to open the containers and comment on the volume of recyclables while making sure to note when and how often the site was emptied.

With the pictures taken, we have compiled a photographic record of each of the 24 recycling sites via a website database. We used a website that has password protected access that will be passed on to the Croydon Council so they may update pictures for the various sites, providing them with an updatable photographic record database.

Interviewing Recycling Site Users

After finding the sites and compiling a photographic database, we chose ten sites that seemed to have the most use to revisit and interview people about their views of the recycling sites. The goal of the survey was to determine:

- Who (apartments vs. houses) is using the site?
- Why do they use that particular site?
- Where they travel from?
- How often do they visit the site?
- What materials, if any, they would like to see collected? (plastics, etc.?)
- Any suggestions for specific improvements from individuals who use the site.

At each recycling site we waited 30 to 45 minutes for people to use the recycling site so we could interview them. This time frame was determined by the group's feelings that waiting less than 30 minutes would be too short a time, and we could possibly miss out on interviews. We also felt that to wait longer than 45 minutes without an interview would be time wasted. Unfortunately, due to several weeks of rainy and cold weather, several of the selected sites have few or no users. This did not allow for the collection of as much data as we had originally hoped, but the data appeared to be consistent.

These surveys enabled us to best determine which sites are getting the most use, and whether or not these sites are used frequently, and if not, why. A comparison of data collected from users at several sites allowed us to create a detailed report of all factors involved in the success of recycling centres.

Promotional Materials

The Council of Croydon uses promotional materials such as pamphlets, brochures, and posters to inform residents about the recycling programs offered to them, and to enumerate the details of each program. It has been noted by our sponsors that “though not always the case, traditionally the economically poorer areas of Croydon have a poor recycling rate” (Paul Vincent). Our sponsors provided us with many of the promotional materials that they have used in the past (see Appendices F-K) so that we could see examples of their work. The materials that are distributed throughout the borough range from calendars of the collection schedule to general flyers and brochures about the programs offered.

Our initial goal was to assess the effectiveness of the promotional materials distributed by the council, and to determine the impact that these materials have on the less affluent, northern region of Croydon. This would have allowed us to provide evidence supporting our speculations about the barriers that might surface in future promotional campaigns in Croydon. This assessment would have also allowed us to make suggestions regarding changes that could be made to future promotional materials in order to make them more effective and visible to the community. Unfortunately, because of time constraints, the efforts we made to begin this assessment were

unsuccessful and it became impossible for us to speak with residents of the borough about the promotional materials distributed by the council.

In order to investigate why promotional materials are having less of an effect on the less affluent areas of Croydon – the northern section – we attempted to interview residents from a number of different neighbourhoods throughout Croydon. We decided that interviewing people from all areas would give us an idea of how the promotional materials affect the different sections of Croydon.

We planned to ask the following questions about the promotional materials:

- Have the residents seen recycling promotional materials?
 - Where have they seen them?
 - How long ago did they see them?
 - Do they remember what the message was?
 - How could they be redesigned to display a clearer message?
- What type of promotional program would be most likely to compel them to recycle?
 - Negative environmental effects?
 - Negative economic effects?
 - More convenient recycling procedures?
- What would be effective locations for promotional materials?
 - Billboards
 - Public Transportation
 - Flyers and pamphlets

We also tried to determine language barrier issues:

- Do the residents perceive a problem with people being able to understand the message in promotional materials?
- Do they think people of other nationalities would be more willing to recycle if they saw that promotional materials were being targeted to their native language?
- Do they have recommendations about making materials more linguistically friendly?
 - More pictures?
 - Different languages?

After a number of trials, door-to-door surveying within the community asking questions about residents' recycling habits did not prove to be an effective way to get feedback from the community about promotional materials. Our original plan was to travel door to door speaking with residents about the effectiveness of promotional items

while also interviewing them regarding their involvement with the kerbside collection program. We hoped that this would be an efficient way to gather data, and would provide us with the results we needed in a shorter period of time.

We discovered, however, that many individuals did not answer their doors when we knocked. In addition to this, many individuals who did agree to participate in our survey often did so with the disclaimer that they had very little time. Since the promotional materials survey is lengthier and less central to our project's main focus than the kerbside recycling survey, we had to shorten the surveying time by only conducting the survey about the kerbside program.

A second problem that we encountered when attempting to interview people, both about the kerbside program and promotional material effectiveness, was the language barrier. Many of the individuals who answered the door did not speak English fluently, and because of this we were unable to attain meaningful results from these survey attempts. Organizing "focus groups" was another method that we attempted to use in order to collect data from residents regarding promotional materials. We thought that these groups would not only allow us to ask our direct questions about promotional materials, but would also stimulate discussion among the residents about the topic of recycling in Croydon. We hoped to be able to observe the discussions and to derive conclusions from resident opinions. These focus groups would have avoided both the potential problems of vague answers to general survey questions, and residents feeling as if they had been put on the spot if the questions were asked in an un-planned environment.

We attempted to recruit focus group participants by contacting local resident associations, though our efforts were answered with virtually no success. In total, we attempted to contact about 20 residents associations, both by telephone and by email if no phone number was given for contact. Of these, we were able to speak to representatives from six associations, though we had no success in using the associations' member bases for focus group participant recruitment. This was largely due to poor communication ability among members of the residents associations. Most of the residents associations that we spoke to about arranging focus groups did not have an email contact list for the

members, and the only communication about upcoming events in most cases was a bi-annual newsletter.

The use of focus groups would have allowed us to see what effects our questions would have had on a group of people discussing potential ideas and solutions with each other. Through this approach we would have been able to obtain immediate and valuable qualitative results about resident opinions regarding promotional materials. Had we been able to organize and successfully run a focus group with residents from both the northern and southern sections of Croydon, we would have been able to see the impressions that the promotional materials have had on residents in each area. We would have then used the data and observations from these discussions to pinpoint particular ways in which to improve promotional materials throughout the council.

Although the focus groups and interviews did not work out, we were able to analyze the promotional materials from a new perspective. It was taken into account that many residents do not speak English and also that like with any advertisement, people tend to look at the paper once briefly. From this we were able to create a list of recommendations on how to best improve the promotional materials.

Chapter 4 Results and Analysis

The following chapter shows the data and results that we have compiled over the course of the project. Results from surveys conducted at neighbourhood recycling sites and door-to-door interviews, as well as observations of the kerbside collection program and recycling sites allowed us to compile a list of recommendations for the improvement of these programs.

Kerbside Recycling Program

Data collected while shadowing the collection crews for both Routes C and I are presented graphically in Figure 4-1 through Figure 4-34. Each figure shows the percentage of correctly presented and incorrectly presented green boxes for each individual street visited as well as the overall route percentages.

Route C Presentation Results

The following is the statistical breakdown of the observations made along recycling route C. Data is organized into two categories. “Presented” means that the green box was presented for collection. “Not Presented” means that no green box was presented for collection, or the green box at the residence was empty

Route C Overall

- **Presented – 76%**
- **Not Presented – 24%**

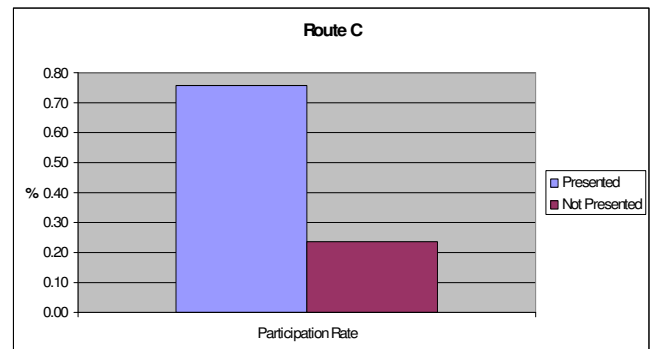


Figure 4-1: Compilation of Total Resident C Presentation (n=417)

Angelica Gardens

- Presented – 36%
- Not Presented – 64%

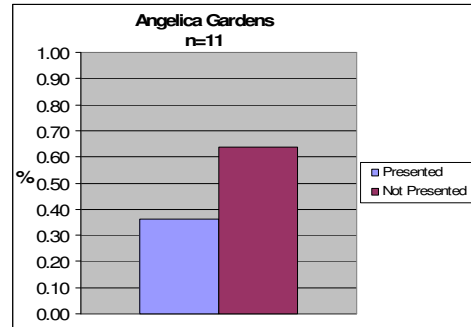


Figure 4-2: Route C: Angelica Gardens (n=11)

Basil Gardens

- Presented – 40%
- Not Presented – 60%

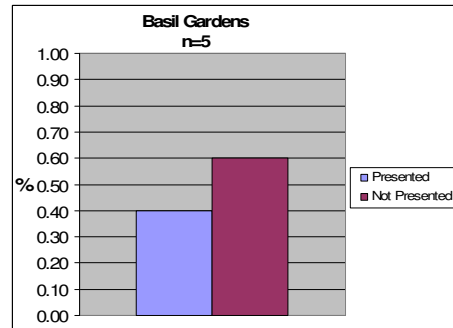


Figure 4-3: Route C: Basil Gardens (n=5)

Betony Close

- Presented – 70%
- Not Presented – 30%

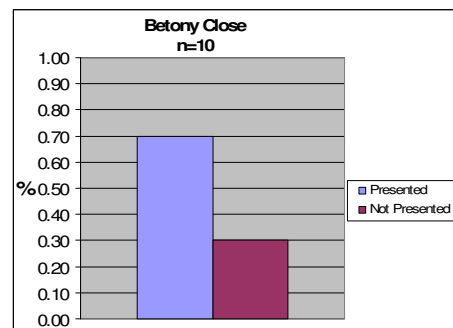


Figure 4-4: Route C: Betony Close (n=10)

Burdock Close

- Presented – 60%
- Not Presented – 40%

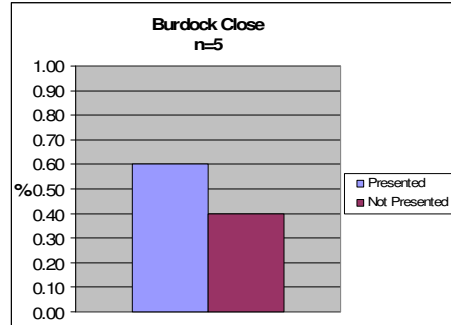


Figure 4-5: Route C: Burdock Close (n=5)

Cheston Avenue

- Presented – 71%
- Not Presented – 29%

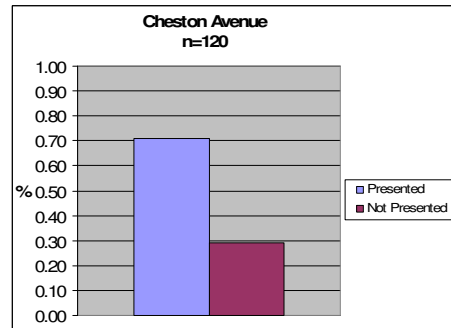


Figure 4-6: Route C: Cheston Avenue (n=120)

Cornflower Lane

- Presented – 68%
- Not Presented – 32%

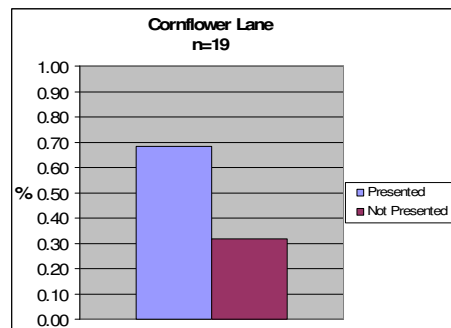


Figure 4-7: Route C: Cornflower Lane (n=19)

Cottongrass Close

- Presented – 67%
- Not Presented – 33%

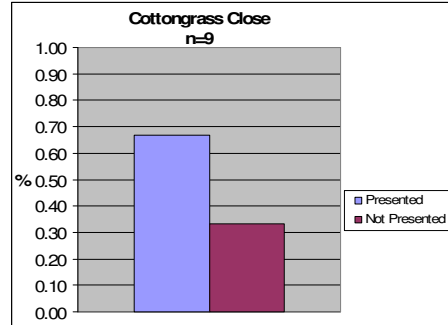


Figure 4-8: Route C: Cottongrass Close (n=9)

Crocus Close

- Presented – 40%
- Not Presented – 60%

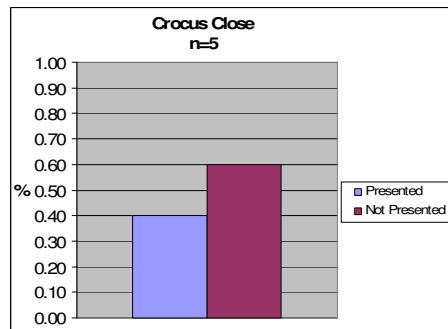


Figure 4-9: Route C: Crocus Close (n=5)

Daisy Close

- Presented – 70%
- Not Presented – 30%

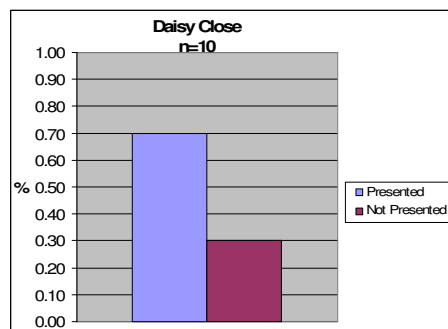


Figure 4-10: Route C: Daisy Close (n=10)

Firsby Avenue

- Presented – 78%
- Not Presented – 19%
- Presented Incorrectly – 3%

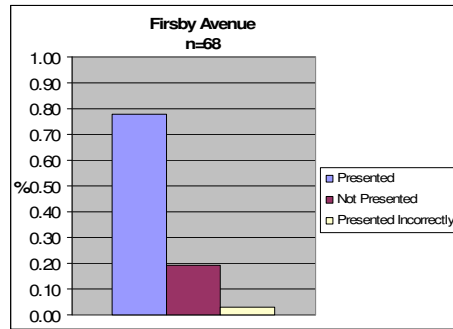


Figure 4-11: Route C: Firsby Avenue (n=68)

Parkfields

- Presented – 100%
- Not Presented – 0%

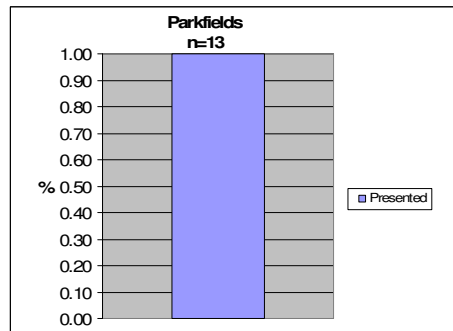


Figure 4-12: Route C: Parkfields (n=13)

Ridgemont Avenue

- Presented – 85%
- Not Presented – 15%

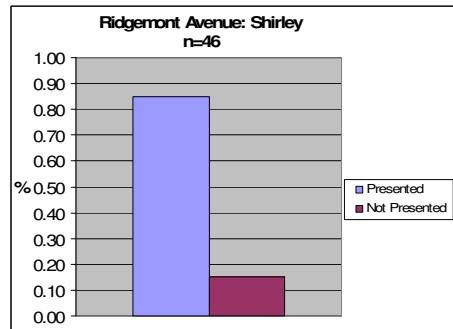


Figure 4-13: Route C: Ridgemont Avenue (n=46)

Verdayne Avenue

- Presented – 86%
- Not Presented – 14%

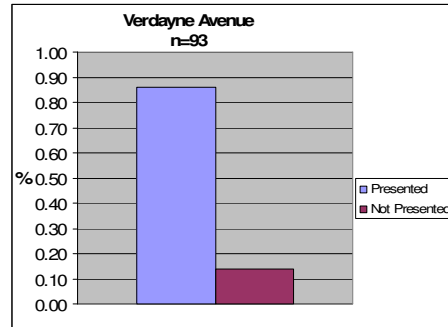


Figure 4-14: Route C: Verdayne Avenue (n=83)

Route I Presentation Results

The statistical breakdown of our observations along recycling route I consists of four categories. The addition of two categories was designed to illustrate presentation problems from this neighbourhood in greater detail. This detail was beneficial for us to have about Route I because of the low participation rate in this neighbourhood as opposed to the high participation rate among Route C residents. In order to make accurate recommendations about increasing recycling participation along Route I, specific problems with presentation needed to be illustrated.

“Presented” indicates that the green box was presented at the property’s curtilage. “Not Presented” means that the green box was not presented for collection at all, or the green box was empty. “Presented Incorrectly” means that the green box was presented for collection, but it was left behind a closed gate in the front yard, or at the doorstep of the house. “Contaminated” indicates that there were unacceptable materials mixed with the recyclables presented for collection

Route I Overall Results

- **Presented Correctly – 46%**
- **Not Presented – 47%**
- **Presented Incorrectly – 6%**
- **Contaminated – 1%**

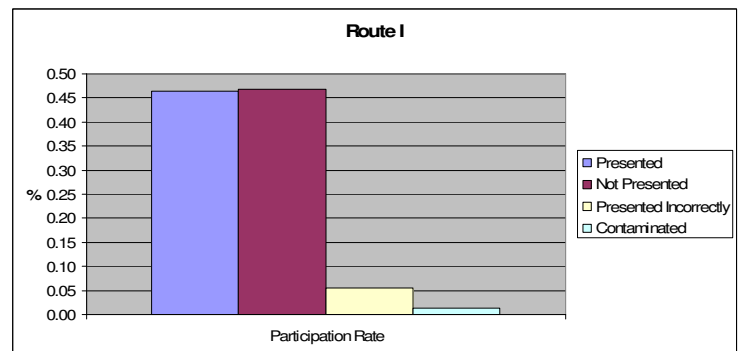


Figure 4-15: Compilation of Total Route I Presentation (n=761)

Arundel Street

- Presented Correctly – 60%
- Not Presented – 36%
- Presented Incorrectly – 4%
- Contaminated – 0%

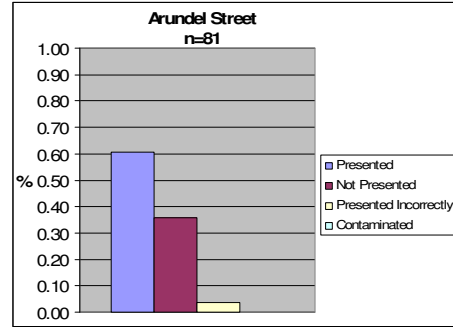


Figure 4-16: Route I: Arundel Street (n=61)

Burdett Road

- Presented Correctly – 84%
- Not Presented – 16%
- Presented Incorrectly – 0%
- Contaminated – 0%

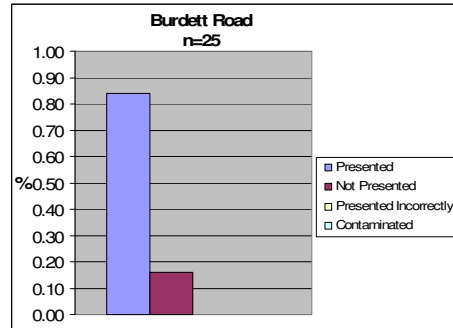


Figure 4-17: Route I: Burdett Road (n=25)

Clarence Road

- Presented Correctly – 38%
- Not Presented – 35%
- Presented Incorrectly – 27%
- Contaminated – 0%

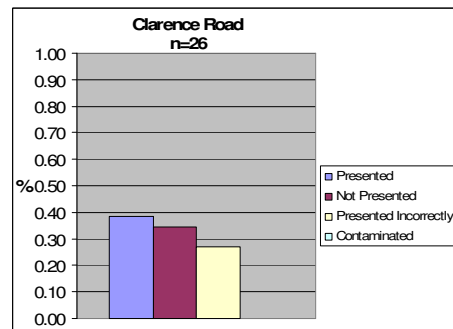


Figure 4-18: Route I: Clarence Road (n=26)

Gloucester Road

- Presented Correctly – 61%
- Not Presented – 39%
- Presented Incorrectly – 0%
- Contaminated – 0%

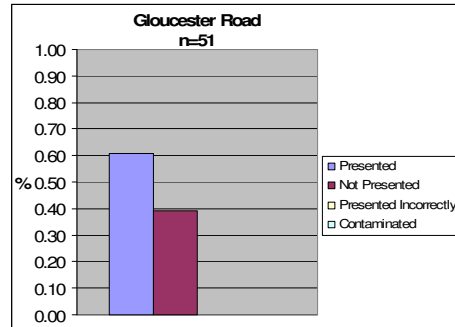


Figure 4-19: Route I: Gloucester Road (n=51)

Grenaby Avenue

- Presented Correctly – 26%
- Not Presented – 44%
- Presented Incorrectly – 19%
- Contaminated – 11%

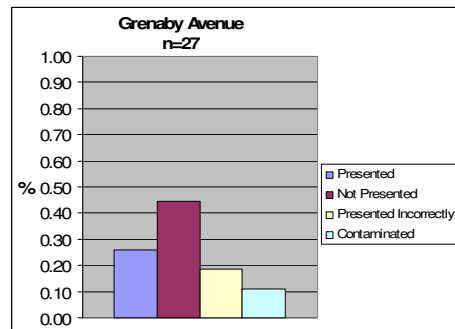


Figure 4-20: Route I: Grenaby Avenue (n=27)

Grenaby Road

- Presented Correctly – 9%
- Not Presented – 64%
- Presented Incorrectly – 27%
- Contaminated – 0%

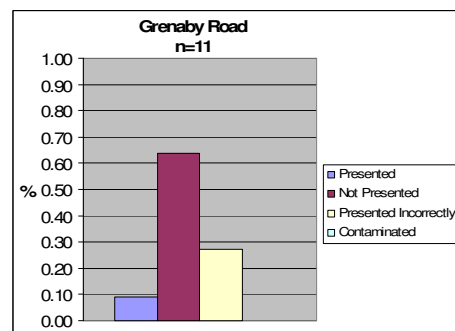


Figure 4-21: Route I: Grenaby Road (n=11)

Limes Road

- Presented Correctly – 55%
- Not Presented – 40%
- Presented Incorrectly – 5%
- Contaminated – 0%

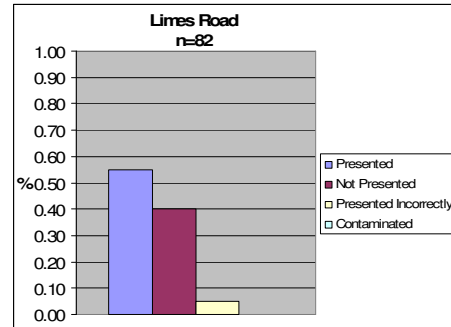


Figure 4-22: Route I: Limes Road (n=82)

Milton Road

- Presented Correctly – 61%
- Not Presented – 37%
- Presented Incorrectly – 0%
- Contaminated – 3%

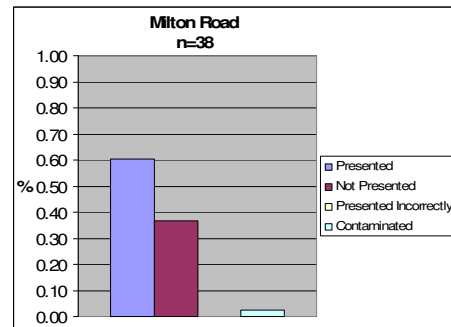


Figure 4-23: Route I: Milton Road (n=38)

Neville Road

- Presented Correctly – 36%
- Not Presented – 62%
- Presented Incorrectly – 0%
- Contaminated – 0%

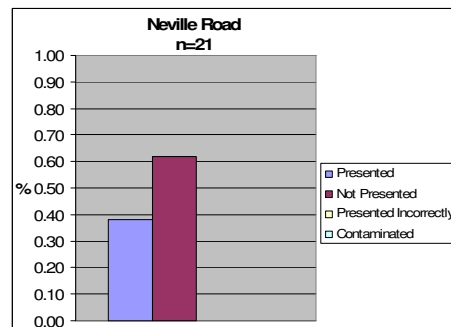


Figure 4-24: Route I: Neville Road (n=21)

Selhurst Place

- Presented Correctly – 51%
- Not Presented – 49%
- Presented Incorrectly – 0%
- Contaminated – 0%

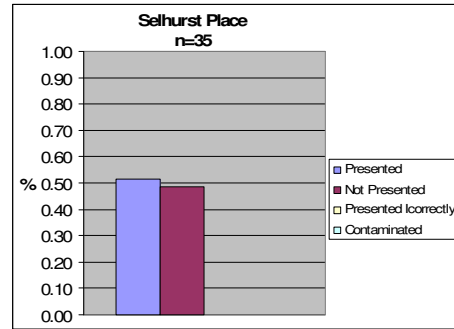


Figure 4-25: Route I: Selhurst Place (n=35)

St. James Road

- Presented Correctly – 38%
- Not Presented – 62%
- Presented Incorrectly – 0%
- Contaminated – 0%

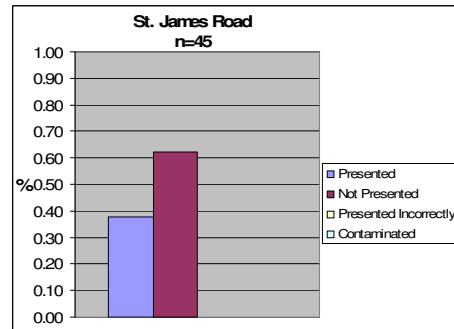


Figure 4-26: Route I: St. James Road (n=45)

Strathmore Road

- Presented Correctly – 8%
- Not Presented – 88%
- Presented Incorrectly – 4%
- Contaminated – 0%

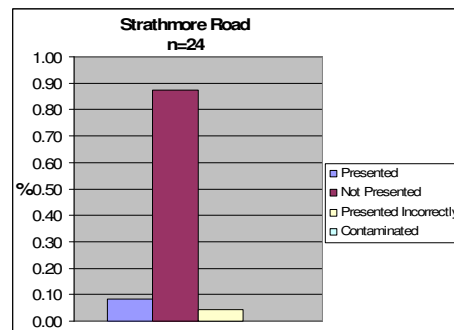


Figure 4-27: Route I: Strathmore Road (n=24)

Sydenham Road

- Presented Correctly – 41%
- Not Presented – 54%
- Presented Incorrectly – 3%
- Contaminated – 2%

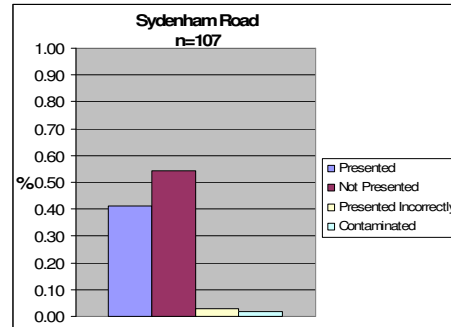


Figure 4-28: Route I: Sydenham Road (n=107)

Tavistock Grove

- Presented Correctly – 18%
- Not Presented – 71%
- Presented Incorrectly – 12%
- Contaminated – 0%

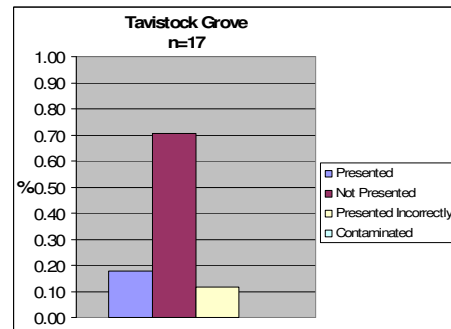


Figure 4-29: Route I: Tavistock Grove (n=17)

Thornhill Road

- Presented Correctly – 48%
- Not Presented – 33%
- Presented Incorrectly – 19%
- Contaminated – 0%

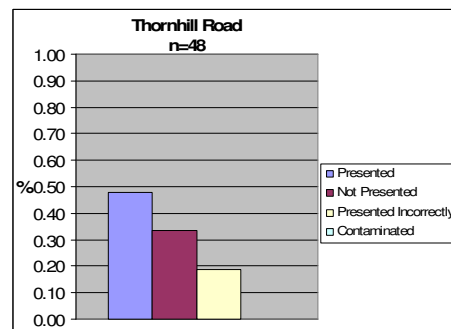


Figure 4-30: Route I: Thornhill Road (n=48)

Torrington Square

- Presented Correctly – 36%
- Not Presented – 52%
- Presented Incorrectly – 12%
- Contaminated – 0%

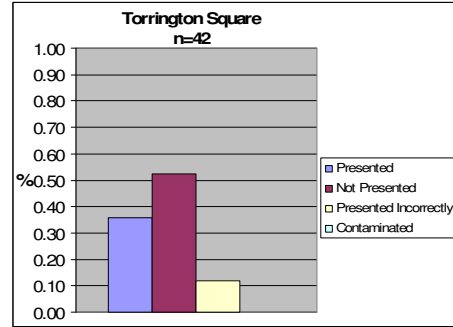


Figure 4-31: Route I: Torrington Square (n=42)

Westbury Road

- Presented Correctly – 58%
- Not Presented – 43%
- Presented Incorrectly – 0%
- Contaminated – 0%

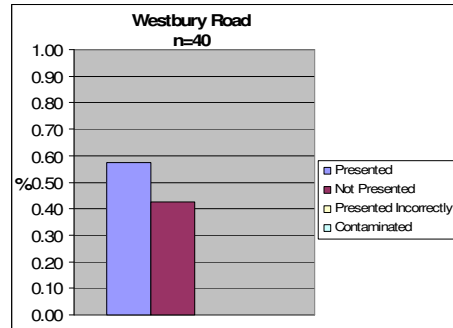


Figure 4-32: Route I: Westbury Road (n=4)

Willis Road

- Presented Correctly – 29%
- Not Presented – 71%
- Presented Incorrectly – 0%
- Contaminated – 0%

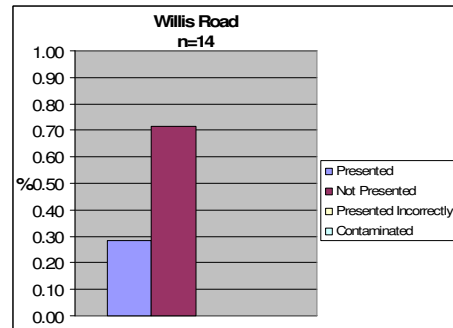


Figure 4-33: Route I: Willis Road (n=14)

Windmill Road

- Presented Correctly – 33%
- Not Presented – 52%
- Presented Incorrectly – 0%
- Contaminated – 15%

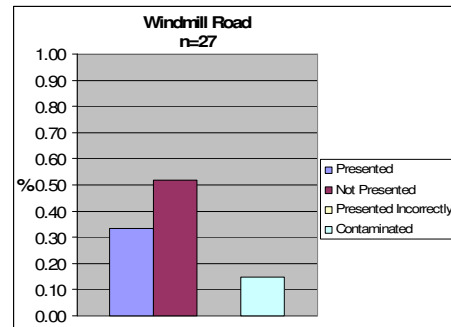


Figure 4-34: Route I: Windmill Road (n=27)

Kerbside Collection Observation Analysis

The data collected along routes C and I illustrate the effect that economic status can have on recycling participation in given neighbourhoods. Observations made along both recycling routes, suggest that route C residents were of a higher socioeconomic standing than residents along route I. Route C tended to consist of larger homes with more property per resident than the homes observed along route I. In addition, the homes along recycling route C were generally in better repair than homes along route I. These observations directly correlate to our observation of recycling rates in each neighbourhood, with route C recycling rates being considerably higher than the recycling participation rates observed along route I. This can be viewed graphically in Figure 4-1 and Figure 4-15 from both recycling routes.

Kerbside Recycling Program Surveys

Route C

Interviews with residents along recycling route C (Tuesday collection) are presented in several graphics. Figure 4-35 through Figure 4-41 display the most common responses from residents along route C to questions asked regarding Croydon's current kerbside collection program. The results indicate that many residents in this area fit the following general profile:

- 100% of the interviewed route C residents are aware of the kerbside recycling service.
- 78% of interviewed route C residents regularly use the kerbside recycling service.
- 100% of interviewed route C residents are aware of what materials may be presented for collection in the kerbside recycling program.
- 89% of interviewed route C residents are aware of where the green box should be presented for collection.

- 78% of interviewed route C residents feel a need for plastics to be collected as part of the kerbside recycling program.
- 67% of interviewed route C residents feel that it would be beneficial for the kerbside program to also collect green garden waste and cardboard.

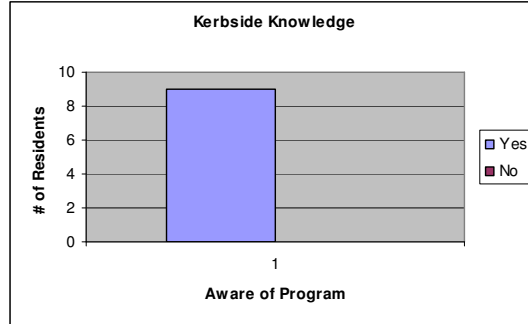


Figure 4-35: Route C: Residents Knowledge of Kerbside Program (n=9)

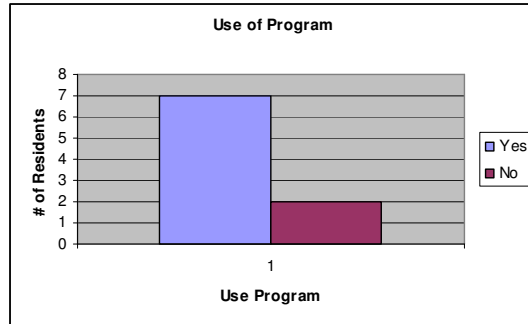


Figure 4-36: Route C: Residents Use of Kerbside Program (n=9)

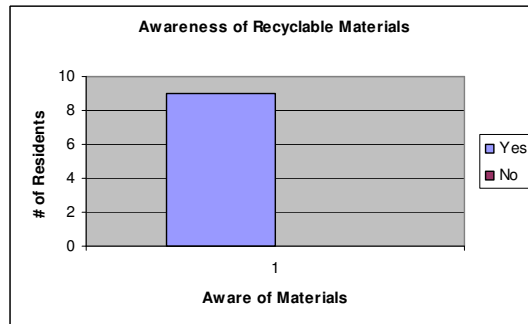


Figure 4-37: Route C: Residents Awareness of Recyclable Materials (n=9)

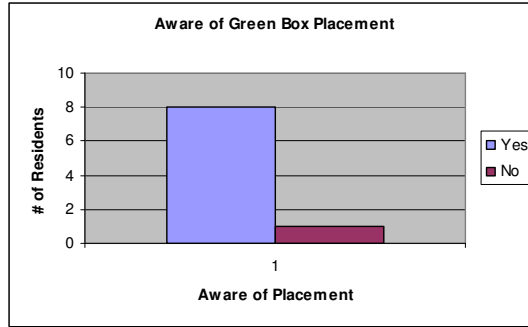


Figure 4-38: Route C: Resident Awareness of Green Box Placement (n=9)

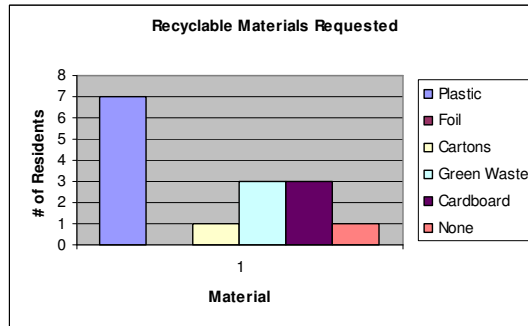


Figure 4-39: Route C: Requested Recyclable Materials (n=9)

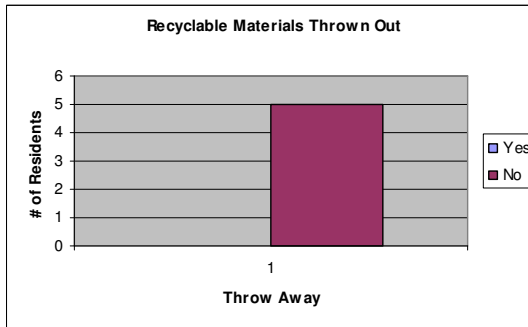


Figure 4-40: Route C: Residents That Throw Away Recyclable Materials (n=5)

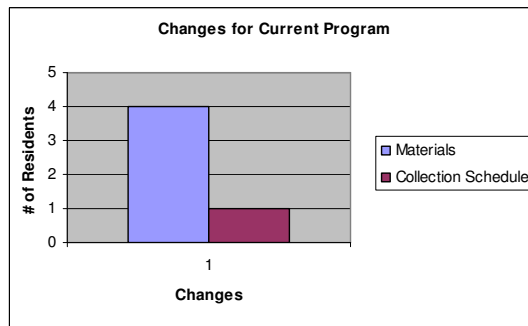


Figure 4-41: Route C: Changes Residents Would Like to See for the Kerbside Program (n=5)

Residents interviewed along Route C were generally elderly individuals, often living alone or with one other individual. In addition to this, the neighbourhood in which we were interviewing residents seemed to be above average economically. We observed that this demographic group has an above-average kerbside recycling participation rate, and generally participates correctly in the program.

Route C Survey Analysis

The main reason for route C residents not participating in the kerbside collection program was not lack of knowledge or lack of motivation. Instead, many residents expressed that the kerbside collection program simply did not accept all of the recyclable materials that they needed to recycle, so they brought their recyclables to a neighbourhood recycling site instead of separating their recyclables for kerbside collection.

The materials most frequently requested by residents in this category were cardboard and plastics. This indicates a strong desire for a recycling program that accepts these materials among the population that already recycle.

Route I

Figure 4-42 through Figure 4-47 show the overall views of several residents from route I neighbourhoods. The surveys reveal the following results:

- 100% of the surveyed residents were aware of and using the current kerbside recycling program.
- 67% of the surveyed residents knew where the green box is supposed to be placed.
- 83% of the surveyed residents knew which materials are recyclable in their area.
- 5 out of 6 residents do not throw out recyclables once their box is full.
- 83% of surveyed residents would like to see plastics recycled in the near future.

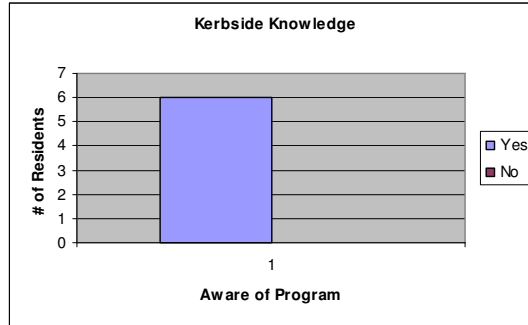


Figure 4-42: Route I: Residents Knowledge of Kerbside Program (n=6)

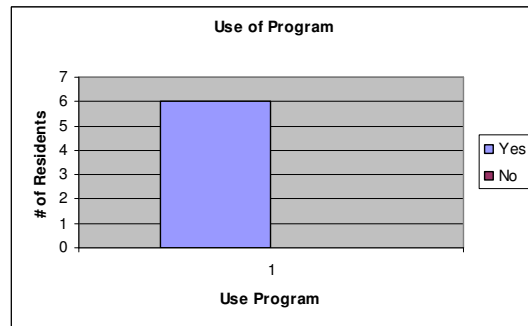


Figure 4-43: Route I: Residents Use of Kerbside Program (n=6)

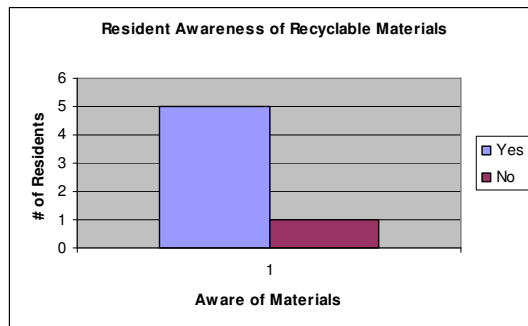


Figure 4-44: Route I: Resident Awareness of Recyclable Materials (n=6)

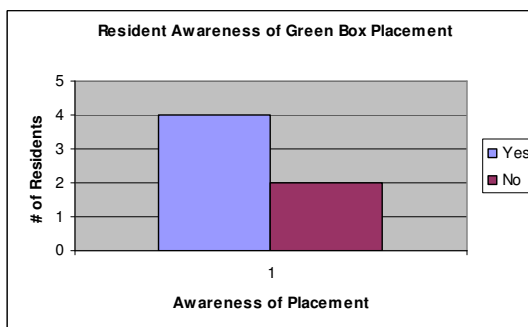


Figure 4-45: Route I: Resident Awareness of Green Box Placement (n=6)

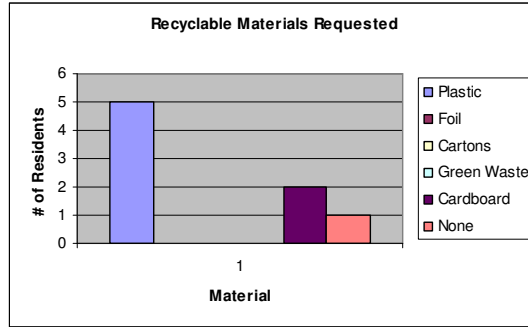


Figure 4-46: Route I: Requested Recyclable Materials (n=6)

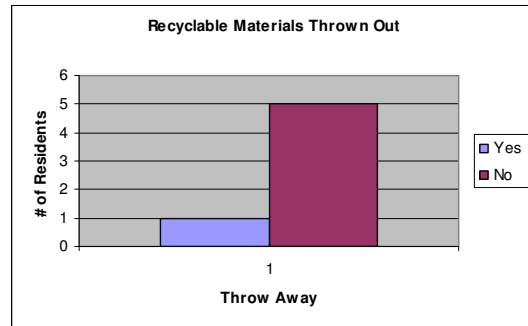


Figure 4-47: Route I: Residents That Throw Out Recyclable Materials (n=6)

Observation of the demographics along route I suggest that the residents we interviewed along this route tended to be of mixed age and race. In addition, the neighbourhood in which we were interviewing residents seemed to range from average to below-average economically.

Route I Survey Analysis

From the data and observations collected along recycling route I we have suggested reasons for the state of program participation among these residents. One obstacle that we encountered when trying to interview residents along the recycling route was language. Several individuals who answered the door when we were attempting to interview residents did not speak English fluently enough to answer our questions. The fact that we had a problem with language barriers, however, should be some indication that instructions for green box presentation written in English may be less effective for these individuals.

Though our interview results indicate that a high percentage of route I residents are aware of correct green box placement, and use their green box on a regular basis, the observations made while following recycling crews indicate otherwise. Because of this, we believe that the residents interviewed do not represent a large enough or diverse enough sample upon which to

base conclusions about recycling participation in the neighbourhood. This could be attributed to the fact that individuals willing to answer the door and answer questions about recycling are the same individuals who participate in the program correctly and regularly. Another possibility is that interviewed residents felt uncomfortable admitting non-participation in the recycling program, and did not give truthful answers about their recycling habits.

Recycling Centre Observation

The Borough of Croydon contains 30 recycling centres, of which we evaluated 24. Figure 4-48 through Figure 4-56 compare individual observations made collectively over the 24 sites. Observations suggest that overall:

- About 95% of the sites are used on a regular basis.
- Glass and paper tend to be the most recycled materials at many of the centres.
- 100% of the labels are of the old version of the council’s logo. Also, they tend to not be uniform throughout the centres and sometimes vary at a single centre.
- 88% of the labels are in average to good condition, but many need to be replaced due to graffiti and fading.
- 54% of the bins are in average condition, although many need to be repainted due to rust and graffiti.
- Over half of the sites are dirty and appear to be in poor condition.
- 50% of the centres have containers that have been observed to be contaminated with non-recyclable materials.
- 67% of the sites are handicap accessible and do not have health or safety issues.

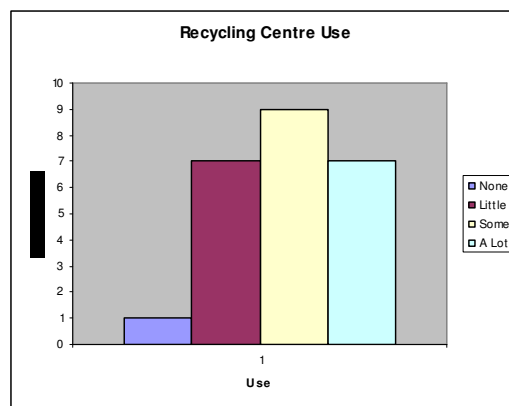


Figure 4-48: Observed Use of Recycling Sites (n=24)

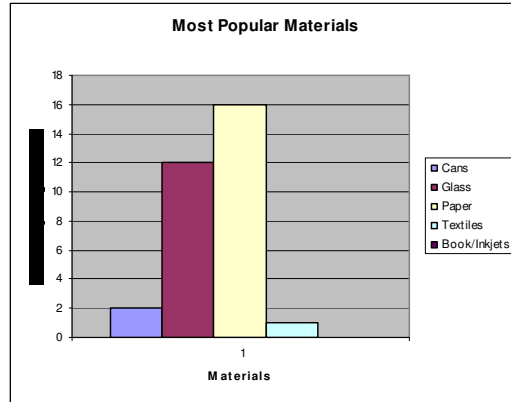


Figure 4-49: Content of Materials at Recycling Sites (n=24)

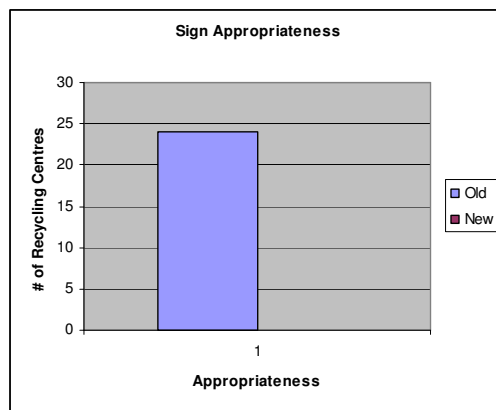


Figure 4-50: Observed Label Appropriateness (n=24)

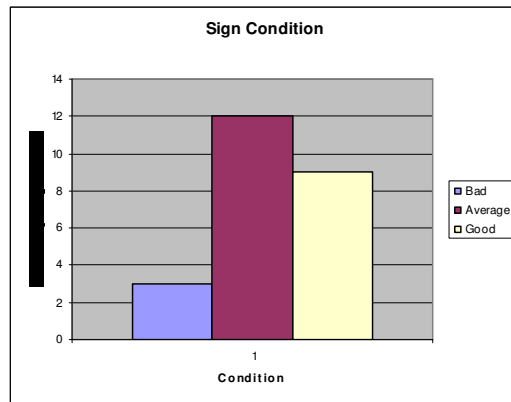


Figure 4-51: Condition of Labels (n=24)

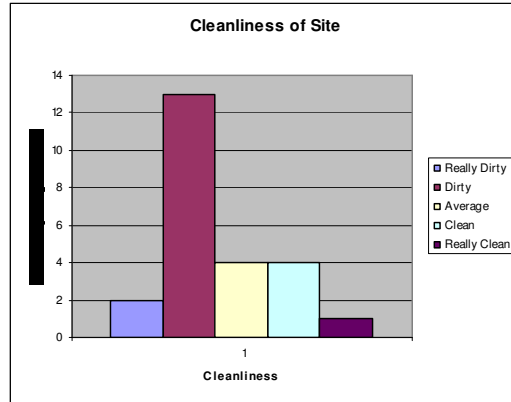


Figure 4-52: Level of Site Cleanliness (n=24)

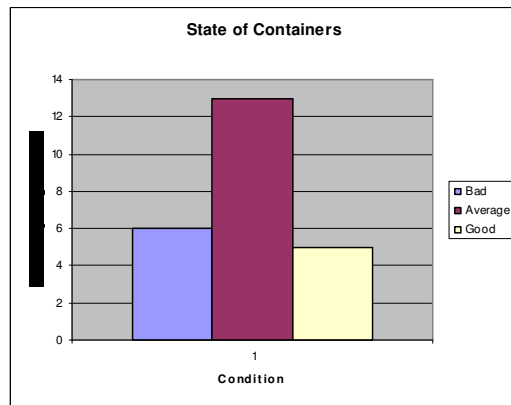


Figure 4-53: Container Condition (n=24)

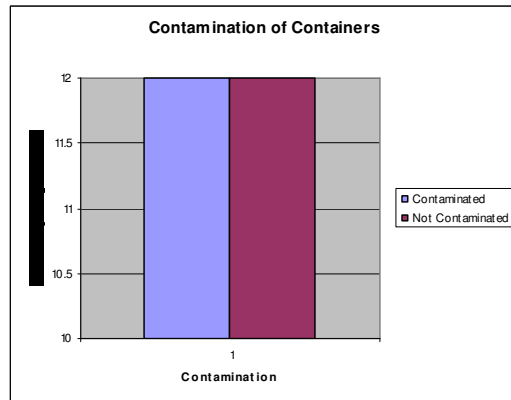


Figure 4-54: Observed Contamination of Containers (n=24)

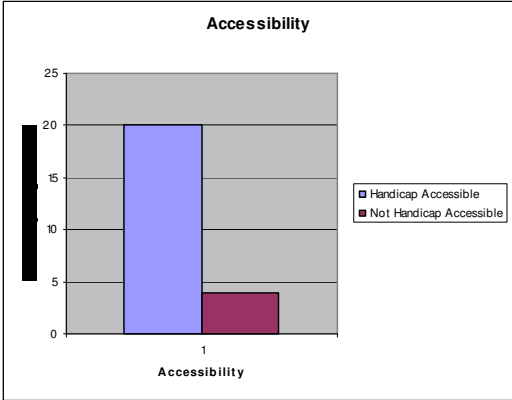


Figure 4-55: Accessibility to Site (n=24)

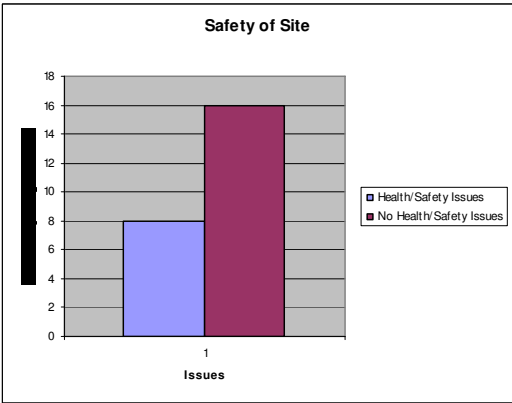


Figure 4-56: Safety of Sites (n=24)

Below are the numerical survey results from interviews conducted with residents using neighbourhood recycling sites:

Use	Total	Cleanliness of Site	Total
None	1	Really Dirty	2
Little	7	Dirty	13
Some	8	Average	4
A lot	7	Clean	4
		Really Clean	1
Most Popular Material(s) by Volume			
Cans	2	Contaminated Containers	
Glass	10	Yes	11
Paper	16	No	12
Textiles	1		
Books/Inkjets	0	Accessibility	
		Easy for anyone	20
Label Appropriateness		Not accessible for handicap	4
Old	2		
New	22	Health/Safety Issues	
		Yes	8
Label Condition		No	16
Bad	3		
Average	12		
Good	9		
State of Containers			
Bad	6		
Average	13		
Good	5		

Table 1: Total Numbers Taken Through Observation at Recycling Sites

We have provided the Croydon Council with an online photographic database via Webshots, containing a photographic record of each recycling centre. This database has 24 albums, with each named for the recycling centre that it represents. In every album there is a picture of the bus stop taken to get to the site, an overall picture of the centre, and individual labelled pictures of each of the containers. The website is easy to use and can be kept updated by the council in the future via password access. The Website is available for viewing by all, and comments can be made to the various photos by the general public. Webshots Desktop, a

program available from the Webshots website, can be downloaded to any computer and provides a faster and easier way of maintaining the database. The website can be found at: www.community.webshots.com/user/CroydonD07. Figure 4-57 is an example of what the website looks like, and the picture on the lower right is a screenshot of the Webshots Desktop interface.

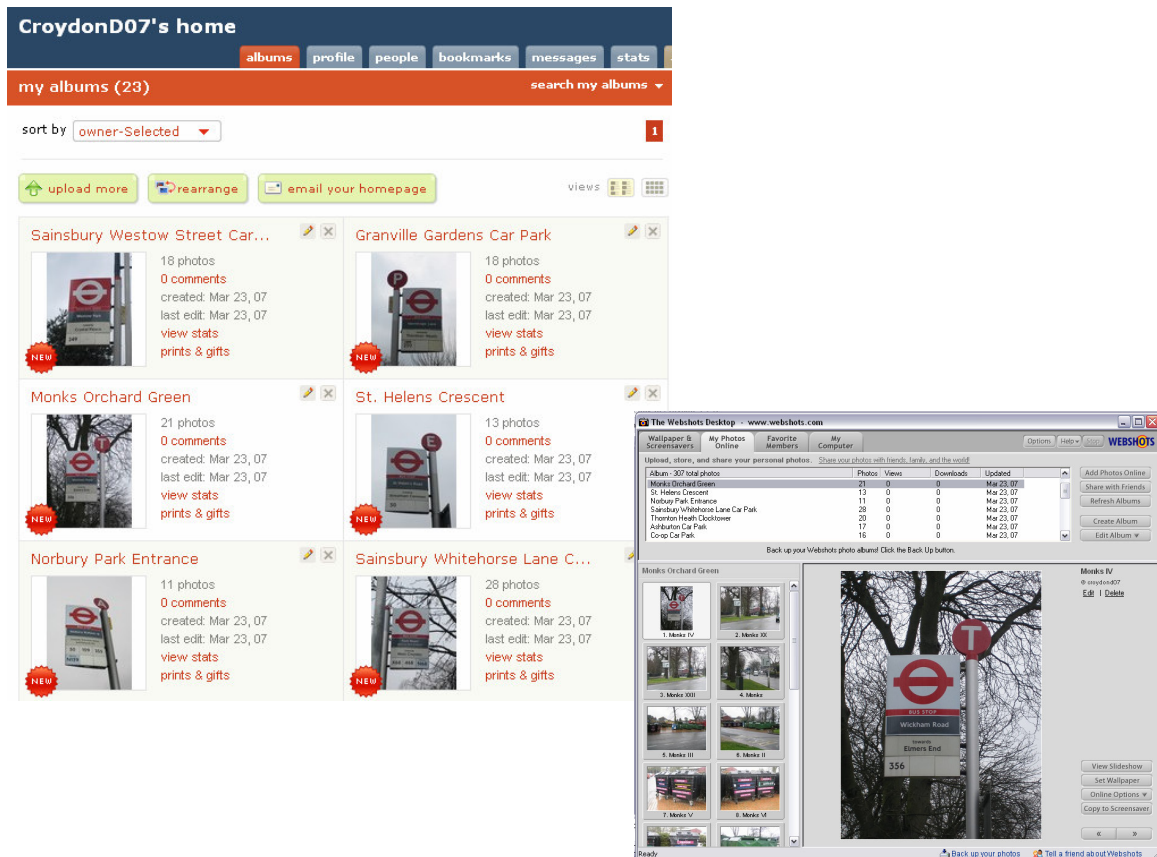


Figure 4-57: Example of Webshots Database

We have also provided the council with a more detailed database made with Microsoft Publisher. This database contains directions to each site, recommendations, pictures at each site, observations, the date that it was visited, and how many people were observed using it on the given day. An example of one of the recycling sites database page can be seen in Figure 4-58 on the page below, and the rest of the document is available in a separate file.



Figure 4-58: Example of Publisher Database

Analysis of Recycling Centre Observations

Of the recycling sites observed, 79% had a substantial problem with rubbish in the surrounding area. Three main types of rubbish had accumulated at the sites: plastic carrier bags, non-recyclable materials, or rubbish overflowing from rubbish bins located at the site. The statistical breakdown of sites containing each type of rubbish is illustrated in Figure 4-59.

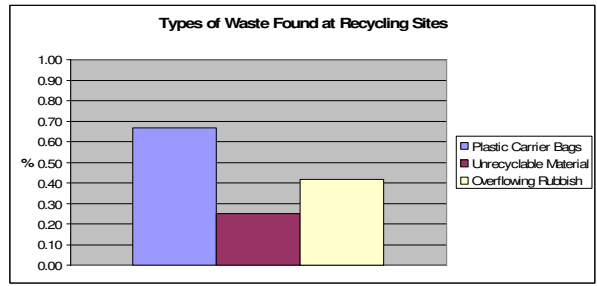


Figure 4-59: Rubbish Found at Recycling Centres (n=24)

Recycling Centre Surveys

Following the completion of observing the recycling sites, several sites were visited again in order to determine local residents' thoughts on the recycling sites. Figure 4-60 through Figure 4-68 graphically show the information gathered from these interviews. The following gives information about residents using the sites, and illustrates their general feelings about the sites:

- 74% of the recycling site users interviewed currently live in a house.
- Of these home-owners, 100% of them have a kerbside program offered in their neighbourhood.
- 80% of these home-owners use the kerbside program, and 20% either use the program occasionally or not at all.
- 71% of the recycling site users interviewed lived less than a mile from the site.
- The rest of the surveyed residents lived no more than 5 miles away from the site.
- 86% of the recycling site users recycled at the chosen site because of its location near another errand they had to do that day.
- 93% of the interviewed users consistently recycle paper at the recycling sites.
- Glass is also recycled consistently; according to the recycling site users 56% of them bring glass to the sites.
- 78% of the recycling site users would like to see plastics recycled in the near future.
- 52% of the users believed that the recycling sites they visited were mostly clean, other than the plastic bags always left behind.
- 100% of the recycling site users think that the sites are very easy to use.

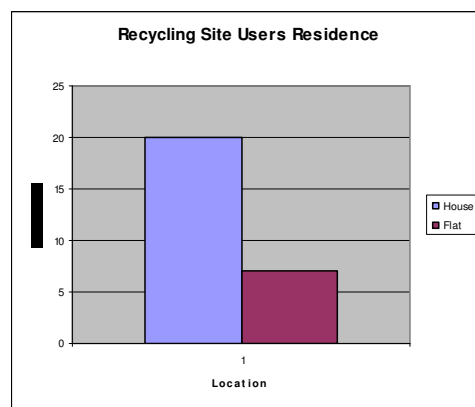


Figure 4-60: Residence of Recycling Site Users (n=27)

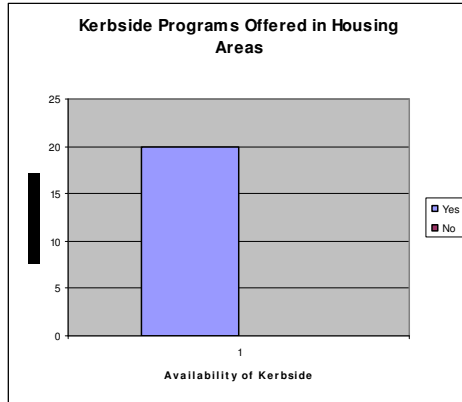


Figure 4-61: Kerbside Program (n=20)

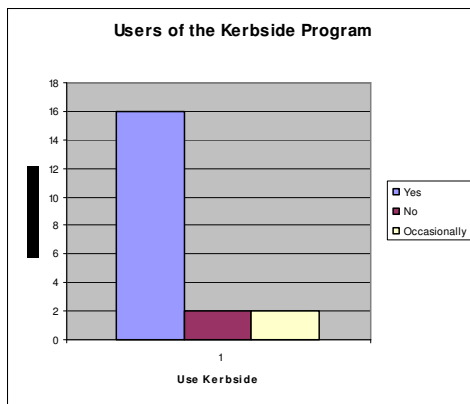


Figure 4-62: Kerbside Program Users (n=20)

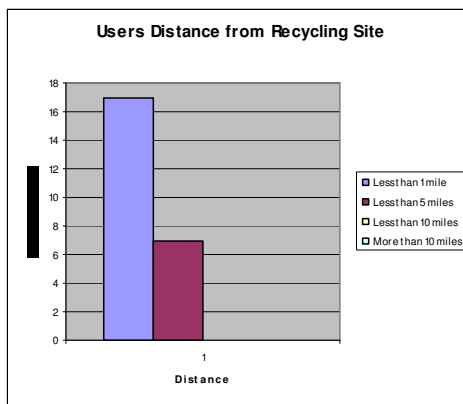


Figure 4-63: User Distance from Recycling Site (n=24)

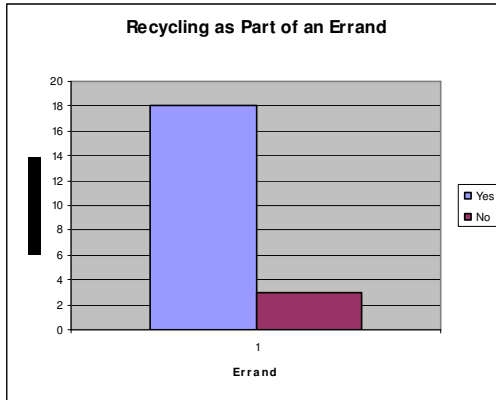


Figure 4-64: Recycling Site Usage as Part of Another Errand (n=21)

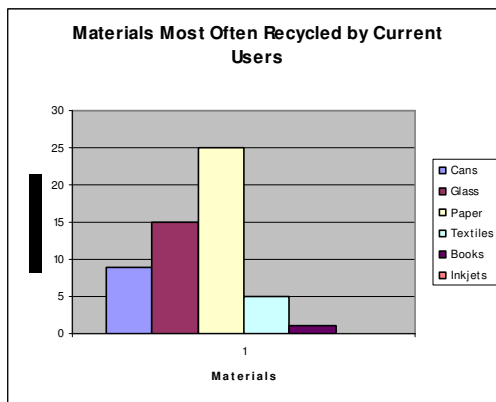


Figure 4-65: Most Popular Materials as Noted by Residents (n=27)

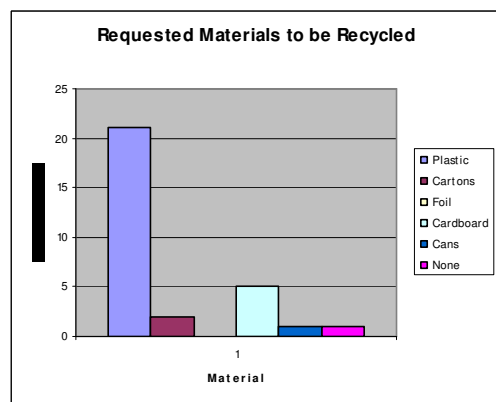


Figure 4-66: Materials Requested at Recycling Sites (n=27)

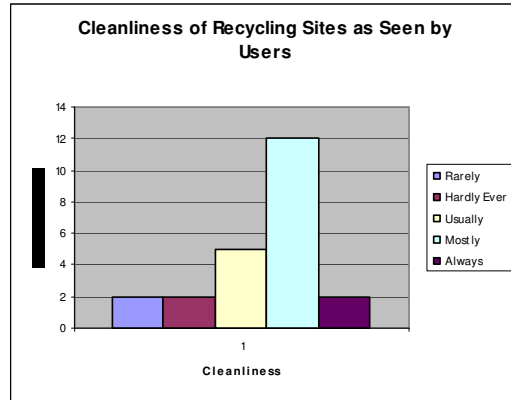


Figure 4-67: Cleanliness of Recycling Sites (n=23)

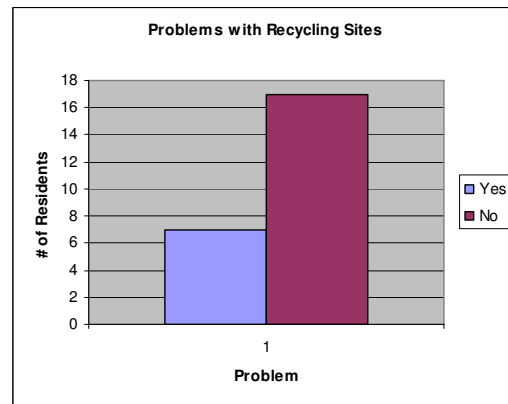


Figure 4-68: Problems with the Current Recycling Sites (n=24)

Recycling Centre Survey Analysis

The surveys reveal a general trend in comments made repeatedly by residents. Several noted that they would often go to other boroughs to recycle plastics and other materials not collected by Croydon. A few of the collection sites become too full before the materials are collected. Many residents would like to see bins more frequently collected or more bins at such sites. Almost everyone surveyed said that the sites become littered with plastic bags or other rubbish. They noted that a rubbish bin would be a good solution for this issue.

Most of the individuals surveyed at neighbourhood recycling sites lived in houses rather than flats, and had kerbside recycling services offered in their neighbourhood. These individuals noted that their reasons for using the neighbourhood recycling sites were that kerbside collection was too infrequent, or did not collect an adequate range of materials. The recycling site that flat

residents chose to use was often the site closest to their residence. Home owners often opted to use sites that collected the materials that were not accepted in their kerbside program.

Promotional Material Analysis

Though we were unable to organize focus groups to discuss promotional materials, and interviewing residents proved to be an ineffective method for gathering data about the promotional materials in use by the borough, several recurring observations from resident interviews enabled us to formulate an analysis about the council's promotional materials. One of these observations was the language barrier; many of the residents could not answer our questions due to the fact that they were unable to speak English. Many of the promotional materials tend to be heavy on text with few pictures. This could prove difficult for a non-native English speaker to understand.

Throughout the borough we observed no flyers or posters promoting recycling. If the promotional materials are not visible within the borough, then the residents will not be familiar with the program and the services offered in their area. In contrast we noticed many recycling posters around several areas of London with higher recycling rates, such as Camden.

Chapter 5 Recommendations

After analyzing the data collected from shadowing the recycling crews, observing the recycling sites, interviewing numerous residents, and reviewing promotional materials; several recommendations aimed to increase recycling participation have been developed.

Working with the recycling crews, we collected data on how many people in certain areas misplaced their collection bins. This enabled us to see where residents misplaced their boxes and suggest solutions to the miscommunication about bin placement.

After working with the crews, visiting the recycling sites was the next course of action. At each site observations were made regarding maintenance, usage and ease of finding the site. With this information, conclusions regarding making the recycling sites more easily accessible and usable could be derived.

We interviewed residents and asked questions such as “do you feel that this recycling site is kept clean on a regular basis?” Questions like this were asked in an effort to ensure that observations made at the recycling sites were accurate representations of the usual site condition.

In reviewing the promotional materials, efforts to organize a focus group were flawed due to time constraints and lack of responses. We reviewed the materials, looking for sources of possible problems with comprehension and clarity of message. A significant issue with many of the promotional materials was that they relied too heavily on text to convey important messages. The use of pictures would greatly improve message comprehension for non-English-speaking individuals.

The following section details our recommendations for the improvements of the recycling programs offered by the Croydon Council.

Plastics

Interviews with residents at the recycling sites and door to door revealed that their primary interest is to see a wider variety of recyclables collected at both their doorstep via kerbside collection and at the recycling sites. When specifically asked, “Are there any more materials you would like to see collected?” – 78% of residents said “plastics”.

Why Recycle Plastics?

Plastics are one of the lightest recyclable materials. Because of this they add minimal weight to the overall tonnage of recyclables collected by a community. The extra time and finances needed to implement a program and teach people the types of plastic (Figure 5-1) that are accepted in the program often outweighs the minimal economic benefits of plastic recycling.

Although recycling plastics initially does not cause a drastic increase in recycling tonnage, the long-term effects on the environment make it worth the efforts. Recycling plastics has the ability to reduce emissions of CO₂ and nitrogen oxide, conserve non-renewable fuels and energy, and to reduce solid waste.

In contrast to creating plastics from virgin materials, the emissions of carbon dioxide and nitrogen oxide are reduced greatly by producing plastics from a recycled source.

Plastics, like many of today's manufactured products, are made from a virgin material that will one day run out. The oil used to create plastics comes from a fossil fuel. As a means to keep up with the demands for oil for other sources, such as fuel for cars, provide heat and energy, the fossil fuels are quickly diminishing. Any way to postpone the consumption of oil is a good method to conserve the virgin material.

Recycling plastic materials is currently one way to slow down the consumption of fossil fuels while still being able to keep up with the demands for plastics. For instance, it takes only 25 recycled PET bottles to manufacture one adults fleece jacket (*Plastics Recycling.INFO*). Given that 486 million plastic bottles were recycled in the United Kingdom in 2003; 19.4 million adult fleece jackets had the potential to be manufactured using recycled materials.

Polymer Types	Examples of applications	Symbol
Polyethylene Terephthalate	Fizzy drink and water bottles. Salad trays.	
High Density Polyethylene	Milk bottles, bleach, cleaners and most shampoo bottles.	
Polyvinyl Chloride	Pipes, fittings, window and door frames (rigid PVC). Thermal insulation (PVC foam) and automotive parts.	
Low Density Polyethylene	Carrier bags, bin liners and packaging films.	
Polypropylene	Margarine tubs, microwaveable meal trays, also produced as fibres and filaments for carpets, wall coverings and vehicle upholstery.	
Polystyrene	Yoghurt pots, foam hamburger boxes and egg cartons, plastic cutlery, protective packaging for electronic goods and toys. Insulating material in the building and construction industry.	
Unallocated References	Any other plastics that do not fall into any of the above categories - for example polycarbonate which is often used in glazing for the aircraft industry	

Figure 5-1: Plastics 1 – 7
<http://www.wrap.org.uk/>

In addition to using unnecessary oil, creating new plastics also wastes energy. The creation of plastics utilizes 4% of the output of oil refineries to satisfy societies need for plastics. In order to produce 1 kilogram of plastic from a virgin source takes 36.16MJ of energy. However, if you were to create that same plastic from a recycled source, it would use only 4.39MJ of energy. It takes 8 times less energy to recycle plastic than the energy needed to create the same plastic from a virgin material. Given these figures, the energy saved could be used to power a 60W light bulb for six hours per bottle recycled (*Recycling Plastic Bottles - The Energy Equation*). Comparatively, the total energy required to produce a new plastic from a virgin material exceeds the energy required to collect plastic bottles through a kerbside collection program or recycling sites.

Recycling plastics greatly decreases the volume of rubbish brought to landfills. Approximately 11% of household waste is plastic. Of this waste, 40% are plastic bottles. The overall cost to dispose of this per year is £45 million (*Plastics Recycling.INFO*). The more a community recycles, the more it reduces its landfill requirements. Using alternative methods for waste disposal helps to increase the life of a landfill as its dependency is decreased. As fees for disposing of waste is continually on the rise as an incentive to recycle more; plastic seems to be the one recyclable material that is ignored because it does not significantly add to overall recycling tonnage.

If plastics were included in the recycling program, not only would there be positive long term environmental effects, but residents would have a more positive outlook on the recycling program. Many people question why certain materials are collected in some areas but not others, and immediately cite fault in the program.



Figure 5-2: Plastic Bottles in a Croydon Rubbish Bin

Plastics, plastic bottles specifically, are used on a daily basis. Unfortunately, without proper recycling programs the bottles end up in the rubbish. Given that the public has expressed a desire for a program that allows them to recycle plastics, it would generate good publicity for recycling if these demands were answered.

Although proper plastic processing facilities are lacking in the London area, economics proves that with time supply meets demand. Currently, if there seems to be no need for a plastics processing facility in the

London due to minimal Boroughs recycling plastics, there will be no motivation for a facility to be built. However, if more Boroughs were to express an active interest in recycling plastics with programs already installed, a company looking to expand would consider London a prime area to begin. Eventually, recycling plastics would lead to the creation of jobs. With the development of new infrastructures, jobs ranging from waste management to product development, manufacturing and marketing could be created.

Increasing the variety of recyclables collected through the recycling programs offered by the council would make recycling more convenient and increase overall recycling participation throughout the borough.

Recycling Bin Placement with Rubbish Bins

Offering recycling bins next to rubbish bins throughout the borough would allow residents to choose to recycle without any added effort. Considering that 9 out of 10 people in England and Wales would recycle more if it was made easier, a top priority with recycling programs should be in making them simple (*recycle now*).

Many individuals rely on public transportation to get around the borough, often consuming beverages in plastic or glass bottles. When finished with these bottles, people look to the nearest rubbish bin to dispose of their waste. If a recycling bin was located next to each rubbish bin, it would take no added effort to choose to recycle the object instead of discarding it. Prime locations for such recycling bins include at parks, public restrooms, and areas of transit.



Figure 5-3: Camden Lock Sign



Figure 5-4: Recycling Bin at Camden Lock

Currently, Camden Lock of Central London recycles 50% of its waste (Figure 5-3). This area experiences a high level of foot traffic and is an ideal location to offer plastic bottle or can recycling options next to rubbish bins (Figure 5-4). If all the aluminium drink cans sold in the United Kingdom were recycled, there would be 14 million fewer full rubbish bins per year (*Recycling Aluminium Packaging in the UK*). Offering a simple way for people to take part in recycling is one step towards reducing the amount of waste that goes to the landfills through rubbish collection.

Kerbside Recycling Program

We noticed that on average 50% of residents misplace recycling bins on collection days. The proper placement of the recycling bin is where the end of one's property meets the



Figure 5-6: Improper Kerbside Bin Placement

kerb (Figure 5-5). However, people are often forgetful of the day of collection, too busy to relocate their bin in time for collection, or feel that their recycling bin is too heavy to move to the edge of their property. Whatever the case may be, numerous situations were noted where the bin was misplaced and left beside the doorstep instead of being placed at the end of one's property on the days of collection (Figure 5-6).



Figure 5-5: Proper Kerbside Bin Placement

In door-to-door interviews, 90% said that they do know where the box is supposed to be placed. Several elaborated on their knowledge of the proper box location by pointing to where they place it on the days of collection. However, often the residents described or pointed to an improper place. When informing residents that the proper place for the recycling bin was at the end of their property before the kerb, many commented, "Well they collect it from here anyway, so this is where I put it".

Although issues with people feeling too busy to place their recycling bin properly can be helped only so much, the main focus here is educating people where the proper place to put your recycling bin. People knew what day the collection crews came around supporting that the promotional materials are doing their job in that respect, however a lack of knowledge on where to place the box was evident.

Uniform Collection Criteria

The residents' lack of knowledge on proper bin placement is due in part to variable collection habits among recycling crews. Some crews choose not to collect from a bin that is misplaced, and other crews choose to collect from that bin regardless. In doing this, mixed messages are sent to residents regardless of the council's efforts to inform residents on the proper location for the recycling bins. If the collection crews still collect the residents' bins from their

doorsteps, there is no incentive for the residents to put in the effort to relocate the box on collection day.

Complaint calls placed to the recycling company about bins not being collected are one possible reason for this variation. Crews feel that, “Just taking the few extra steps to collect the bin is easier than dealing with the complaints” (Ricky - Recycling Crew Member Route C).

The council should reiterate to the recycling crews that they should not have to go out of their way to collect the bins. In order to establish clear communication between the council and the residents, the collection crews need to work in conjunction with one another and either collect all misplaced bins or none.

Informing residents of proper bin placement could be accomplished by using one of the following methods.

Stickers

The council considered using stickers to inform residents that they have misplaced their bins. The idea was to have recycling crews place stickers on bins that were not located at the kerb in order to inform residents of why their bin was not emptied. Some residents might be discouraged to see that the recycling crews were willing to walk up to the bin and place a sticker on it, but not to empty it.

We have developed a similar alternative to this sticker method. Instead of placing a sticker on the bin informing the resident that ‘the bin was misplaced’ and walking away without collecting the recyclables, a different message could be delivered. A sticker could be used to inform the resident that “By (some prescribed date in the future), your box must be presented where the collection crews left it or your recyclables will not be collected”. After collecting the recyclables, the crew would place the sticker on the side of the container and leave it in the location they would like to see the bin presented for collection.

This method not only would reach the residents with a message that their bin was misplaced, but would also physically show them where they should place their bin in the future. Also on the sticker should be the cut-off date when crews will stop collecting the misplaced bins to serve as a warning to the resident. This way they will not be surprised when they leave their bin in an improper place for collection and the crews do not collect it.

Door Hangers

One reason people seemed confused about where to place their bins is weak communication. Whether the resident does not speak English or merely does not understand what is meant by, “from the kerb at the edge of your property” (Appendix H), bin misplacement is common. One way to alleviate this is to bypass the language barrier and utilize images to communicate messages. There were instances where people seemed to make an effort to place their bin near the kerb, though not quite in the proper place (Figure 5-7). Situations like this can cause confusion on the part of the recycling crew. Questions like “Should it be collected, even though it is improperly placed?” and “How far is too far away?” are created.



Figure 5-7: Recycling Bin Placed Misplaced by a few Meters

A visual representation available to all residents depicting the definition of “from the kerb at the edge of your property” (Appendix H) would be a beneficial way to clarify any discrepancies.

One method of sharing this information with residents who habitually misplace their green bins is to use a door hanger.

Crews are required to keep record on their route of what houses did not present a bin and what houses had presented a bin contaminated with non-recyclable materials. If the crews were to also mark down what bins they did not collect due to misplacement, the council could use that data to determine which houses should receive a door hanger.



Figure 5-8: Example of a Door Hanger

Another benefit to the door hangers is that not only could they be used to reach out to individuals who have misplaced their bins, but they could also be used to reach out to individuals who have contaminated bins. Besides misplacement or lack of presentation of a bin, the other reason why recycling crews would refuse to collect from a bin was due to contamination. One side of the hanger could be used to depict the proper placement of a bin, while the other side of the door hanger could then be used to elaborate what materials are acceptable in the bins.

Paint

A more involved approach to ensuring residents understand where to place their green bin is by painting a mark in front of every house. The mark would represent where the resident is to place their green bin on collection day. The mark would be made with a natural paint colour and would display the house number so that each resident knows where their bin is to be placed (Figure 5-9).



“Green Bin – #”
written on paint line

Figure 5-9: Green Bin Paint

Recycling Sites

Improving the aesthetics and ease of use for the recycling sites requires attention to several areas. A majority of the sites had bins that had minimal or fading signs and rusting or chipped paint that need to be replaced. Almost all of the sites had bins with outdated signs offering false contact information by displaying outdated telephone numbers. Some sites used different types of bins to collect the same recyclables. However, individuals with language barriers could be easily confused as to what is accepted where if they are use to putting their recyclables in the same size, shape, and colour bins. Various other sites had excessive amounts of rubbish floating around the area. The rubbish consisted mainly of plastic carrier bags used to bring recyclables to the site and recyclables left in front of overflowing bins. A photographic database and a site by site analysis is available in a separate document. The following section elaborates on the overall suggestions as bulleted in the appendix.

Update Signs/Bins



Figure 5-11:
Clothing Bank at
Monks Green
Orchard

In order to guarantee residents understanding of what materials are accepted in the various bins, clear labels describing what materials are received in each bin are essential. Many of the posted signs have become faded due to age and weather conditions (Figure 5-10). In other cases, signs on bins at recycling sites have become distorted due to rust and intense paint chipping (Figure 5-11).

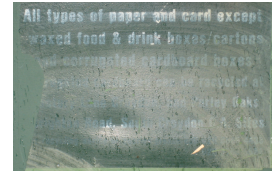


Figure 5-10: Sign on Paper Bin at Ashburton Park

When two bins are collecting the same items, similar colours and signs should be used in order to differentiate it from similar bins. Issues of contamination could be avoided if bins were not only identifiable with clear labels but through the use of similar colours as well. Using a uniform colour coded system would be an advantageous way to help those with language barriers who cannot read the posted signs. Individuals would be able to learn through pamphlets provided in their own language, such as the ones they receive yearly, which materials are acceptable at which bins and then associate the colour key provided in the pamphlet to the bins at the site.



Figure 5-12: Outdated Signs at Fairfield Car Park

Although Croydon does currently have a method regarding national standards of item icons and colours, nearly all of the signs on the bins are outdated. The icon images already standardized should be updated on the bins regardless if the sign is in good condition. Along with outdated icons, outdated contact information on the bins display false information (Figure 5-12). If a resident were interested in contacting their local officials using that number, they would be discouraged to find it is an outdated source.

Although Croydon does currently have a method regarding national standards of item icons and colours, nearly all of the signs on the bins are outdated. The icon images already standardized should be updated on the bins regardless if the sign is in good condition. Along with outdated icons,

Paint

To further enhance the aesthetics of the sites, cleaning up the graffiti markings is essential. The majority of the recycling sites are graffiti free. A few sites - Forestdale Shopping Centre, High Street, and St. Helen's Crescent - have only a small marking on one bin. However, three sites were noted to have excessive amounts of graffiti on more than one bin requiring immediate attention. These sites include:



Figure 5-14: Clothing Bank Graffiti at Co-Op Car Park

- Ashburton Park Car Park
- Co-Op Car Park
- Lion Green Road Car Park

Since most of the bins are outdated and need to be replaced (Figure 5-13), attempting to remove the graffiti would be futile if a new bin will only take its place. However, newer bins; such as the clothing bank in Figure 5-14, have excessive amounts of graffiti on them that need attention. Replacing a new bin with another new bin as a means to remove the graffiti would not be cost efficient. An alternative would be purchasing a solvent to remove the markings, or painting over them.

In order to deter future graffiti markings, anti-graffiti coatings are available through various service vendors. One vendor, Tensid, operating out of Surrey, supplies “a complete range of efficient, cost-effective and environmentally friendly products designed to remove existing graffiti and protect surfaces to make removal easier from future attack” (www.buildingdesign.co.uk). Tensid is not a contractor; however using their extensive nationwide list of approved contractors, they do offer to help organizations find one.

Given that only six recycling sites have any issues with graffiti markings, and only three of those recycling sites have markings on more than one bin, purchasing anti-graffiti coating for all the recycling sites would be costly and unnecessary. Instead, purchasing anti-graffiti coating for any new bins placed in known problems areas would be a beneficial way to avoid future attacks.

Another way to deter graffiti artists is to use bins that have muted tones such as brick red, brown or grey. Vandals are less likely to deface property with these colours as the graffiti will not stand out. One bin that received a lot of attention from vandals is the bright blue



Figure 5-13: Clothing Bank Graffiti at Ashburton Park Car Park



shoe bank (Figure 5-15). At several different sites, this bin had been seen tagged with graffiti. Were this bin not such a bright and vibrant colour, it would be a less likely target for one to want to graffiti.

Figure 5-15: Shoe Banks of Ashburton Park Car Park, Co-op Car Park, and Lion Green Road

Rubbish Bins

Unless sites are well maintained, excess rubbish left at the recycling sites builds up causing litter to clutter the area. Rubbish left behind at the recycling sites consists mainly of recyclables not collected at that site, bags left next to overflowing bins, and plastic carrier bags. The most prominent article of rubbish left behind at recycling sites is plastic carrier bags. Residents use the plastic carrier bags as a method to transport their recyclables to the site, and then leave the bags behind when they are done with them. Most plastic carrier bags were seen lodged into the handles of the bins as in Figure 5-16. Other sites had the plastic carrier bags tucked in



Figure 5-16: Plastic Carrier Bags left at Clocktower Site



Figure 5-17: Clothing and Shoe Bank of Granville Gardens

between recycling bins or clogging their deposit slots as in Figure 5-17. No sites were noted as having the bags lying around on the ground. However, that could be attributed to the windy weather of London that sweeps the bags away littering another location. Of the 24 recycling sites analyzed, 16 of those sites had plastic carrier bags as a form of rubbish debris.

Two of the cleanest recycling sites that also had no plastic carrier bags were High Street and Forestdale Shopping Centre. At both recycling sites, a rubbish container was present. When looking into the rubbish container at the Forestdale Shopping Centre recycling site, plastic carrier bags were the main form of refuse in the bin (Figure 5-18).



Figure 5-18: Refuse Bin at Forestdale Shopping Centre

Having a bin for the rubbish at the recycling site would be a useful way to not only dispose of the plastic carrier bags, but to also cut down on contamination within the recycling bins.

When interviewing people at Monks Orchard Green, a man was observed approaching the site and looking around for a refuse bin with rubbish in hand. When he did not find one, he then proceeded to dispose of his rubbish in one of the paper recycling bins, and left. Were there a refuse bin for the man to dispose of his rubbish in the proper fashion, he would not have contaminated the paper bin.



Figure 5-19: Sainsbury Plastic Carrier Bag Recycling Machine

Sainsbury Plastic Carrier Bag Assistance

Not all plastic carrier bags are recyclable, although some corporations are making a conscious effort to make plastic carrier bags that are. Sainsbury's Markets is one of these organizations. Located inside the Sainsbury was a plastic carrier bag recycling container (Figure 5-19). Working in conjunction with Sainsbury's already ongoing efforts to recycle plastic carrier bags would be a simple way to expand Croydon Council's recycling efforts. We contacted Sainsbury headquarters and they suggested that the best step for working with local markets is to contact the Sainsbury's of interest.

Since several recycling sites are currently located in Sainsbury car parks - Purely Way, Selsdon, Westow Street, and Whitehorse Lane - these would be the best places to initiate contact.

Recycling Site Cost Analysis

The Croydon Council has allocated a £50,000 budget increase for the next fiscal year dedicated solely to improving the neighbourhood recycling centres. From our research, we suggest that the improvement schemes that will most significantly impact recycling participation at neighbourhood recycling centres address the issues of range of materials collected, site aesthetics, and site accessibility.

The recommendation that requires the most financial investment is the improvement of recycling site aesthetics. Recycling sites which had more rubbish strewn about, had bins in worse condition, and were generally more unsightly, had significantly lower usage rates than clean, well organized and well maintained sites. Site aesthetics can influence how residents view the recycling program, and may impact their willingness to participate.

The first action that should be taken at any cost is the installation of rubbish containers at each of the recycling sites where one does not currently exist. Though plastic wheeled rubbish bins are not feasible at the recycling sites due to the risk that they may be set on fire, a steel rubbish container at each site would alleviate the litter problems that exist at recycling sites while also decreasing risk of arson. In addition to the placement of rubbish containers at recycling sites, it must be arranged for them to be emptied frequently enough to keep them from overflowing with rubbish and creating litter at the site. If an estimate of £150 per rubbish container is used, the total cost of this will be £3,600.

Many of the recycling sites are in need of either new recycling containers, or refurbishment and re-labelling of existing recycling containers. Updating signage at each site to the new national recycling iconography will cost approximately £500 per site. Across 24 recycling sites this will cost £12,000. The Sainsbury's at Purley Oaks, Tesco and Brighton Road, the Reedham Railway Station site, and the Sainsbury's at Whitehorse Lane are in need of a total of five new 1200 litre recycling containers for cans at a cost of £500 each. Reedham Railway station also needs one new 1200 litre glass bins, and a paper bin, costing approximately £500 and £2000 respectively. The site located at Forestdale shopping centre is in need of a new paper collection bin, costing £2000.

The above mentioned costs are necessary improvements to the sites in terms of physical container requirements. The total cost for these is £22,600. The additional £27,400 should be allocated towards graffiti removal and repainting of unsightly containers and replacement of containers deemed too damaged to refurbish. At the price of £500 per 1200 litre bin, this allows enough money to completely replace 54 1200 litre bins, 13 paper collection bins, or a combination of both of these. This should be adequate to completely update and refurbish all of the recycling sites to a satisfactory level. The completion of these recycling site refurbishments will greatly improve residents' opinions of the recycling sites, and demonstrate that the Council is serious about increasing recycling participation.

“Adopt-a-Recycling Site”

Given the numerous recycling sites spread throughout the Borough of Croydon, it is a difficult task to keep track of the maintenance of each site without assistance. One way the council could monitor all of the recycling sites simultaneously is to work in conjunction with the communities in which the sites are located. Starting an “Adopt-a-Recycling Site” program would be an advantageous way for Croydon Council to work with local community organizations such as scouts, community service organizations, faith groups, or businesses.

An organization that chooses to take part in the “Adopt-a-Recycling Site” program would work in conjunction with the council informing them if the recycling bins are overflowing and not being emptied enough or if bins have become damaged or rusted and need to be replaced. General maintenance regarding removal of excess rubbish and washing away of graffiti would be a role the organization would take on as a form of community service. In turn, the organization working with the council would have a sign posted at the recycling site they adopted. This sign would demonstrate to the public the organization’s concern for the environment and community involvement.

Such programs have been hugely successful in the United States as a way to lessen the amount of rubbish on sides of highways and streets. One organization, Mendocino Redwood Company, adopted a three-mile stretch of Highway 128 in Navarro in 2000. Since the organization had volunteers doing litter walks, they have collected over 4,000 pounds of rubbish from the roadside (*Mendocino Redwood Company*).

Promotional Materials

Croydon council uses promotional material in the form of posters and leaflets to inform its residents of various programs offered by the council for recycling. In the form of brochures and pamphlets, promotional materials are used to inform residents how to participate in such programs. However, miscommunication within these materials skews the message. Not having a concise message, confusing pictures, or experiencing language barriers are all issues that result in miscommunication. How a message is presented affects the reader’s interpretation greatly.

Also affecting the success of promotional materials is where they are displayed. In order for a message to reach its target audience, the message should be displayed in an area applicable to your target audience. For instance, if you wanted to inform people about what materials can

be recycled through the kerbside collection program, having images of recyclable items displayed on lorries and green bins, would be one way to reach interested individuals.

Clear Message

Promotional materials are a form of marketing. In marketing, you want to have quick eye-catching slogans to entice people to want to read further into the article. Slogans like “Reduce your rubbish” (Figure 5-20) work well to explicitly state the goal of the poster. However, the fine print shows that the poster is not just informing people to reduce their rubbish in general, but is referring to a junk mail cancellation service offered by the council. Given the word choice and the lone picture of a rubbish bin on the flyer, a passer by quickly reading the poster only takes away the message ‘reduce your rubbish’. The information regarding the junk mail cancellation service is lost.



Figure 5-20: Reduce Junk Mail Poster



Figure 5-21: Exit Sign

For this reason, a successful promotional material should not only have a captivating slogan, but should also have graphics relating to the message. Graphics not only help to enhance the understanding of the message, but are also a way to reach those that do not speak the same language as presented on the promotional material. Having a diverse community that speaks various languages makes it difficult to reach everyone. The use of universal images in conjunction with words can clarify the message that the poster is trying to tell you. For example, exit signs located in almost all buildings not only have the phrase “exit” written in bold on it; but they also have arrows and pictures to reach anyone who does not understand English (Figure 5-21).

Facts Sheets

More often than not, people recycle because of the general understanding that it is better for the environment. Unless it was part of a subject studied in school or it was publicized somewhere, the majority of the general public is unaware of the facts relating to recycling.

Similarly, most individuals who do not take up smoking cigarettes nowadays do so because of the general knowledge that it is bad for your health. Again, a majority of the population remains unaware of the facts and figures relating to cigarettes and ones health.

However, given the severe effects smoking has had on people’s health, actions to warn the public of their choice to smoke have become more outspoken. Labels explicitly stating the dangers of smoking are placed on cigarette packs and cartons (Figure 5-22).



Figure 5-22: Cigarette Warning Labels

In the United States, ‘Truth’ campaigns run commercials in which they bombard the viewers with information through dramatizations.

These commercials aim to inform the public of the facts and health side effects of smoking. Whether the commercial stars a man without a voice box singing about smoking, or a scene of walking through a crowded city with chalk body outlines of those who have died due to a smoking health related issue – the messages are dramatic.



Figure 5-23: Sainsbury - Whitehorse Lane Inkjet Bin

Facts and statistics can also be used to promote recycling. Any form of information that one comes across and can relate to helps them to perceive things differently. Hearing the generic statement “recycling is good for the environment” is something people can generally agree upon. However, if you instead say, “The unreleased energy contained in the average dustbin each year could power a television for 5,000 hours” (*Recycling Fact and Figures – The Guides Network*), it puts the power of recycling into a new perspective.

One creative place displaying informative facts was on an inkjet recycling bin at the Sainsbury of Whitehorse Lane recycling site (Figure 5-23). Putting facts on recycling bins about the product being recycled is a good way to make the user feel satisfied that they are doing their part to make a difference.

The key to an effective promotional material is not only in the content of what it says and the pictures used to enhance the message, but its location.

Green Bin & Lorry Signs

Given that the recycling lorries are seen driving around the borough everyday, they make an ideal location for pro recycling signs. Placing 'Recycle for Croydon' decals and messages about the positive effects of recycling on the lorries would be a novel technique for spreading facts about recycling throughout the borough.

Another prime location to display information regarding recycling is on the green bins distributed to all the residents. Currently, on one side of the green bins are stickers informing users what materials can be recycled through the kerbside program (Figure 5-24). Having information regarding the positive effects of recycling the different items on the plain side of the bin would be another original location for promotional materials.



Figure 5-24: Green Bin

Various facts that would be of interest include:

Aluminium

- 1 recycled tin can would save enough energy to power a television for 3 hours
- If all cans in the UK were recycled, we would need 14 million fewer dustbins

Glass

- 1 recycled glass bottle would save enough energy to power a computer for 25 minutes
- Glass that is thrown away ends up in landfills and will never decompose

Paper

- 70% less energy is required to recycle paper compared with making it from raw materials
- Recycled paper produces 73% less air pollution than if it was made from raw materials

Plastic Bottles

- 1 recycled plastic bottle would save enough energy to power a 60-watt light bulb for 3 hours
- Plastic can take up to 500 years to decompose

Green Waste Recycling

- Every tonne of biodegradable waste produces 300-500 cubic metres of landfill gas
- Landfill sites released 20% of the United Kingdom's methane emissions in 2002
-

*Recycling Fact and Figures – The Guides Network
Environment – Walsall Council*

Informing the public about the positive effects of recycling on the environment is a method to entice people to recycle more. When people feel that their efforts are not futile, they are more willing to participate in recycling programs.

Chapter 6 Conclusion

Over the past seven years, London's Borough of Croydon has made significant progress toward developing a community recycling program that is both efficient and simple for residents to use. The kerbside recycling collection service and neighbourhood recycling centres that are now available to borough residents are a solid framework for boosting resident recycling participation up to and beyond the levels set by national recycling guidelines. Like any fairly young program, however, some minor adjustments and changes must be implemented throughout the borough to achieve desired recycling rates. Our project was designed to help Croydon Council identify the main hurdles existing in Croydon that separated them from achieving their target recycling rate, and to provide suggestions about how to most effectively motivate the community to clear these hurdles.

The accomplishment of our project goals proved to be a valuable learning experience about improving programs that reach out to a large number of people. Because of the scale of Croydon's recycling program, even small changes like recycling site maintenance and changes to the collection program require extensive supporting research and data collection. The need for this research is created by large monetary costs associated with program improvements and the need to convince officials that the improvements are necessary.

We also learned a great deal about working towards a larger goal within a team. Working in both our small project group and the larger Croydon Council team required efficient communication and planning to complete work effectively. Beyond our experience with the recycling process in Croydon, the communication and planning skills acquired during this project will prove useful in all of our future business and academic endeavours.

It is our hope that the Borough of Croydon will be able to use this project as a tool for the implementation of key changes in the current recycling program, and that in the near future Croydon will be exceeding the national standards for recycling participation.

References

- 2004 UK climate change sustainable development indicator and greenhouse gas emissions final figures. (2006). Retrieved February 15, 2007, from <http://www.defra.gov.uk/news/2006/060123b.htm>
- Bluewater Recycling Association. (2004). *Landfills*. Retrieved February 10, 2007, from <http://www.bra.org/landfills.html>
- City of Seattle. (2007). *Seattle.gov*. Retrieved January, 2007, 2007, from www.seattle.gov
- Croydon Council. (September, 2006). *Croydon plans to make it easier to recycle more: Press release PR2551*. Retrieved January 31, 2007, from <http://www.croydon.gov.uk/candd/communication/pressrel/y2006/478060/478085?a=5441>
- Croydon Council. (2006). *Council acts as survey reveals residents can do more to recycle*. Retrieved January 30, 2007, from <http://www.croydon.gov.uk/candd/communication/pressrel/y2006/461980/462633?a=5441>
- Curbside recycling in the U. S. A.: Convenience and mandatory participation.(1993). [Electronic version]. *Waste management & research (Sage)*, 11(1), 49.
- D Taylor, P. (1999). *DETR CONSULTATION PAPER : 'A WAY WITH WASTE' – a draft waste strategy for England and Wales*. London, England: DETR Waste Strategy Team. from http://www.rsc.org/images/ehscsubswaste_tcm18-49044.pdf
- Daniel Guerin, P. D., Jean Crete, D. Phil., & Jean Mercier, P. D. A multilevel analysis of the determinants of recycling behavior in the european countries. (Ph.D., Laval University).
- Department of the Environment. (2006). *Waste strategy 2000 for england and wales*. Retrieved January 28, 2007, from <http://www.defra.gov.uk/environment/waste/strategy/cm4693/index.htm>
- Ecology's Solid Waste and Financial Assitance Program. (2005). *Focus on the benefits of recycling*. Retrieved February 11, 2007, from <http://www.ecy.wa.gov/pubs/0407005.pdf>
- EEA (European Environment Agency). (2002). Chapter 12 - waste and material flows. *Environmental Signals, 2002*(2002), January 29 . Retrieved January 28, 2007, from http://reports.eea.europa.eu/environmental_assessment_report_2002_9/en/signals2002-chap12.pdf
- Enviroment, *Walsall Council* (2007). Retrieved April 2007 from http://www.walsall.gov.uk/index/recycling_facts.htm

- Environmental Outlook. (2006). *Conservation program saves money, landfill space*. Retrieved February 4, 2006, from <http://www.djc.com/news/en/11180864.html>
- EUROPA. (2006). *WASTE*. Retrieved January 29, 2007, from <http://ec.europa.eu/environment/waste/index.htm>
- Fischer, J. (2001). Can state incentive programs boost materials recovery? [Electronic version]. *Resource Recycling*, Retrieved January 20, 2007,
- Folz, D. H., & Hazlett, J. M. (1991). Public participation and recycling performance: Explaining program success. , *51*(6), January 25, 2007
- Folz, D. H., & Folz, D. H. (1991). Recycling program design, management, and participation: A national survey of municipal experience. [Electronic version]. *Public administration review*, *51*(3), 222.
- Great Britain, & Dept. of the Environment. (1992). *This common inheritance : The second year report : Britain's environmental strategy*. London: HMSO.
- Great Britain, & Dept. of the Environment. (1990). *This common inheritance : Britain's environmental strategy*. London: H.M.S.O.
- Harder, M. K., Woodard, R., & Bench, M. L. (20060401). Two measured parameters correlated to participation rates in curbside recycling schemes in the UK. [Electronic version]. *Environmental management*, *37*(4), 487.
- House of commons - environment, transport and regional affairs - fifth report*.<http://www.parliament.the-stationery-office.co.uk/pa/cm200001/cmselect/cmenvtra/36/3610.htm>
- Massachusetts Department of Environmental Protection. (2000). *Massachusetts DEP recycling participation survey*
- Media team, Friends of the Earth. (2003). *Press release: MPs URGED TO BACK RECYCLING BILL*. Retrieved January 29, 2007, from http://www.foe.co.uk/resource/press_releases/20030122000558.html
- Natural Resources Defense council. (2006). *Recycling returns*. Retrieved February 4, 2007, from <http://www.nrdc.org/cities/recycling/default.asp>
- Oxford Internet Consultants. (2006). *Capital waste facts.*, 2007, from <http://www.capitalwastefacts.com/>
- Plastics Recycling.INFO (2007). *Recoup.*, 2007, from <http://www.plasticsrecycling.info/>

Recycling Aluminium Packaging in the UK. *aluPRO.*, Retrieved April 2007 from <http://www.alupro.org.uk/>

Recycling and reuse. Retrieved January 19, 2007, from <http://www.croydon.gov.uk/environment/recyclingreuse/>

Recycling Facts and Figures. *The Guides Network.* Retrieved April 2007 from <http://www.recycling-guide.org.uk/facts.html>

Recycle Now. Retrieved April 2007, from <http://www.recyclenow.com/index.html>

Recycling Plastic Bottles – The Energy Equation. *Recoup.*, Retrieved April 2007, from http://www.recoup.org/shop/product_documents/33.pdf

Richard A. Denison, & John F. Ruston. (1996). *Anti-recycling myths commentary on "recycling is garbage"*. Retrieved February 11, 2007, from http://www.environmentaldefense.org/documents/611_ACF17F.htm#endnotes

Richard Kashmanian. (1989). Promoting source reduction and recyclability in the marketplace. , January 2007

U.S Environmental Protection Agency. (2006). *Municipal solid waste.* Retrieved February 11, 2007, from <http://www.epa.gov/epaoswer/non-hw/muncpl/recycle.htm>

UK defra | e-digest environment statistics, municipal waste. <http://www.defra.gov.uk/environment/statistics/wastats/bulletin.htm>

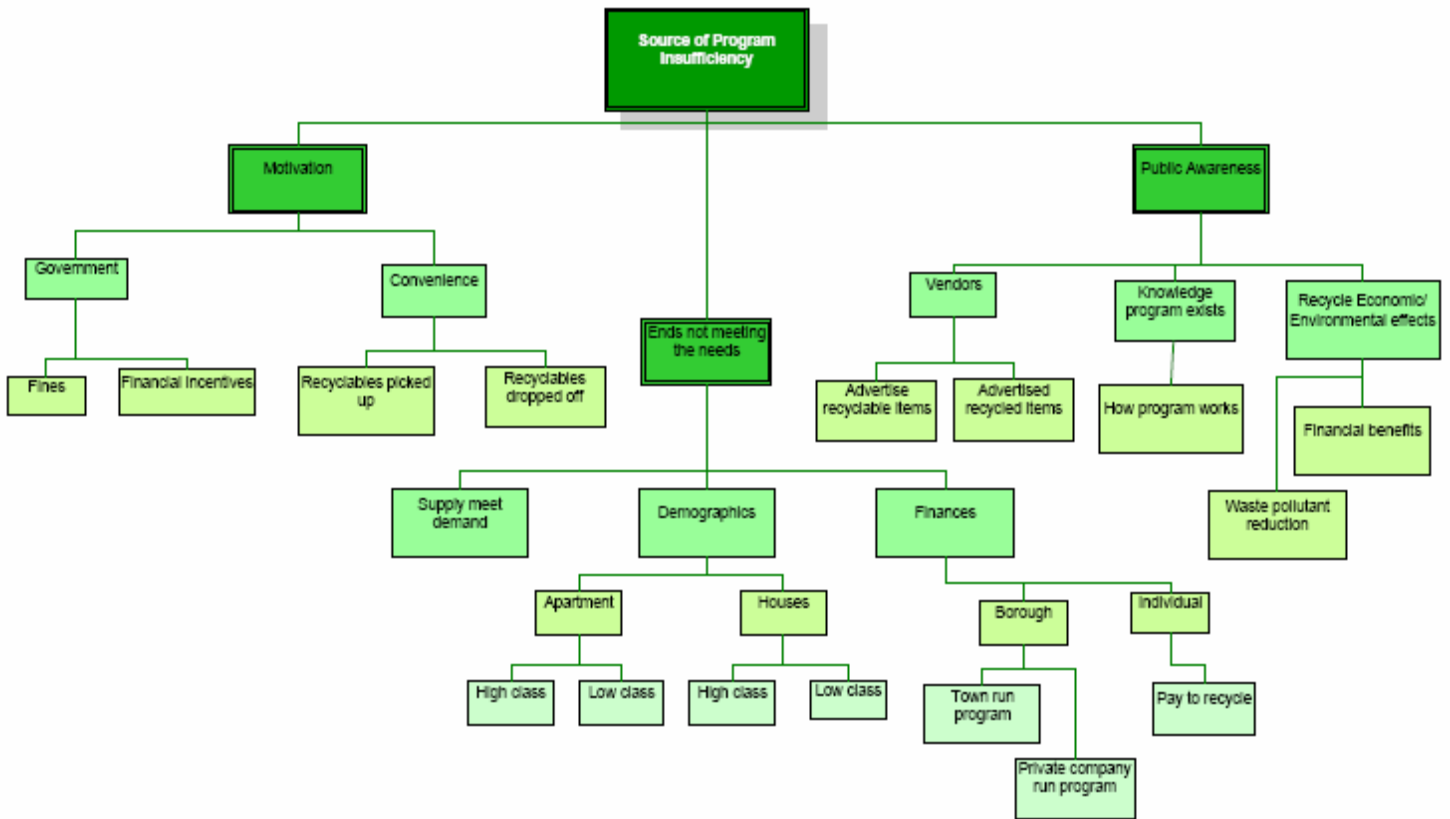
United States Environmental Protection Agency. (Aug 1999). *Recycling works! state and local solutions to solid waste management problems* No. 5305W) Retrieved January 28, 2007, from Solid Waste and Emergency Response database.

Woodard, R., Bench, M., & Harder, M. (20050401). The development of a UK kerbside scheme using known practice. [Electronic version]. *Journal of environmental management*, 75(2), 115.

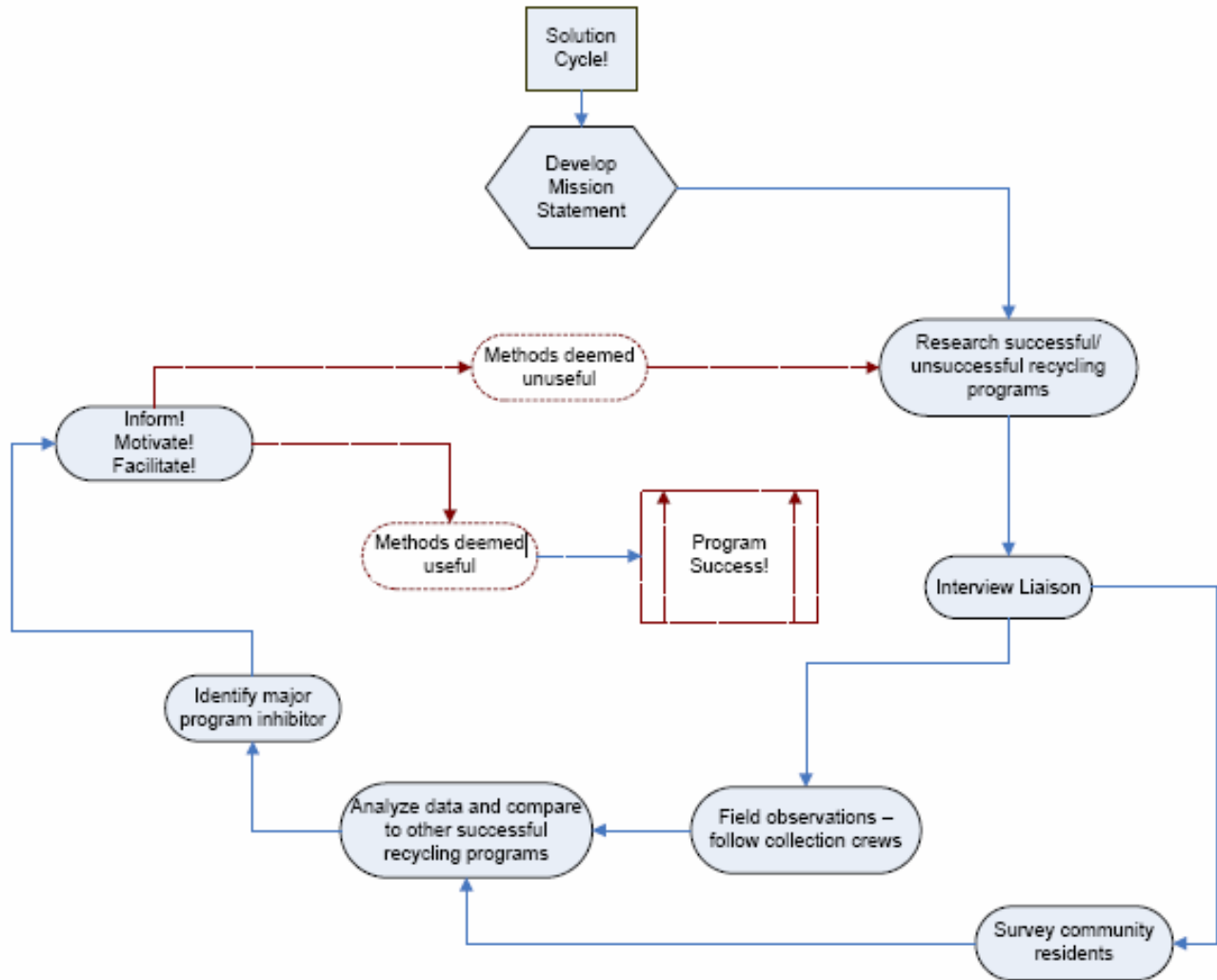
Worcester. (2007). *City of Worcester, Massachusetts.* Retrieved January/2007, 2007, from <http://www.ci.worcester.ma.us/dpw/>

Tensid UK plc, Retrieved April 2007 from <http://www.buildingdesign.co.uk/facil-group2/tensid/index.htm>

Appendix A: Methodology Idea Web



Appendix B: Solution Cycle



Appendix C: “Wrong Stuff” Door Hanger

**YOUR
RECYCLING
CART
HAD THE
WRONG
STUFF!**

**EN EL CARRITO DE RECICLADO TIENE
EL MATERIAL equivocado**

oops!

Dear Customer:

THE RECYCLING STAFF OF COURSE DOES NOT HAVE the “Wrong Stuff” in your recycling cart and unfortunately for you, neither do I. Please look on the side of the cart for more guidelines for recycling.

Your recycling will be collected on your next regular collection day if the “Wrong Stuff” has been removed.

Remember to place your curbside cart inside or at curb on your regular collection day. Get the cart at least five feet from your porch/steps and set it upright on a hard, level surface, not on grass, mulch, or other soft.




CITY OF REDLANDS
Solid Waste and Recycling

If you have any questions, please call 798-7329.
Si usted tiene más preguntas, llame por favor 798-7329.

**EXAMPLES OF
THE WRONG STUFF:**

Household garbage (Basura de la casa)
Wet or liquid contaminated paper (El papel mojado o el aluminio contaminado por papas)
Plastic bags (Bolsas de plástico)
Window glass or mirrors (El vidrio de la ventana o espejos)
Refrigerators, light bulbs, air conditioning systems, compressors, air pumps, freezers, hot plates, hot rollers, hot bonnets, hot boxes (que deben ventilarse o el agua)
Yard waste or wood (Cespeda de la yarda o madera)
Concrete, dirt or rocks (Cemento, la tierra, las piedras)

**THE RIGHT STUFF!
WHAT CAN BE PLACED
IN YOUR CART:**

Cardboard (must be cut down to fit inside of cart) (El carton se debe cortar, aplastar y debe ser colocado al interior del carrito)
Dry paper (El papel seco)
Glass bottles and jars (Bottles embotelladas y los jarros)
Plastic bottles with the recycling symbol (El plástico embotellado con el símbolo de reciclado)
Empty aerosol cans (Las bomboncillos vacíos del aerosol)
Aluminum and steel food cans (Las conservas de aluminio y el acero)
Clean aluminum (El aluminio limpio)

PLACE CARTS CORRECTLY, AS SHOWN ON FRONT.
(Coloque el carrito correctamente en la frente.)

CITY OF REDLANDS
Solid Waste and Recycling

If you have any questions, please call 798-7329.
Si usted tiene más preguntas, llame por favor 798-7329.

www.ci.redlands.ca.us

<http://www.ci.redlands.ca.us/utilities/PDFs/RecyclingCart.pdf>

Appendix D: Helpful Ideas for Improving Kerbside Recycling Participation

CURBSIDE RECYCLING PROGRAMS

HELPFUL IDEAS FOR IMPROVING PARTICIPATION

1. Recycling is most apt to be successful if the method of collecting recyclables mirrors the method of trash collection. If trash is collected weekly, collect recyclables weekly and on the same day as the trash collection. Every other week collection of recyclables generally confuses residents resulting in a very low participation rate.
2. Limit trash collection to one time a week. Once a week trash collection will greatly increase participation in the recycling program because residents will want to divert materials to the recycling container in order to save space in their trash cans/bags.
3. Participation in a kerbside recycling program will be better if the community provides residents with set-out containers for recyclable materials rather than relying on the residents to provide their own. Color coded bags are also an option for residents to use for storage and handling of their recyclables. These should be provided to the residents by the community in lieu of a set-out container. Whatever type of container is chosen, it should meet the needs of the residents, but should also be easy for personnel collecting the material at the kerb.
4. Public education is the key to a successful program. To get the information out about the recycling program, use radio and tv spots, newspaper ads and articles, and billboard ads; visit and give presentations to neighborhood associations, schools, churches and civic organizations to promote and explain the program; put quarterly flyers, leaflets and/or newsletters in the water/sewer bill, bank statement or by separate mailing by the water/sewer department; train community volunteers on program so they educate neighbors and others; produce video on local waste management/recycling program and provide video free to video stores; and setup a display information booth on weekends at the local malls, discount stores and/or food centers. Whatever the means of getting the information out, ensure that the material explains 1) what is being collected, 2) preparation instructions, 3) time and day when the materials will be collected, and 4) who to contact if you have questions. Simple, active language and simple line graphics in the printed material is very important. Continuous education is critical if the recycling program is to be successful. Education of the residents should begin 3 months before the recycling program begins and continue quarterly. Contact MDEQ for samples of educational flyers and leaflets.
5. Offer incentives for recycling such as lower garbage collection fees. The community may ultimately want to consider a variable rate or volume base solid waste fee. Example: The resident has the option of using a 30, 60 or 90 gallon trash can, with the cost of service for each being \$5, \$10, and \$15, respectively. If you recycle, you may only need the use of the smallest trash bin, thereby saving on your monthly trash disposal bill. Another incentive could be a Recycling Lottery. The community chooses each month a house in one or more locations in the community. If that resident puts out their recyclables at least one time during that month and a minimum of 2 or 3 types of recyclable materials placed in the bin, that resident wins a monetary prize. This can be set-up in various ways as determined by the community leaders.
6. Reject contaminants in the recycling bin by having the recycling collection personnel leave pre-prepared checkoff notes in the residents recycling bin which identify non-recyclable materials (contaminates) and explain why the materials were not collected.
7. The recycling program should only collect materials for which a market already exists. Do not start collecting a material in hopes that a market will soon develop. Find out who you can sell to, what materials they want, the degree of contamination they'll accept, and how they want the material processed and shipped. Estimate the potential revenue and stability of markets and then decide what items to recycle.
8. Collection techniques which require too much effort and thought on the part of the residents or excessive work and expense on the part of the haulers are doomed to failure.
9. Limit materials collected in the recycling program to 4 or 5 materials for the first year. Residents tend to be confused if more materials are collected. After the program has been going well for a year or more, add 1 or 2 materials, if needed, and ensure the public is educated on the new items being collected.
10. The following materials should be considered at the beginning of the program: aluminum and steel cans, newspapers, cardboard, #1 and # 2 plastics and glass. Items to be added after the program matures may include: mixed paper, used motor oil, and textiles.
11. An anti-scavenging ordinance should be passed prior to the start of the recycling program.

12. Schedule pickup times for recyclables in the contract so to ensure collection personnel and vehicles are not collecting materials prior to 7:00 A.M. Too early of a collection time will reduce participation rates. Look into organizing a recycling cooperative in your area. The reason for it is that if you can put 20 tons or more of clean recyclable material on a truck, someone will buy it. Joint efforts with other communities and/or counties may ensure that you collect sufficient quantity of materials. In addition, there must be sufficient coordination of shipping and processing of the materials. Quality and quantity are important keys to recycling. The cost of recycling almost always exceeds the revenue earned from the sale of recyclables. But a combination of revenues, avoided landfill tipping fees and extending the life of the landfill, could equal or exceed the cost of running a recycling program.

MECHANICS OF A SUCCESSFUL PROGRAM

- Commitment and initiative at the highest level of local government
- Innovative and consistent education and communication with all affected parties
- Public works support, including monitoring and follow-up
- Equipment and facilities in place to enable efficient material handling and product flow
- Don't just talk about it. Take action and do it!

If you have any questions regarding recycling programs, equipment needs, and/or markets, please call the Recycling and Solid Waste Reduction Program at the Mississippi Department of Environmental Quality (MDEQ) 601/961-5171.

Kerbside Recycling Programs Helpful Ideas for Improving Participation

[http://www.deq.state.ms.us/MDEQ.nsf/pdf/Recycling_KerbsideRecyclingTips/\\$File/KerbsideProgramTips.pdf?OpenElement](http://www.deq.state.ms.us/MDEQ.nsf/pdf/Recycling_KerbsideRecyclingTips/$File/KerbsideProgramTips.pdf?OpenElement)

Appendix E: Kerbside Observation Log Sheet

Street	House #	Green Box?	Correct Placement?	Notes

Appendix F: Christmas Tree Collection & Green Waste Flyer

Christmas Tree

COLLECTION POINTS JANUARY 2007

Take your old Christmas Tree down to one of our collection points on the 6 & 7 January for recycling

Addiscombe	Co-op, Lower Addiscombe Road
Broad Green	Sainsbury's Homebase, Purley Way
Coulsdon	Lion Green Car Park
Coulsdon East	Canon's Hill, Grange Park Recreation Ground
Fairfield	Oaks Road/Coombe Road Car Park
Heathfield	Gravel Hill Car Park, Addington Park Recreation Ground
Kenley	Oaks Road Green, Kenley Residents' Association
New Addington	Central Parade Car Park
Norbury	Granville Gardens Car Park
Purley	Woodcote Village Green, Upper Woodcote Village Residents' Association
Sanderstead	Occasionally Yours, Limsfield Road
Shirley	Green Court Garden Green, Shirley Parks Residents' Association
Shirley	Monks Orchard Green
South Norwood	Sainsbury's, Whitehorse Lane
Upper Norwood	Secret Garden, Westow Street
Waddon	Sainsbury's Homebase, Five Ways, Purley Way
Waddon	Wyevale Garden Centre, Waddon Way

**Collections will take place on:
Saturday 6 and Sunday 7 January 2007**
Please remove tinsel and decorations!

Special notice: garden waste

COLLECTIONS FROM YOUR HOME

Households that have been receiving a fortnightly kerbside collection of green garden waste are advised that this is a seasonal service, which runs until the end of November. It is anticipated that the service will resume in Easter 2007 – you will receive a notice nearer the time.

Please keep your clear sacks until next year.



Until then...

Trees and green garden waste can be taken to any of our 3 main reuse and recycling centres all year round:

- Factory Lane, Waddon
- Purley Oaks, Brighton Road, Purley
- Fishers Farm, North Downs Crescent, New Addington

For information on recycling and waste call the Council on:
 **020 8726 6200**
or visit www.croydon.gov.uk

Garden waste makes great compost. This year we have a special offer, subsidised through Thames Water, for compost bins at £6 and water butt kits at £34.95. Free Delivery. **Call 0845 130 6090 (local call rate)** Please maximise the use of your green box, put excess materials in carrier bags. These must be placed on top of or next to the recycling box.

reduce your rubbish 

CROYDON COUNCIL
www.croydon.gov.uk

Appendix G: Library Posters

use your green box every fortnight



-  **cans**
-  **paper**
-  **glass**
-  **clothes**

020 8726 6200
www.croydon.gov.uk

 **recycle**
for Croydon

CROYDON COUNCIL
www.croydon.gov.uk

think before you throw



Swap, take or giveaway unwanted items for free at the great giveaway
www.croydononline.org/giveaway

020 8726 6200
www.croydon.gov.uk

 **recycle** for Croydon *The Great Giveaway*

CROYDON COUNCIL
www.croydon.gov.uk

reduce your rubbish



Cancel junk mail through the Mail Preference Service:
 ☎ 020 7291 3310
www.mpsonline.org.uk

Mail Preference Service
 Freepost 29 LON20771
 London W1E 0ZT

020 8726 6200
www.croydon.gov.uk

 **recycle**
for Croydon

CROYDON COUNCIL
www.croydon.gov.uk

Appendix H: Recycle Leaflet

Recycle in Croydon. It's simple



Live in a house? Use your green box
This service is collected fortnightly from the kerb at the edge of your property. We collect paper, cans, glass and old clothes and shoes. If your box is full, extra materials can be placed in plastic bags on top of your box. If you need a box, need to know your collection date or if your box is not collected call ☎ 020 8726 6200



Neighbourhood recycling sites
There are neighbourhood sites located throughout the borough. In addition there are 3 main Reuse and Recycling Centres. Call ☎ 020 8726 6200 to find out if there is one near you.



Blocks of flats
Mini recycling sites can be found at nearly 100 locations across the borough. These sites collect cans, glass, paper and card. Call ☎ 020 8726 6200 to find out if there is one near you.

A guide to reducing, reusing and recycling your rubbish in Croydon



Useful telephone numbers

Factory Lane Waste Transfer Station and Recycling Centre
☎ 020 8288 8700

Fishers Farm Waste and Recycling Centre
☎ 01689 849 312

Purley Oaks Reuse and Recycling Centre
☎ 020 8668 2086

If you live in a house and would like a green box call ☎ 020 8726 6200

If you have useable, but unwanted, furniture or appliances call ARC
☎ 020 8662 8002

Businesses wanting to recycle should call the Envibe Coordinator
☎ 020 8760 5536

For ideas on how you can recycle more call the Environment & Sustainability Team
☎ 020 8760 5640



reduce your rubbish

recycle for Croydon

CROYDON COUNCIL
www.croydon.gov.uk

Reuse and Recycling Centres Reduce in Croydon. It's simple

What can I recycle at Fishers Farm and Purley Oaks Recycling Centres?

- | | |
|---|--|
| <ul style="list-style-type: none"> ■ Books ■ Bricks, rubble ■ Concrete and soil ■ Car batteries ■ Car oil ■ Card and cardboard ■ Food and drinks cartons ■ Clothes ■ Fluorescent tubes ■ Food and drinks cans ■ Green garden waste | <ul style="list-style-type: none"> ■ Household batteries ■ Household electrical appliances ■ Household plastic containers ■ Inkjet cartridges ■ Mixed glass ■ Mobile phones and batteries ■ Paper (including shredded) ■ Scrap metals ■ Shoes ■ Spectacles ■ Hand tools |
|---|--|

What types of plastics are accepted at the three main reuse and recycling centres?

- | | |
|---|---|
| <p>YES PLEASE ✓</p> <ul style="list-style-type: none"> ■ Cream and yoghurt pots (please remove foil) ■ Drinks containers/bottles ■ Food containers and trays (clean) ■ Household cleaners and detergents ■ Milk, juice and squash containers ■ Spread and margarine tubs ■ Washing liquids/conditioners Shampoo/bubble bath | <p>NO THANKS ✗</p> <ul style="list-style-type: none"> ■ Carrier bags/black sacks ■ Coat hangers ■ Cups, cutlery and Polystyrene food trays ■ Flower pots/seed trays ■ Garden furniture ■ Green sacks/bubble wrap ■ Hard plastic tubs ■ Large or bulky items ■ Plastic used for packaging ■ Polystyrene ■ Polystyrene egg boxes ■ Watering cans |
|---|---|

- Cancel junk mail through the Mail Preference Service: ☎ 020 7291 3310, or www.mpsonline.org.uk, or Mail Preference Service, Freeport 29 LON20771, London W1E 0ZT.
- Demand products with less unnecessary packaging.
- Purchase items made from recycled materials.
- Use cotton nappies instead of disposables call ☎ 020 8726 6000 ext 61839 for further information.

Reuse in Croydon. It's simple

- Compost your kitchen and garden waste and transform your garden by buying a subsidised compost bin for only £8. Call ☎ 0845 077 0757 or order online and save an extra £1 at www.recyclenow.com/compost (quoting reference CRO04)
- The Croydon Appliance Reuse Centre (ARC) and Cherry Orchard are local charities supported by Croydon council that specialise in supplying low cost furniture and refurbished large electrical items, such as washing machines, cookers and fridges to people in need. If you have items to donate please call ☎ 020 8662 8002, if you are in need of items please call ☎ 020 8681 6721.
- Remember to donate household goods such as clothes, books, furniture to your local charity shop. Please check first what they accept.
- Giveaway, take, or swap all household items for free using the Great Giveaway, Croydon's very own community online swap shop. Go to: www.croydononline.org/giveaway
- Wherever possible, don't throw it away, repair it or upgrade it and save money and the environment.

Why not become a Recycling Champion and receive recycling news, bulletins and special offers whilst helping to increase the amount of waste we reduce, reuse and recycle in Croydon? For more information call 020 8726 6000 Ext 64049, e-mail: paul.vincent@croydon.gov.uk

This year Croydon council will be installing at least 50 new recycling sites at blocks of flats, making sure that everyone has access to recycling facilities. The sites will collect paper and card, tins and cans and mixed glass.

Appendix I: Recycling Calendar

RECYCLING - THE POSSIBILITIES ARE ENDLESS!



WHAT GOES IN THE BOX?

GLASS

Yes Please

- All glass bottles and jars

No Thank You

- Mirrors, sheet glass, drinking glasses



CANS

Yes Please

All food and drink cans (please wash and squash), clean aluminium foil. No other metal items please.

PAPERS

Yes Please

- Letters, catalogues, brochures, white envelopes, junk mail, leaflets, paper, white telephone directories, all newspapers, magazines

No Thank You

- Cardboard, yellow pages, Financial Times, Loot, brown paper, wallpaper, greetings cards, brown envelopes

TEXTILES

Yes Please

- Clothes, linens and shoes all dry and clean

No Thank You

- Duvets, pillows, cushions

WHERE DOES IT ALL GO?

Glass: Items are ground down and used locally as aggregate. This saves raw materials and energy. Material can be used in road building, water filtration or for shot blasting. **Destination:** Doy Aggregates – used to make Croydon's roads.

Cans: are sorted into aluminium and steel by magnets and sent to reproducers. The metals are melted so they can be reused in the same way as virgin materials. Making steel from recycled items saves 75% of the energy compared with using virgin material. **Destination:** sorted at a plant in Greenwich and recycled locally into new food and drink cans.

Paper: is sorted into different grades, and used for newsprint. Fibres are washed to remove ink and other contaminants. Each time paper is made from recyclable material, the fibres shrink. Some virgin material needs to be added to provide strength. You could recycle and receive the same paper back in 7 weeks! **Destination:** Aylesford newsprint – recycled into newspaper.

Textiles: items are sorted and reused. Unusable items are used for industry as rags and wipers. If everyone in Britain got one item made from recycled wool a year it would save 371 million gallons of water, 480 tonnes of chemical dyes and 4571 million days of an average family's electricity needs! **Destination:** Black Country Rags – recycled into textiles or reused.

What if you have more materials than can fit in your kerbside box?

Put excess materials in carrier bags. These must be placed on top of or next to the recycling box, and away from your general rubbish. Please do not use black or grey bin liners for recycling as material presented in this way will be assumed to be refuse only.

You should put the box out by 7am, on your property where it meets the road or footpath. It will be collected and returned to this point.



How can I get rid of my bulky waste?



Do you have useable furniture or large household appliances to dispose of? Don't let that lovely bed or cooker go to waste! ARC will collect useable furniture and large household appliances in good condition. These are tested and supplied at low cost to local people. Can you help? Please call ARC on 020 8002 8002 for sales information or to arrange a collection.



Do you have items that others may want to use?

The Great Giveaway is for residents of Croydon to swap, give or take items that would otherwise be thrown away. No money can change hands. For further information see www.croydononline.org/giveaway

Other large items requiring disposal, that cannot be reused?

Residents are entitled to one collection per annum, for up to seven items free of charge directly from your home! Please call 020 8726 6200 for further information and to arrange a collection.

Other large items requiring disposal?

There are three Reuse and Recycling Centres in Croydon, they are located at:

- Factory Lane, West Croydon (waste and recycling).
- Fishers Farm, New Addington (waste and recycling).
- Purley Oaks, South Croydon (recycling only).

For translations, braille, or large print, please call 020 8726 6200

Appendix J: Recycling Calendar Week 2

Working hard to make it easy for you...

- Over 100,000 wheeled bins mean cleaner streets and less litter and waste!
- Kerbside collection for all houses and 100 recycling centres for blocks of flats mean less landfill.
- Purley Oaks Reuse and Recycling Centre means somewhere for batteries, bricks, plastics, card and a host of other recyclable materials.

Bulky waste Items that are too big for your bin?

Don't let that lovely washing machine, cooker or item of furniture go to waste! ARC will collect useable furniture and large household appliances in good condition. These are tested and supplied at low cost to local people. Can you help?

Please call ARC on **020 8662 8002** for sales information or to arrange a collection.



A FINE A DAY KEEPS LITTER AWAY



£75 FOR A FAG BUTT!

Every working day someone in Croydon is fined for littering or flytipping.

Keep Croydon Tidy



Do you have items that others may want to use?


The Great Giveaway is for residents of Croydon to swap, give or take items that would otherwise be thrown away. No money can change hands. For further information see www.croydononline.org/giveaway






Green Box Collections


! recycling calendar

Monday Week 2


mixed glass


food & drink cans


newspapers & magazines


textiles

Please put your box out for collection on:

	Monday	Monday	Monday
AUGUST 2006	14	28	-
SEPTEMBER 2006	11	25	-
OCTOBER 2006	9	23	-
NOVEMBER 2006	6	20	-
DECEMBER 2007	4	18	-
JANUARY 2007	3*	15	29
FEBRUARY 2007	12	26	-
MARCH 2007	12	26	-

recycle for Croydon

Christmas and New Year Collections:
Please note that the dates highlighted with an asterisk* are for Christmas and New Year collections, and may not be on your usual day. For refuse collection during this period, please check the local press nearer the time.

What to do if you need a replacement green box.
To request a delivery of a recycling box, please call 020 8726 6200 or email: contact.thecouncil@croydon.gov.uk

CROYDON COUNCIL
www.croydon.gov.uk

Appendix K: Green Waste Flyer

Where to put your bags

On your fortnightly collection day, please leave the bags out by 7.00am at the edge of your property where they can be clearly seen from the road, without obstructing the path.



Please call us on 020 8726 6200 if:

- your bags are not collected
- you need a replacement bag
- you need information about recycling or waste.

or email: contact.thecouncil@croydon.gov.uk or www.croydon.gov.uk

Bags must be left open and not tied or taped shut.

Compost bin offer

Don't forget: you can compost kitchen and garden waste if you have a garden.

Croydon Council are working in partnership with Blackwell and Thames Water to offer residents 330 litre compost bins for just £6 with free delivery (allow 28 days - BPP £50,000). Please call 0845 130 6090 or log onto www.getcomposting.com/croydon



SPECIAL NOTICE: Garden waste – collections from your home

Households that have been receiving a fortnightly kerbside collection of green **garden waste** are advised that this is a seasonal service, which runs until the end of November. It is anticipated that the service will resume in Easter 2007 – you will receive a notice nearer the time.

Please keep your sacks until next year.

Christmas Trees and green garden waste can be taken to any of our 3 main reuse and recycling centres all year round: Factory Lane, (Waddon), Purley Oaks, (Brighton Road, Purley), Fishers Farm, North Downs Crescent, (New Addington).

For information on recycling and waste call the Council on: 020 8726 6200 or www.croydon.gov.uk

Green waste is taken to Viridor in Beddington Lane and composted for horticultural use. Other green waste is made into Croypost, Croydon's very own soil conditioner. It can be purchased at very low prices at our reuse and recycling centre on Factory Lane or is currently available for free at Purley Oaks reuse and recycling centre, Brighton Road.

In the red plastic bag ...

YES PLEASE ✓

- Household card and cardboard including cereal boxes, other outer food wraps if made of card, washing powder packs, corrugated cardboard and egg boxes.

Please remove tape where possible

NO THANKS X

- Cardboard milk and juice containers (tetrapaks)
- Plastic-coated cardboard
- Newspapers and magazines (please use your green box or recycling site)
- Very large or bulky cardboard boxes and other items.



The card and cardboard is recycled into new cardboard.

In the red plastic bag ...

YES PLEASE ✓

- Plastic drink, milk, juice and squash bottles
- Conditioner, shampoo and bubble-bath bottles
- Household cleaner, detergent and washing-up liquid bottles (please rinse)
- Plastic food containers and trays (clean, no wrapping)
- Butter, margarine and ice cream tubs (please remove foil)
- Yogurt and pudding pots.

NO THANKS X

- Polystyrene
- Flower pots (reuse if possible), seed trays, plant containers
- Plastic cups or cutlery
- Children's toys and pieces from games and building sets
- Garden furniture or other large or bulky items
- Coat hangers
- Hard, brittle plastic such as CD covers
- Plastic items with metal parts
- Carrier bags, black sacks, green sacks, bubble wrap and plastic used for packaging, wrapping and filling.



Your plastic will be recycled to make a variety of new plastic items including containers and fleece jackets.

Reuse carrier bags and try to choose fewer packaged goods.

Appendix L: Motivation and Education sections (removed)

(Originally in methodology, but used more as a reference)

The successful completion of our project will rely on our understanding of the recycling habits of the citizens of Croydon. In order to obtain this understanding, we will travel with the recycling collection crews along their route, and observe the general state of Croydon's recycling program participation. It can be generalized that a lack of recycling participation by households in a community can be attributed to a lack of motivation to recycle within these households. By the same logic, households failing to place recyclables in the correct spot for pickup are often lacking in procedural understanding, and would benefit from improved program education.

Motivation

One major obstacle to overcome in creating a more successful recycling program is the issue of public motivation. If the community at large is not motivated to make recycling a larger part of its waste disposal program, then even the best designed systems will not see adequate success levels. The most important motivational tactic in creating a more successful recycling program involves the way a community thinks about the issue of recycling. People who perceive municipal waste management to be a means for getting rid of trash will be less likely to recycle than people who consider the program as one designed primarily to deal with recyclables, with trash disposal being an afterthought to deal with leftover material (Harder et al., 2006). This seems to be a small issue of semantics, though the human mind can be strongly influenced by such small alterations in the thought process. In order to achieve this shift in the perception of waste management, a number of different strategies may be utilized.

Distribution of pamphlets or flyers emphasizing the municipal recycling program's importance would be a good way to reinforce the thought of recycling as a major portion of waste management.

Education

Education of the community is another important aspect to consider when attempting to improve recycling program participation. It must be realized that negative reinforcement may occur in individuals whose recyclables are not collected because they unwittingly placed them improperly for pickup. One of the goals that we will work towards in this project is the avoidance of this negative reinforcement.

Stickers affixed to misplaced recycling boxes informing individuals of exactly where to place their box for pickup may help individuals to understand why their box was not collected without discouraging them from using the program in the future.

Appendix M: References (with annotations)

2004 UK climate change sustainable development indicator and greenhouse gas emissions final figures. (2006). Retrieved February 15, 2007, from <http://www.defra.gov.uk/news/2006/060123b.htm>

Useful only for finding information about methane gas emissions produced by landfills and the decrease expected pending increased recycling rates.

Bluewater Recycling Association. (2004). *Landfills*. Retrieved February 10, 2007, from <http://www.bra.org/landfills.html>

Useful for information on landfills and how they are currently created and what acts are being done in order to make them safer for the environment and surrounding communities.

City of Seattle. (2007). *Seattle.gov*. Retrieved January, 2007, 2007, from www.seattle.gov

This website would not prove resourceful for our project. It was only used to reference population size and land size.

Croydon Council. (September, 2006). *Croydon plans to make it easier to recycle more: Press release PR2551*. Retrieved January 31, 2007, from <http://www.croydon.gov.uk/candd/communication/pressrel/y2006/478060/478085?a=5441>

Very useful in determining Croydon's current actions pertaining to their recycling programs.

Croydon Council. (2006). *Council acts as survey reveals residents can do more to recycle*. Retrieved January 30, 2007, from <http://www.croydon.gov.uk/candd/communication/pressrel/y2006/461980/462633?a=5441>

Interesting information on a survey provided by the Croydon Council observing recycling rates within the community.

Curbside recycling in the U. S. A.: Convenience and mandatory participation.(1993). [Electronic version]. *Waste management & research (Sage)*, 11(1), 49.

Very useful for learning about current kerbside projects in the US. Shows statistics and facts about what methods have been successful. Good source of references for learning about why people do or do not recycle and how to conduct successful surveys. May have references with successful and unsuccessful programs.

D Taylor, P. (1999). *DETR CONSULTATION PAPER : 'A WAY WITH WASTE' – a draft waste strategy for England and Wales*. London, England: DETR Waste Strategy Team. from http://www.rsc.org/images/ehscsubswaste_tcm18-49044.pdf

Useful information on the critical thinking about 'A Way with Waste' implemented in 1999 by the U.K.

Guerin, D. P. D., Crete, J., Phil., D., & Mercier, J. P. D. A multilevel analysis of the determinants of recycling behavior in the European countries. (Ph.D., Laval University).

This article is moderately useful. The paper is a full text PDF document regarding the behaviour of recycling in European countries.

Department of the Environment. (2006). *Waste strategy 2000 for England and Wales*. Retrieved January 28, 2007, from <http://www.defra.gov.uk/environment/waste/strategy/cm4693/index.htm>

Probably the most useful source to learn about the current plans in the U.K. to increase recycling participation all over. This source is the actual strategy put forth by the U.K. about proposed plans for future implementations and also set clear and concise goals for the future of waste management.

Ecology's Solid Waste and Financial Assistance Program. (2005). *Focus on the benefits of recycling*. Retrieved February 11, 2007, from <http://www.ecy.wa.gov/pubs/0407005.pdf>

A brief physical example for the benefits of recycling in Washington in 2002 that could emphasize the thesis of recycling.

EEA (European Environment Agency). (2002). Chapter 12 - waste and material flows. *Environmental Signals, 2002*(2002), January 29. Retrieved January 28, 2007, from http://reports.eea.europa.eu/environmental_assessment_report_2002_9/en/signals2002-chap12.pdf

This is a page providing information about waste flows in the UK, and other data directly pertaining to recycling and waste management.

Environmental Outlook. (2006). *Conservation program saves money, landfill space*. Retrieved February 4, 2006, from <http://www.djc.com/news/en/11180864.html>

This is an article about recycling program success in Seattle, WA.

EUROPA. (2006). *WASTE*. Retrieved January 29, 2007, from <http://ec.europa.eu/environment/waste/index.htm>

A brief description to point out the EU policies to reduce waste and trash.

Fischer, J. (2001, Can state incentive programs boost materials recovery? [Electronic version]. *Resource Recycling*, Retrieved January 20, 2007,

This is a brief discussion describing the effects state incentives have on recycling efforts and various plausible state incentives.

Folz, D. H., & Hazlett, J. M. (1991). Public participation and recycling performance: Explaining program success. , *51*(6), January 25, 2007

This article was very useful in breaking down various recycling tactics and techniques. The article also goes into depth describing successful versus unsuccessful methods of recycling and trying to promote recycling.

Folz, D. H., & Folz, D. H. (1991). Recycling program design, management, and participation: A national survey of municipal experience. [Electronic version]. *Public administration review*, *51*(3), 222.

Great Britain, & Dept. of the Environment. (1992). *This common inheritance : The second year report : Britain's environmental strategy*. London: HMSO.

Great Britain, & Dept. of the Environment. (1990). *This common inheritance : Britain's environmental strategy*. London: H.M.S.O.

A book published by the British Government designed to touch upon all environmental issues, with recycling and waste disposal being a major topic

Harder, M. K., Woodard, R., & Bench, M. L. (2006). Two measured parameters correlated to participation rates in kerbside recycling schemes in the UK. [Electronic version]. *Environmental management*, *37*(4), 487.

Very useful to find information about current efforts in the UK. Gives a lot of data from past years and future estimations for the production of waste. Gives methods of recycling that have been shown to promote the most participation. Lots of potentially useful resources on waste strategies and how to measure their success

House of commons - environment, transport and regional affairs - fifth report.<http://www.parliament.the-stationery-office.co.uk/pa/cm200001/cmselect/cmenvtra/36/3610.htm>

A paper written by a committee within the House of Commons discussing sustainability in waste management. This was a good primary government source, and provides real insight to government planning and waste management strategy.

Massachusetts Department of Environmental Protection. (2000). *Massachusetts DEP recycling participation survey*

This article describes the results of surveys key findings on recycling patterns and attitudes towards recycling from communities and workplaces. This article is useful as we were prompted to do some surveys while in London and it is beneficial to have information regarding past surveys.

Media team, Friends of the Earth. (2003). *Press release: MPs URGED TO BACK RECYCLING BILL*. Retrieved January 29, 2007, from http://www.foe.co.uk/resource/press_releases/20030122000558.html

Some brief descriptions to provide facts and figures from physical observations to recycling.

Natural Resources Defence council. (2006). *Recycling returns*. Retrieved February 4, 2007, from <http://www.nrdc.org/cities/recycling/default.asp>

Source discussing all general aspects of the benefits of recycling. Good for general background research.

Oxford Internet Consultants. (2006). *Capital waste facts.*, 2007, from <http://www.capitalwastefacts.com/>

This website is very beneficial as it has ample fact site links regarding the United Kingdom and focuses on specific Boroughs and sections of London as well.

Recycling and reuse. Retrieved January 19, 2007, from <http://www.croydon.gov.uk/environment/recyclingreuse/>

This website was very useful in finding information on the current initiatives towards recycling in Croydon, although the site is semi-confusing at times.

Denision, R & Ruston, F. (1996). *Anti-recycling myths commentary on "recycling is garbage"*. Retrieved February 11, 2007, from http://www.environmentaldefense.org/documents/611_ACF17F.htm#endnotes

Useful information that collects a lot of myths associated with people's thoughts and inquiries about recycling.

Kashmanian, R. (1989). *Promoting source reduction and recyclability in the marketplace.* , January 2007

This article proved to be very useful as it breaks down recycling into a four step process and focuses primarily on the fourth process.

U.S Environmental Protection Agency. (2006). *Municipal solid waste*. Retrieved February 11, 2007, from <http://www.epa.gov/epaoswer/non-hw/muncpl/recycle.htm>

This is the official web site for U.S Environmental Protection Agency that provides a lot of useful information related to recycling and other different types of waste disposal that provides comprehensible comparison between them.

UK defra | e-digest environment statistics, municipal waste.
<http://www.defra.gov.uk/environment/statistics/wastats/bulletin.htm>

DEFRA waste statistics. Used in the creation of Figure 2.

United States Environmental Protection Agency. (Aug 1999). *Recycling works! state and local solutions to solid waste management problems* No. 5305W) Retrieved January 28, 2007, from Solid Waste and Emergency Response database.

This article is very useful as it describes recycling programs throughout the United States focusing on specific towns. This allows for us to compare and contrast various recycling programs.

Waste Online. “History of Waste and Recycling Information Sheet” from:
<http://www.wasteonline.org.uk/resources/InformationSheets/HistoryofWaste.htm>

“Waste Online” is a website dedicated to waste related information. It is based in the UK which makes it extremely applicable to our project topic. The History of Waste and Recycling Information Sheet is a useful timeline illustrating not only large scale recycling history, but also specific information regarding waste related legislation in the UK. This is a good source to use for finding out about waste legislation in London.

Woodard, R., Bench, M., & Harder, M. (20050401). The development of a UK kerbside scheme using known practice. [Electronic version]. *Journal of environmental management*, 75(2), 115.

Very useful in giving information about successful programs and the development of current programs. Shows how programs can be assessed and breaks down each collected material, collection days and frequencies and shows common methods that have been used. Gives information on how to set up a successful program from the beginning and also gives information on how to analyze data that has been collected. Gives lots of visuals to show how the program should be analyzed, even shows graphs of control groups vs. the method that they are giving. Lots of resources that can be used from how to evaluate programs to general information on recycling in the UK.

Worcester. (2007). *City of Worcester, Massachusetts*. Retrieved January/2007, 2007, from <http://www.ci.worcester.ma.us/dpw/>

This web page will not be of much use to us throughout our project. It was only used to reference Worcester's Department of Public Works information to research some contact information for public officials.

Appendix N: Project suggestions

Title: Overcoming the barriers stopping people from recycling in Croydon

Three main areas

- 1. Canvassing areas of poor presentation**
- 2. Determining use of Neighbourhood Recycling sites**
- 3. Research into the effectiveness of our promotional materials**

Also if time

Investigating the use of rubbish chutes for recycling at blocks of flats

Producing a photographic history of the lifecycle of the materials we recycle for publication on the council's website

Promotion of the new static green waste collection sites

Updating the Great Giveaway (Croydon's swap website)

Helping the community initiatives Officer in Education work at local schools

1 Canvassing areas of poor presentation

Time needed

- 2 students 13 days (possibly more if there is time to go back and survey the round)
 - 5 days survey
 - 5 days canvassing
 - 3 days write up

Background

- The council has a fortnightly green box collection service that collects mixed glass, paper, tins and cans and textiles in a green box from the kerbside outside people's houses.
- The boxes should be placed on the 'curtilage', on the boundary between the road and the property or they are considered 'not presented' and won't be collected by the collection teams.
- Residents who are disabled can register with the council to have their boxes collected from nearer to their door, but if they don't register then the teams won't collect them
- Quite often non collection of the boxes results in residents not continuing with the service and sometimes causes conflict between the collection teams and the resident
- The positioning of the bins is detailed in a calendar that every resident receives and in other promotional materials, but a recent survey showed that there is still a big problem with set out especially on certain rounds (these also happen to be the ones where the contamination- putting in materials the council can't collect- is highest)

- We are at present trialling a sticker on the green box to deal with contamination and have considered the use of a sticker to tackle presentation but the contractors who pick up the recycling aren't keen on this as the message is that we were able to walk up to your box to put a sticker on it, but not to empty it!

Aims

- Our main aims for this project are to find out:
 - i. Why people are putting their boxes in the wrong place: is there a problem with the message of where the bins go or is it due to other issues such as weight of bins or how their property meets the pavement (sidewalk) (it could just simply be that they can't be bothered to drag their boxes to the end of the driveway!)
 - ii. The number of non presented boxes on the round that has been assessed
 - iii. Suggestions of how we can tackle this problem of presentation

Actions

- Spend one week going out with the crews on a poor performing round (if this proves to be a problem due to the early start we could ask the crews to collect the information for us- although this would then need to be manually entered into a database and the results wouldn't be as accurate, alternatively the week could be split between the 4 students i.e. 2 go out for two days, 2 for three or we could choose just three days of the weeks considered the worst by the crews)
- Record the properties where boxes aren't collected as they were not considered to be presented
- Return to these properties the following week and door knock. Ask the residents:
 - i. Do they put their recycling out for collection each week?
 - ii. How often is it missed?
 - iii. Are they aware that their box wasn't picked up due to it being in the wrong place?
 - iv. Inform them of where their box needs to be put out for collection
 - v. Determine if there are any reasons for the box not being put out in the right place e.g. is it because they simply didn't know or they couldn't place the box where they were asked to or that they didn't understand where the box had to go or that they are physically unable to get the box to the edge of their property (in which case they could be eligible for an assisted collection).
 - vi. Ask them if they had received a calendar detailing where the box should have gone
- If time return to the rounds and assess how successful the door knocking had been on encouraging people to put their box in the right place
- Write up a report of your findings including any suggestions for ways we could improve the service (e.g. stickers on boxes, leaflets?) with possible research into how other boroughs tackle this problem.

2 Investigating the use of Neighbourhood Recycling sites

Time needed –

- 13 days
 - 5 days producing a photobank
 - 5 days canvassing at a selection of sites + finishing off write up of above
 - 3 days write up

Background

- The council has a network of 27 Neighbourhood Recycling sites.
- These Recycling sites are placed in different areas across the borough including at places people regularly visit such as Supermarkets and parks.
- They were traditionally the only form of recycling offered to residents before the introduction of the recycling collection service.
- Each site takes a variety of materials- some more than others- including the main core materials of paper and card, mixed glass and food tins and drink cans.
- These sites have suffered from a lack of investment in recent years- mainly due to the concentration on the kerbside collection service.

Aims

- Our aims for this project are
 - i** To have a photographic and written report on the condition of all of the 27 sites
 - ii** To find out who is using the sites and how often and how far they are coming to use them
 - iii** To find out what materials they are recycling at the sites and what materials they would like to see collected at the sites (most likely plastics!)

Actions

- To carry out a survey of the 27 recycling sites producing a photographic bank of evidence of each one and carrying out a survey of the condition of each site
- Canvass the people at a selection (probably the busiest ones at the Supermarkets) of the banks to find out:
 - i. Who is using the banks and why
 - ii. How far they are coming to use them and if they do this as part of another journey (likely if the site is at a Supermarket)
 - iii. What materials they are using the banks for and what materials they would like to see at the site
 - iv. Whether they live in a flat or a house (i.e. whether they have a green recycling box)
 - v. Any problems (how do they rate the site in terms of cleanliness and ease of use and what problems they have in using it)
- Produce a report detailing all of the above

3 Research into the effectiveness of our promotional materials

Time needed

- 4 Students up to 11 days
 - 1 day preparation (study of materials)
 - 5 days canvassing
 - 5 days write up (+ time to finish off other projects)

Background

- Though not always the case traditionally the economically poorer areas of Croydon have a poor recycling rate, this may be due to lifestyle, short term accommodation, a transient population (people don't live there long before they move on to another area) or language and literacy.
- We produce a guide to recycling that covers the whole borough and a calendar that goes out to every household that receives the green box recycling collection service. We have tried to produce these using national guidelines; using pictures and easily recognisable symbols where possible to cut down on any problems with language
- We have in the past had targeted messages for different parts of the borough- the North of the borough is generally less affluent with higher density housing than the south of the borough, so the north had a message detailing how recycling saves you money and the south a message detailing the environmental benefits. Generally however our promotional materials have been the same across the borough.

Aims

- **Our main aims for this project are:**
 - i** To discover how effective our promotional materials are at reaching areas with poor recycling rates
 - ii** To find out what barriers there are that we need to be aware of with future promotions
 - iii** To discover what changes, if any, we might need to make to our promotional materials in the future to make them more accessible

Actions

We can supply you with copies of all the promotional materials and images that we use at present in advance if needed.

- Identify and visit a poor performing recycling area of the borough (from our participation survey) and canvass the residents who live there in particularly poor performing streets
- Take along examples of the literature that we produce and find out from the residents:
 - i. Have they seen any of the promotional items that we produce
 - ii. Can they remember where

- iii. How did they rate the materials in terms of the clearness of the message, the usefulness of the information provided and the way in which it is presented
- iv. Are there any changes that they would like to see (language, clearness of the type etc)
- v. What are the barriers stopping them from recycling- what information do they need
- vi. Inform the residents of the recycling services in the area
- Produce a write up of your results

Appendix O: Proposed Project Timeline (as given by Sponsor)

Settling in and meeting the team/ key people at the council							
Green Box Presentation							
Neighbourhood recycling sites							
Effectiveness of promotional materials							
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
2-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr	8-Apr	
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
12-Mar	13-Mar	14-Mar	15-Mar	16-Mar	17-Mar	18-Mar	
Student 1	Presentation			Preparation			
Student 2	Presentation			Preparation			
Student 3	Presentation			Preparation			
Student 4	Presentation			Preparation			
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	
Out with recycling teams			Canvassing				
Out with recycling teams			Canvassing				
Photographic bank of evidence			Canvassing				
Photographic bank of evidence			Canvassing				
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	
Write up + finishing off other projects						Canvassing	
Write up + finishing off other projects						Canvassing	
Write up + finishing off other projects						Canvassing of sites + write up of photographic bank	
Write up + finishing off other projects						Canvassing of sites + write up of photographic bank	