

Clark County

# Multi-Family Recycling Contamination Project



December 2014

# CLARK COUNTY MULTI-FAMILY RECYCLING CONTAMINATION PROJECT

## FINAL REPORT

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December 2014

## Acknowledgements

Green Solutions gratefully acknowledges the following people and organizations for their assistance with this project:

- Clark County staff, especially Leslie Johnson, for conceiving of this project and guiding it along,
- City of Vancouver staff, especially Tanya Gray and Elsie Deatherage, for their assistance in the design and implementation of this project,
- Waste Connections staff, for providing information about routes and for their assistance in the design and implementation of this project, and
- Terra Heilman, of Terra Linda Consulting, for her assistance in conducting this project.

This project was funded by a Coordinated Prevention Grant from the Washington Department of Ecology.

The cover photo was taken by Terra Heilman, Terra Linda Consulting, on October 29, 2014.

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# CLARK COUNTY MULTI-FAMILY RECYCLING CONTAMINATION PROJECT EXECUTIVE SUMMARY

## INTRODUCTION

This report describes the results of a project conducted to test the impact of outreach activities conducted for recycling at multi-family buildings in Clark County. The project was conducted to address reports of high amounts of contamination in the recyclable materials set out at multi-family buildings. This project was conducted by checking recycling carts at 33 multi-family buildings before and after a public outreach campaign was conducted to see if the outreach activities had an impact on the quality of materials placed in the carts. The contamination problems were also addressed by making improvements to the numbers and types of carts provided for recycling, to the labels on the carts, and to signage posted in the recycling areas.

## CONCLUSIONS

The results of this project show an improvement in the quality of recycling set out at multi-family buildings after an outreach campaign was conducted and improvements were made to the carts, labels and signage. This study also found, however, that the materials set out at many locations were reasonably clean before the improvements were made and the campaign was conducted. It appeared that the contamination problems were being caused by less than half of the multi-family complexes. It also appeared that in many cases, the contamination issues were related to cart and signage problems that left the multi-family residents without clear instructions on how to participate.

Public outreach materials for multi-family residents are very important, and the use of the proper recycling containers and signage is equally important. The ideal arrangement for recycling carts at multi-family complexes includes:

- two or more carts for mixed recyclables, one or more carts for glass, and a cardboard “cage,”
- there should be a sufficient number of carts for the number of apartments served at that location,
- the carts for the mixed recyclables and glass should be different colors and sizes, and need to be clearly labeled,

- labels should be placed both on the outside and on the underside of the lid of the glass carts (on the underside so that the label can be seen if the lid is open while in use, as is often the case at multi-family locations),
- a garbage cart or dumpster should be located near the recycling carts, and the garbage dumpster should not be too tall to be used easily,
- there should be signage posted in a clearly-visible spot near the recycling carts that provides instructions and indicates which materials are acceptable for recycling,
- multi-family residents need to receive information and materials that help them recycle properly, including brochures and bags, and
- there needs to be a building manager, maintenance staff, or other on-site person who monitors the carts and provides additional feedback to tenants as needed.

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## INTRODUCTION

### OVERVIEW

This report describes the results of a project conducted to test the impact of outreach activities conducted for recycling at multi-family buildings in Clark County. The project was conducted to address reports of high amounts of contamination in the recyclable materials set out at multi-family buildings. This project was conducted by checking recycling carts at 33 multi-family buildings before and after a public outreach campaign was conducted to see if the outreach activities had an impact on the quality of materials placed in the carts. The contamination problems were also addressed by making improvements to the numbers and types of carts provided for recycling, to the labels on the carts, and to signage posted in the recycling areas.

This project was conducted by the environmental consulting firms Green Solutions and Terra Linda Consulting, with assistance from staff of Clark County, City of Vancouver and Waste Connections. This project was funded by a Coordinated Prevention Grant from the Washington Department of Ecology.

### BACKGROUND

In 2009 and early 2010, Clark County and its cities switched from a three-bin recycling program to a dual stream approach. For single-family homes, the new dual stream approach uses a 13-gallon bin for glass bottles and a 65- or 96-gallon wheeled cart for other recyclable materials. The switch to a dual stream recycling program required a significant investment in new collection trucks and in a new processing system that could sort out the commingled recyclables. The conversion to a new system also allowed recycling programs for multi-family and commercial customers to be conducted in a similar fashion. For multi-family and commercial customers, larger and/or more recycling containers are usually needed due to the larger volumes being generated at these locations. The principal approach is the same, however, with glass in one container and commingled recyclables (paper, plastics and metals) in another container. Many of the multi-family and commercial customers also have a separate container (a “cage”) for cardboard.

The dual stream system was chosen in Clark County because it avoided the problems that were occurring in other areas when glass is mixed with paper and the other recyclable materials. In early 2013, Waste Connections alerted City and County staff that the carts intended to collect glass at multi-family buildings were contaminated with other recyclable materials and, in some cases, garbage. Because glass is not processed,

the contamination is difficult to handle. Waste Connections addressed this problem by mixing loads and processing glass with the other commingled recyclable materials. The City of Vancouver and Clark County have contracts with Waste Connections to collect the recyclable materials from multifamily complexes, and so all three parties had a significant interest in resolving these problems. The City and County, along with Waste Connections, embarked on a project to assess the problem and to improve education and outreach efforts for multi-family customers. This study was part of that project.

## GOALS OF THE MULTI-FAMILY CONTAMINATION STUDY

This project was designed to learn more about the contamination issues at multi-family complexes and to test outreach materials for multi-family residents. The specific goals of this project were:

- Decreased contamination in recycling containers, with an emphasis on improving the quality of glass set out for recycling.
- Increased awareness among multi-family residents about recycling opportunities and proper preparation and sorting.
- Increased information regarding how multi-family residents are using their containers to guide future outreach and program management.

The following sections of this report discuss the methods, results, and conclusions of this project.

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# DATA COLLECTION METHODS

## INTRODUCTION

This section of the report presents information about how this project was conducted.

## PROJECT APPROACH

The successful completion of this project was the result of a team effort by Clark County, the City of Vancouver (COV), Waste Connections, Green Solutions and Terra Linda Consulting. Clark County staff led a team that included staff from the County, COV and Waste Connections to coordinate project logistics (timeline, route selection, and distribution of outreach materials). Waste Connections staff (with assistance from Clark County and COV staff) designed bags and brochures that were distributed to multi-family residents. Waste Connections staff also provided information about multi-family customers and routes. Green Solutions designed on-route protocols and provided project management and data analysis skills, including preparing this report. Terra Linda Consulting conducted most of the on-route fieldwork, with the assistance of a temporary employee.

Recycling containers for multi-family buildings on the selected route were observed the day before the recycling service day. Terra Linda Consulting checked the recycling carts at each building, collecting data on the contents and making additional observations. The initial observations were conducted over a five-week period starting in May 2014. After the initial observations, a public education and outreach campaign was conducted by Clark County, COV and Waste Connections for the multi-family units on the selected route. In the fall, the consultants again conducted a series of four cart observations to collect data on the degree of contamination and to determine if the outreach campaign had an impact.

The route used for this project was selected based on having a mix of multi-family units that were representative in terms of demographic factors (income levels and racial composition), to the extent that these factors were known. This route had a mix of single buildings and large complexes with several buildings. The selected route was also chosen on the basis of having a mix of units in the city and in the county that reflected the overall mix of multi-family buildings served by the city and county programs (with approximately 75% of the multi-family units in Vancouver). The names, addresses, and locations of the recycling carts (if there was more than one location) for each multi-family complex on the selected route were transferred to a data collection form. Prior to this step, the list of customers on the selected route was

modified to remove a few commercial stops that were on the list, and to remove one assisted living complex (in part because the recycling carts are generally not accessible at that location on the day before the collection day). After the first set of observations, this list was further modified to remove a few complexes where the recycling carts were difficult to reach. The final list of multi-family complexes that were checked for cart quality included 33 buildings or complexes and a total of 84 cart locations.

The project was designed to check each cart four times. The initial round of field observations was conducted over a five-week period because not all of the carts could be checked in the first week (the field crew was slowed down by routing issues, the need to collect additional data and the need to refine observation protocols). Hence, the initial round of observations began on May 7 and was completed on June 4. The second round of observations began on October 8 and was completed on October 29.

Observations were made by a team of two crewmembers (Terra Heilman and a temporary employee), which allowed one person (the temporary employee) to record the data for each location while the other crewmember (Terra Heilman) checked the containers. The contents of each recycling and glass cart were checked (see photo 1), and cardboard cages or recycling dumpsters were also checked if present. Records were kept as to whether the recycling container was empty or over-full, and if the



*Photo 1. The field crew was assisted by City of Vancouver staff Tanya Gray on the first day, photo taken May 7, 2014.*

contents were “okay” or “bad.” The carts were judged to be okay if the contents were reasonably free of materials that should not have been in that specific cart. The carts were judged to be bad if the carts contained an excessive amount of non-recyclable materials, or the wrong type of recyclable material (i.e., if glass was found in the commingled recycling cart, or if commingled recyclables were found in the glass cart, or if any other types of recyclables were observed in the cardboard cages). Whether the cart was judged to be okay or bad, the types of unacceptable materials observed in the carts were noted on the data collection form.

Depending on how full each cart was at the time of the observation, the contents of the recycling cart were typically checked by digging only partway into the cart. Digging deeper into the carts was impractical if the cart was full or overflowing. If the cart was only partly full then the entire contents could generally be observed. The contents of the glass carts could usually be observed without needing to shift the contents around, thanks to the fact that clear glass is the most common type.

For the first visit to each cart location in the first round of observations, additional data was collected on the size of each cart and the adequacy of labels on the carts. The number of each type of cart (commingled or glass) was also confirmed, as well as the presence of cardboard cages and recycling dumpsters. The adequacy of the signage for the cart locations was also noted on the first visit. For the first visit of the second round of observations, these factors were confirmed or modified as appropriate. Several changes were implemented by Waste Connections in the months between the first and second round of observations, including changing the number and sizes of carts at many of the locations, and improved labels and signage. While beneficial to the recycling program, these changes complicated the analysis because the impact of these changes could not be separated from the impact of the outreach efforts.

The data collected through the route observations was entered into an Excel spreadsheet and the information for each cart location was compared for the first and second round of observations. The results are discussed in the next section.



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## RESULTS

### INTRODUCTION

This section of the report provides the results of the first and second round of observations at the multi-family buildings, and compares those results.

### RESULTS OF THE FIRST ROUND OF OBSERVATIONS

Table 1 shows the 33 multi-family buildings or complexes that were included in this study, and indicates whether these were located in the City of Vancouver (CI), or in the nearby unincorporated area of Clark County (CO). The number of apartment units at each multi-family property is shown in the next column, and then the number of locations (“cart clusters”) at each multi-family building or complex is shown. The number of cart clusters varied roughly according to the number of apartment units (tenants) at each multi-family complex, although the actual number at each property depends on factors such as the layout and on the number of garbage dumpster locations. In the first round of observations, conducted in May and June, 2014, the number of carts at each location generally varied from 0 to 2 glass carts and from 1 to 4 recycling carts. A few multi-family complexes had up to 7 or 8 recycling carts at one location, and one large complex had a single location for recycling that held 4 glass carts, 14 recycling carts and two cardboard cages.

A substantial number of cart clusters were found to be good for every one of the four visits. As shown in Table 1, 45 out of the total of 84 cart clusters were found to be acceptably clean for every one of the four visits in the first round of observations. This was somewhat surprising since the premise of this project was that the multi-family recycling and glass carts were typically contaminated to a significant degree. It should be noted that this finding is actually in line with pre-project observations and research by the consultants, when a number of clean carts were observed on a trial run, but the number of clean carts was higher than expected. This finding caused a shift in the approach for the next phase of the project. The original approach was to divide the multi-family complexes into a control and a test group, with public outreach materials distributed only to the test group, but the high number of cart locations that were always good (i.e., cart locations that didn’t have any room for improvement) did not leave a sufficient number remaining to divide into two groups.

The last two columns of Table 1 provide additional detail as to which of the carts were found to be contaminated and the number of times a location at that property was found to have a contaminated cart. For example, glass carts at one of the cart clusters at the first complex (Willow Pointe Apartments) were found to be contaminated with non-

Table 1  
RESULTS OF THE FIRST ROUND OF OBSERVATIONS OF MULTI-FAMILY RECYCLING CARTS

	City (CI) or County (CO)	Number of Units	Number of Cart Clusters	Clusters that were All Good	Number of Times that Bad Carts were Observed	
					Glass	Recycling
WILLOW POINTE APARTMENTS	CO	191	8	5	8	3
KLINELINE LAKE CONDOS	CO	6	1	0		1
99 R V PARK	CO	80	3	1	8	7
VINTAGE OAKS CONDOS	CO	74	4	4		
INTEGRITY STRUCTURES	CO	10	1	1		
VISTA VIEW APARTMENTS	CO	90	2	2		
RUNNING SPRINGS	CO	26	2	2		
WATERS EDGE APARTMENTS	CO	138	4	3	1	
OVERLOOK PARK	CI	154	1	0	4	4
MADISON PARK APARTMENTS	CI	170	11	6	6	5
EVERGREEN VILLAGE	CI	120	3	0	7	6
EVERGREEN APARTMENTS	CI	28	1	0	2	3
RW THOMPSON PROPERTIES	CI	20	1	1	NA	
DENNIS FORBESS	CI	8	1	1		
DONGLI YANG	CI	8	1	0		1
O R M PROPERTIES	CI	6	1	0	3	
Q R M PROPERTIES	CI	6	1	0	NA	2
INVEST WEST #3	CI	2	1	0	NA	1
VANCOUVER EIGHT PLEX	CI	8	1	1		
FIRST STREET STATION	CI	70	2	1	1	1
WISTERIA MANOR	CI	24	1	0		1
MILL PLAIN COURT APARTMENTS	CI	72	1	0		2
CASCADE VIEW APARTMENTS	CI	96	2	1	4	3
COLUMBIA PLACE TOWNHOMES	CI	145	1	0	1	1
MILLENIUM PARK APTS	CI	132	2	2		
RESERVE AT COLUMBIA TECH	CI	180	2	0	8	1
AUTUMN PARK	CI	36	1	1		
RENAISSANCE	CI	100	10	10	1	
VILLAGE ON 7TH APARTMENTS	CI	104	1	0	NA	
THE CASCADIAN EAST	CI	49	1	1		
VILLAGE AT CASCADE PARK	CI	192	6	0	NA	13
CHINTIMINI	CI	158	5	1		
ARDENDALE APARTMENTS	CI	40	1	1	11	5
<b>TOTALS</b>		<u>2,543</u>	<u>84</u>	<u>45</u>	<u>65</u>	<u>60</u>

NA = No glass carts were at this location for the first round of observations.

recyclable materials on eight occasions. Five of these clusters were actually clean every time, so the other three were the cart clusters that had a contaminated cart on one or more occasions. In other words, it could be that one cart cluster was found to have a contaminated glass cart twice and the other two could have had a contaminated glass cart three times, or it could have been another combination that adds up to eight.

## RESULTS OF THE SECOND ROUND OF OBSERVATIONS

The second round of observations were conducted in October, 2014, and included the same 33 multi-family complexes and the same 84 cart locations at those complexes. In the months since the first and second round of observations, however, several changes were made to the number of carts at many of the cart clusters, as well as changes in the sizes and types of carts. These changes were generally beneficial, largely consisting of changes such as swapping a poorly-labeled glass cart for a standardized 65-gallon glass cart that is a different color from the commingled recycling carts (and hence easier for participants to distinguish from the other recycling carts). Other changes included changing the number of recycling carts (often by adding carts to provide additional capacity) and better labeling and signage. Altogether, the following changes were made in the numbers and types of carts:

- 21 commingled recycling carts were added, mostly to bring the number of these carts up to three at each location within a complex.
- 3 commingled recycling carts were removed, and two of these were apparently removed to make room for a glass cart that was added to those locations.
- 3 cardboard cages were added.
- 15 glass carts were added, mostly to add glass carts to locations that did not previously have a glass cart.
- 2 glass carts were removed, and both of these carts were removed from the same location to reduce the number of glass carts at that cart cluster from 4 to 2.
- existing 96-gallon glass carts were switched to 64-gallon carts at 13 cart clusters.

Although these changes were largely beneficial, these changes complicate the ability to compare the results of the first and second round of observations. These changes in the carts were in addition to an extensive outreach campaign conducted by Clark County, the City of Vancouver, and Waste Connections. The outreach campaign included brochures and special bags that were provided to each apartment unit for all of the 33 multi-family complexes. In addition, seven multi-family complexes with a high number of bad carts (as measured in the first round of observations) also received new signage for the cart clusters, new labels on the carts, and “no plastic bag” stickers on their carts. With so many factors potentially influencing the results, it is impossible to say how much each of the factors may have impacted the results.

Table 2 summarizes the results of the cart observations by showing how many of the 84 cart clusters improved, stayed the same or got worse. Almost all (32 out of 35) of the cart clusters that worsened were locations that were perfect in the first round of observations, but in the second round may have been observed with one or two items that pushed the cart from the “okay” category to the “bad” category. It could be argued that this is an incidental problem that is skewing the results, since the 45 carts that were perfect in the first round of observations had no room for improvement. The bottom half of Table 2 shows the results for the seven multi-family complexes that were bad in the first round of observations and that received special attention.

**Table 2  
CHANGES IN CART CONTAMINATION**

	All Cart Clusters	
	Number	Percent
Carts that Improved	29	34.5%
Carts that Stayed the Same	35	41.7%
Carts that Worsened	20	23.8%
<b>Totals</b>	<b>84</b>	<b>100%</b>
	Seven Bad Complexes	
	Number	Percent
Carts that Improved	12	44.4%
Carts that Stayed the Same	11	40.7%
Carts that Worsened	4	14.8%
<b>Totals</b>	<b>27</b>	<b>100%</b>

## TYPES OF CONTAMINANTS FOUND

Records were kept during the cart observations as to which contaminants were seen in the carts. This was done for all of the carts, whether those were rated as good or bad. In many cases, the good carts still had one or two small items that were not supposed to be in that cart. Table 3 shows the most common types of contaminants that were observed in each of the carts. This list is based on the second round of observations, although the list of the most common contaminants would be very similar for the first round of observations. As can be seen in Table 3, plastic bags are one of the most common contaminants for both types of carts.

Other contaminants commonly found included plastic packaging (such as trays and clamshells), plastic products (such as CD’s and toys), and food-soiled paper (such as

paper towels and pizza boxes, although clean pizza boxes were not counted as a contaminant).

**Table 3**  
**MOST COMMON TYPES OF CONTAMINANTS OBSERVED**

Type of Cart	Contaminant	Number of Times Observed
Commingled Recycling Cart	Plastic bags	188
	Plastic packaging	187
	Non-recyclable paper	70
	Plastic objects	47
	Styrofoam	45
	Glass bottles	43
	Bags of garbage	41
	Food-soiled paper	35
	Food	18
	Non-recyclable glass	6
	Other	5
Glass Cart	Other recyclables	110
	Plastic bags	81
	Non-recyclable glass	46
	Bags of garbage	16
	Non-recyclable paper	13
	Plastic packaging	8
	Other	6

Note: Contaminants for each type of cart are based on the second round of observations (in October).



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## CONCLUSIONS

### INTRODUCTION

This section of the report presents conclusions based on the results of this project.

### CONCLUSIONS

Conclusions from the route observations include:

- The results of this project show an improvement in the quality of recycling setouts at apartment buildings after an outreach campaign was conducted and improvements were made to the carts, labels and signage.
- This study also found, however, that the materials set out at many locations were reasonably clean before the improvements were made and the campaign was conducted. It appeared that the contamination problems were being caused by less than half of the multi-family complexes.
- It also appeared that in many cases, the contamination issues were related to cart and signage problems that left the multi-family residents without clear instructions on how to participate.
- At one location, a tall dumpster appeared to be contributing to contamination in the recycling carts by making it difficult to put the garbage into the proper receptacle. At another complex, the lack of a garbage dumpster near a few of the recycling cart clusters also appeared to be causing higher contamination in the recycling carts.

The ideal arrangement for recycling carts at multi-family complexes includes:

- two or more carts for mixed recyclables, one or more carts for glass, and a cardboard “cage,”
- there should be a sufficient number of carts for the number of apartments served at that location,
- the carts for the mixed recyclables and glass should be different colors and sizes, and need to be clearly labeled,
- labels should be placed both on the outside and on the underside of the lid of the glass carts (on the underside so that the label can be seen if the lid is open while in use, as is often the case at multi-family locations),

- a garbage cart or dumpster should be located near the recycling carts, and the garbage dumpster should not be too tall to be used easily,
- there should be signage posted in a clearly-visible spot near the recycling carts that provides instructions and indicates which materials are acceptable for recycling,
- multi-family residents need to receive information and materials that help them recycle properly, including brochures and bags, and
- there needs to be a building manager, maintenance staff, or other on-site person who monitors the carts and provides additional feedback to tenants as needed.

## ROUTE OBSERVATION DATA FORM

### INTRODUCTION

This appendix shows the form used to record data for each observation of the recycling and glass carts.

### DATA COLLECTION FORM

Shown on the next page is the first page of the data collection form used for recording observations of the quality of the carts. The complete data collection forms consisted of ten pages. A list of abbreviations for the contaminants was used with this form to make record-keeping and data entry quicker and more efficient.

Route #602-4	Cart Contents					Label?	Cart	Signage?, Other Comments
	None	Empty	Ok	Bad	Contamination			
<b>WILLOW POINTE APARTMENTS, 13717 NW 2ND AVE, BY HB FULLER PARK - 8 LOCATIONS - CLOSE ALL GATES</b>								
Location 1: Across from Bldg. P								
Glass Cart							65	
Recycling Cart #1							96	
Location 2: Next to Bldg. T								
Glass Cart							65	
Recycling Cart #1							96	
Recycling Cart #2							96	
Location3: by Compactor								
Glass Cart							65	
Recycling Cart #1							96	
Recycling Cart #2							96	
Recycling Cart #3							96	
Location 4: Across street from Salmon Creek Indoor Sports								
Glass Cart							65	
Recycling Cart #1							96	
Recycling Cart #2							96	
Location 5: Across from Bldg. C								
Glass Cart							65	
Recycling Cart #1							96	
Recycling Cart #2							96	
Location 6: by Units 81, 82								
Glass Cart							65	
Recycling Cart #1							96	
Recycling Cart #2							96	
Location 7: by S-23								
Glass Cart							65	
Recycling Cart #1							96	
Location 8: by Bldg. J								
Glass Cart							65	
Recycling Cart #1							96	
Recycling Cart #2							96	
<b>KLINELINE LAKE CONDOS, 12005 NE PLANTATION RD (no route notes)</b>								
Glass Cart							96	
Recycling Cart #1							96	
Recycling Cart #2							96	
Recycling Cart #3							96	
Recycling Cart #4							96	
Recycling Cart #5							96	
<b>99 R V PARK, 1913 NE LEICHTNER RD, 9 SETS OF TOTERS 3 LOCATIONS</b>								
Location 1: Near back entrance								
Glass Cart #1							65	
Glass Cart #2							65	
Recycling Cart #1							65	
Recycling Cart #2							96	
Recycling Cart #3							96	
Recycling Cart #4							96	
Recycling Cart #5							96	