Diamond Valley

Technical Report | Garbage Audit

June 2024

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S-Cubed Environmental

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i. Executive Summary

In June 2024, the Town of Diamond Valley conducted a study involving a comprehensive residential garbage audit and a lid-flip audit on the organics and recycling streams from June 18th to 20th. The purpose of the audits is for Diamond Valley to better understand how the residents utilize the curbside waste programs. The results will help tailor educational messaging, specifically to increase organics and recycling program use and divert more material from the landfill.

The garbage audit study examined 108 houses, which included checking for set-out, collection, weighing, and sorting into 11 pre-determined categories. It also included determining material that is currently garbage but will be considered recycling in April 2025 as part of the Extended Producer Responsibility (EPR) program. The organics and recycling cart lid-flip study inspected 104 houses, which involved visual inspection for set-out, fullness, and weighing the cart.

The results of the garbage audit revealed that 66% (71 out of 108) placed their material out for collection. The garbage contained 49% compostables, 37% landfill material, 8% recycling, and 6% other programs. Of the garbage material, 3.2% (by weight) was sorted and classified as part of the EPR recycling program in April 2025.

The lid-flip audit results showed that 32% (33 out of 104) of organics carts and 46% (48 out of 104) of recycling carts were out for collection.

The main contaminants inside the organic carts were animal waste in plastic bags. The main contaminants inside the recycling carts were non-printed paper and packaging items, loose film, and newsprint still with elastics wrapped around the bundle.

Based on audit results, there are opportunities to divert more material. Specific focus should be removing compostable material from the garbage and utilizing the curbside organics program. Methods to accomplish this should involve specific educational messaging (such as a campaign), increased face-to-face engagement with residents to identify challenges and opportunities with current programs, and expanding on resource availability to make sorting materials easier (e.g. online search tool or waste sorting application). These are all part of using Community Based Social Marketing techniques.

1 Background

In 2021, both Black Diamond and Turner Valley had a residential garbage audit conducted. These two towns were amalgamated in 2023 to form the Town of Diamond Valley. In 2024, S-Cubed Environmental was contracted to carry out two types of residential waste audits simultaneously for Diamond Valley, including a comprehensive garbage audit and a lid-flip audit on the organic and recycling carts. Sorting categories for the 2024 audit were more comprehensive than the audit completed in 2021 for the two separate towns. Categorizing items that will be part of the EPR program was completed to determine the material that will eventually be considered recyclable in April 2025.

Garbage in Diamond Valley is collected by the Town of Okotoks on Tuesday (west side) and Thursday (east side). Organic and recycling carts are collected on Wednesdays by private haulers.

Diamond Valley intends to use the audit data to improve their understanding of how residents utilize the recycling and organic programs. Analysis of audit results will help the town tailor public messaging and educational efforts effectively to achieve the goal of biweekly garbage collection. This would be supported through increased use of organic and recycling carts.

2 Waste Audit Methodology

Garbage audit

The residential garbage audit examined 108 homes from the streets of Country Meadows, McLeod Crescent, Willow Ridge Close, Emerald Way, 2 Avenue, Royalite Way and Dingman Close. These streets had garbage collected either on Tuesday or Thursday by the hauler.

The samples of garbage were taken to the Black Diamond Laydown Yard where a team of five people sorted the material into 11 categories.

Digital photographs of garbage samples were taken at the sorting site before and after sorting (Appendix D). Garbage samples were hand-sorted into various containers lined with black garbage bags. Containers were labelled with the subcategories (Appendix A). Materials were weighed after sorting using a floor scale accurate to five grams. Data was entered into a spreadsheet for data analysis.

Following the waste sort, hazardous waste and electronics were stockpiled for appropriate management by Diamond Valley.

Organic and recycling lid-flip audit

A lid-flip audit of organic and recycling carts was completed on Wednesday June 19th. It included 104 homes from the streets of: Country Meadows, McLeod Crescent, Willow Ridge Close, Emerald Way and 2 Avenue. The curbside audit involved staff recording if a cart was out for collection (set-out), weighing the cart and looking inside the cart to record fullness and noting the

types of materials inside the cart. Tare weight of each cart type was recorded to calculate the net weight of the carts. Data was entered onto a field recording sheet and then later into a spreadsheet.

3 Garbage Audit Categories

The garbage audit sort categories included paper, plastic, glass, metal, beverage containers, organics, electronics, textiles, hazardous waste, and landfill. Within each category, materials were sorted into subcategories. A detailed list of categories and their subcategories, including examples of items found in each, is in Appendix A.

The EPR list of items has five subcategories: EPR flexible plastics, EPR rigid plastics, EPR paper products, EPR metal packaging and EPR glass (Appendix A).

4 Garbage Audit Results

4.1 Set-out rate

Garbage

The set-out rate for garbage was 66%, 71 out of 108 houses.

Organics carts

There were 104 houses part of the organics lid lift audit, and during the study the set-out rate was 32%, or 33 carts out for collection. Carts were on average 40% full and averaged 13 kilograms. Visible contamination noted in the organics cart included animal waste in plastic bags and a blue bag inside the cart.

Recycling carts

There were 104 houses that were part of the recycling lid-lift audit, and during the study, there was a set-out rate of 46% or 48 cart outs for collection. The recycling cart, on average, was 65% full, and the average weight was 3.5 kilograms. Visible contamination noted in the recycling cart included non-printed paper and packaging items such as garden ornaments, a plastic cooler, fake plants, loose film, cardboard boxes with plastic overwrap, greasy pizza boxes, food in plastic containers, newspapers with elastics wrapped around the bundle, and a cloth bag.

4.2 Garbage stream audit results

The sample of garbage material based on 71 households weighed 820.5 kilograms, representing an average of 11.6 kilograms per household.

The garbage sample (Figure 1) was divided into four classification types: compostable, recycling, landfill, and other programs. The breakdown was 49% compostable, 37% landfill, 8% recycling, and 6% other programs. Details in Appendix B.

The **compostable** portion was made up of 26% food waste, including packaged food that residents would need to separate before composting (e.g., granola bars in wrappers, meat in packaging), 13% yard waste, 7% animal waste, 3% compostable paper, and lastly small amounts of 'other organic waste' such as cork, popsicle sticks, and animal hair.

The **landfill** portion included a subcategory, 'other waste,' which captured items such as hoses, plastic car parts, furnace filters, and containers filled with non-food products. This was followed by hygiene products, diapers and pet pads, non-recyclable plastics, and non-donatable textiles.

The **recyclable** portion consisted mostly of mixed paper, plastics, and smaller amounts of metal and cardboard recyclables.

The **other programs** portion included donatable items, hazardous wastes such as batteries, paint, and oil containers, and smaller amounts of electronics and glass food jars.

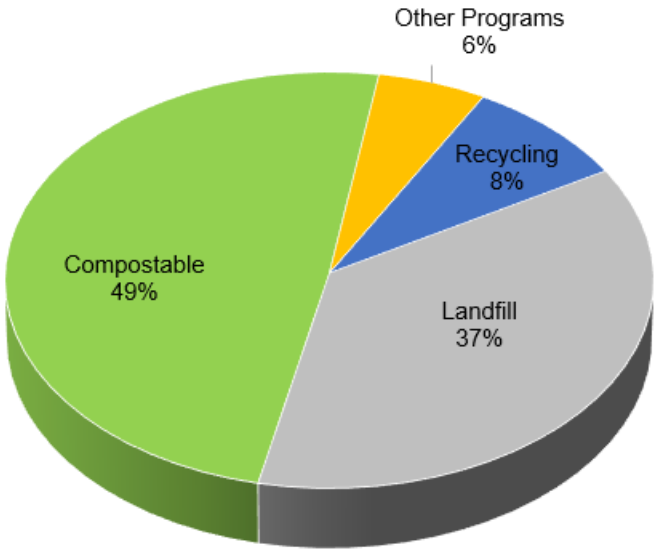


Figure 1 –*Garbage profile from 2024 audit*

The EPR categories (Appendix C) weighed 26 kilograms, or 3.2% of the garbage stream. That means an additional 3.2% of the items currently in the garbage stream could be accepted into the recycling program when EPR starts in April 2025.

4.3 Comparison of garbage audit results

The 2021 audit had six categories, five fewer than the 2024 audit which had 11. These 11 categories were classified into subcategories Compostable, Recyclable, Landfill or 'Other Programs'. Other Programs included items such as electronics, HHW, batteries and items that could be diverted to thrift stores, such as useable clothing and housewares. Any of these items would have been considered landfill (garbage) in the 2021 audit.

The 2021 audit did not specify animal waste as a separate organics' subcategory. It made up 7% of the garbage stream in 2024, which is a noteworthy amount.

Upon reviewing the data on compostable materials, it is evident that food waste continues to be the primary item comprising the garbage stream. Residents are not utilizing their organics carts to their full capacity. The week of the audit experienced uncharacteristically cool spring weather, including rain. It is possible that improved weather would have resulted in more grass and yard waste being disposed of in both the organics and garbage carts.

The 2021 set-out rate was 69% (106 out of 153) compared to 66% in 2024.

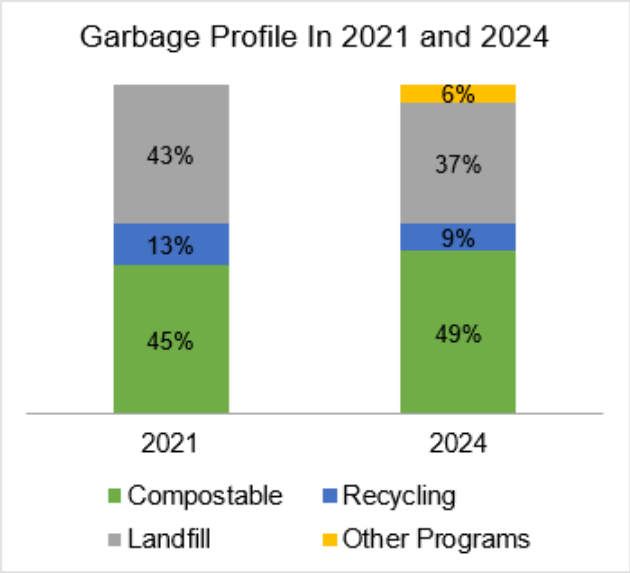


Figure 2 –*Comparison of 2021 and 2024 garbage audit profiles*

5 Observations and Recommendations

Results from the June 2024 garbage audit indicate the biggest opportunity would be to divert compostable material from the garbage to the green cart, as it made up nearly half of the garbage material. This would result in an increased diversion rate and less material going to the landfill. The section below describes approaches Diamond Valley could consider for increased diversion and assisting in moving towards a biweekly residential garbage collection service.

5.1 Divert compostable material to organics cart

The largest diversion opportunity is to increase the amount of compostable material in the organics (green) carts. The June 2024 audit revealed that nearly half of the garbage stream consisted of compostable material such as food scraps, yard waste, animal waste, and compostable paper, which could have been diverted to the green cart.

Table 1 presents approaches Diamond Valley may wish to apply to increase the diversion of compostable items from the garbage into the green cart. Communities that have achieved high rates of organics diversion most often use a combination of policy and educational tools.

Table 1 – *Educational Approaches to Increase Diversion of Compostable Items*

Approach	Rationale and Explanation
Community-based social marketing.	• Community-based social marketing techniques[1] have been shown to work well in prompting people to participate successfully in programs such as organics diversion. • Involves identifying the barriers residents face that are hindering them participating in organics curbside program. Many ways to identify these such as informal conversations, formal surveys. • Involves identifying what could incentivize residents (monetary or not) to participate. • Implementing a pilot program, such as cart tagging, to determine its effectiveness. Reaching out to other municipalities (Airdrie and St. Alberta have had success utilizing cart tagging) to learn about what has and has not worked could be beneficial if starting a program.
Expand educational messaging to target the diversion of	• Implement educational campaign(s) focused on 'What goes where?' with a particular focus on diverting food scraps and animal waste into the green cart. • Explaining to residents to entire process from collection to processing will help them understand the importance of participating. • Distribute stickers that can be affixed to existing kitchen catchers and/or carts that describe, through pictures and text what items can be placed in green cart.

[1] McKenzie-Mohr, D. 2023. An introduction to community-based social marketing. Tools of Change.

compostable material.	• Utilize other town services to piggyback messaging. For example, including an organic tips sheet in both print and online utility bills. • Simple messaging relevant to the time of year. Educating about yard waste in Spring and fall, and leftovers during Christmas holidays or barbeque season. This helps residents to be focused on what is currently applicable to them. • Using diverse messaging platforms, including social media, print, road signs. This video highlights seasonal recycling items and use of media. https://www.facebook.com/CityofAirdrie/videos/8642540832452679. • Provide residents with a new promotional item that includes organic diversion messaging, such as acceptable bags attached to a list of what can be included in the organic cart.
Engage directly with residents at community events.	• Through direct in-person outreach, work to identify and address the barriers individuals face that prevent them from diverting compostable material to the green cart. Do residents understand how the program works and how they can participate? Do they feel motivated to participate? Are there language barriers? What other barriers exist for people, and how can they be addressed? • Consider creating a composting and recycling educational booth and a 'What Goes Where?' trivia game about the Town's waste diversion programs It is helpful to be creative and set up the booth throughout the year at places where people are already gathering – sports tournaments, arts events, public gatherings, etc. Consider different displays at different events depending on the audience. Figure 3 provides three examples. • Facilitating an interactive display creates an ideal opportunity to check-in with residents about their experience participating in waste diversion programs, and answer questions or concerns.

Spin the Wheel of Waste Diversion trivia game.

Educational display on compost program and Recycle Right Relay game the Yellowknife Farmers' Market educational booth.

City of Airdrie booth promoting recycling and organics stream through activities and promotional items.

Figure 3 – Examples of educational displays

5.2 Reducing contamination prior to biweekly garbage collection

If Diamond Valley changes to biweekly garbage collection, a campaign should be implemented before switching collection frequency. It is suggested that other communities be contacted to confirm how much notice residents were given. This will allow residents to learn about changes, voice opinions, and have stakeholders (council, residents, haulers) on the same page.

Diamond Valley will need to consider strategies that will send a message to residents that contamination is not tolerated and why it is important to use the proper programs. This should be done before switching to less frequent garbage collection to get residents in the habit of using their organic and recycling carts. In April 2025, at the start of EPR, the Producer Responsibility Organization will be in charge of recycling cart communication, but it would make sense that they would be working with Diamond Valley to implement it.

Research from other similar or neighbouring municipalities should be conducted to learn about what worked, what did not and best practices for biweekly garbage collection.

Appendix A: Audit Categories

Category	Subcategory	Examples of items
Paper		
	Mixed Paper	Boxboard, envelops, paper, brown paper bags, egg carton, newsprint, and office paper.
	EPR Paper	Paper packaging - cartons and containers, Spiral round containers, aseptic containers, broth, ice cream, gable-top.
	Cardboard	Pizza boxes; soiled go to compostable paper
	Other - Recyclable paper	Plastic lined coffee and drink cups, fountain cups
Plastic		
	Plastic #1 to #7	clamshells, sealable cake trays, microwave dinner trays,
	Styrofoam packaging	
Glass		
	EPR Glass	Glass food containers made from glass
Metal		
	Steel Cans & Aluminum foil	Food cans, aluminum foil trays/foil wrap
	Scrap Metal	scrap metals, empty paint can, screws, bolts
Beverage Containers		
	All types	Plastic, aluminum, glass, pouches, gable cartons
Organics		
	Compostable paper	
	Food Waste	Food soiled napkins, paper plates, fast food packaging (i.e., French fry boxes, flour bags, parchment paper); subway paper; Kleenex/ tissue,
	Food in Packaging	Sour cream container, dipping sauce containers
	Yard & Garden	Plants, leaves, grass
	Animal Waste	In a compostable bag; loose
	Other Organic Compostable Waste	Stir sticks, chop sticks, toothpicks, popsicle sticks, animal hair.
Electronics		
	E-Waste	Items with a plug, garden tools, headphones, electronic toys, Kitchen and Power Tools
	Other Electronics	IT accessories, printers, computers, notebooks, copiers, TV.
Hazardous and Special Waste (HSW)		
	HSW AUOMA	AUOMA containers and used engine oil and filters
	HSW Paint	Paint in cans; spray paint
	HSW Mercury bulbs	Fluorescent bulb
	HSP	Alkaline Batteries, Vapes (for the battery), chemicals and containers, antifreeze, DEF, Propane tanks
	EPR Metal	Aerosol Cans like whip cream, air freshener, metal hangers

Category	Subcategory	Examples of items
Textiles		
	Donatable Textiles	Clothing, footwear and household items that could be clean and donated.
	Other textiles	Rags & Gloves and damaged clothing and household items
Landfill		
	Other Waste	Playdough, glue, cig butts, elastics, rubber gloves, fines - small residue, dryer lint, Q-Tip's, vacuum bag, broken water sprinkler as due to mixed materials, stuffies, foil with food residue
	Non-Recyclable Paper	Cigarette foils, padded envelope with paper outside and plastic inside, gift bags with fabric tassels or reuse; laminated paper.
	EPR Paper	Paper laminates (spiral wound containers for frozen juice, chips, cookie dough), pet food bags, clothing tags, pinatas, scratch cards, stickers or sticky labels, popcorn bags, receipts.
	Non-Recyclable Plastic	CD cases (Non-Numbered), PVC #3
	EPR Rigid Plastic	Expanded polystyrene (meat trays, beverage cups, packaging peanuts, cushion packaging, egg cartons), blister packaging, candy dispensers, plastic hangers, tubes, toothpaste tubes, inserts and moulds in packaging, straws, stir sticks, utensils, beverage lids.
	EPR Flexible plastics	plastic film (frozen vegetable bags, pre washed salad bag) plastic laminates (coffee or deli pouches, stand-up pouches, chip bags, cheese wrap, woven plastic bags used for fruit, nuts, candy and snack wrappers, cereal liner bags, bacon packaging); cheese string packaging, tea bag coverage, vacuum packaging, baby wipes packaging.
	Non-Recyclable Glass/ Ceramics	Windowpanes, fish tanks, ceramic coffee mugs and plates.
	Construction and Demolition (C&D) waste	Treated and painted wood, sawdust; drywall; clean lumber and wood
	Hygiene/ Diapers/Pet Pads	
	Donatable Items	Items that could be donated
	Concrete, gravel, rock	
	Garbage bags	Liners used to contain garbage, usually black or white

Appendix B: Garbage Audit Results 2024

Audit Subcategories	KG	%
Compostable	**403.02**	**49.1%**
Food Waste	187.79	22.9%
Yard & Garden	109.26	13.3%
Animal Waste	57.45	7.0%
Compostable Paper	26.17	3.2%
Food in Packaging	22.07	2.7%
Other Organic Waste	0.30	0.04%
Recyclable	**70.14**	**8.55%**
Mixed Paper	30.67	3.74%
Plastic #1-#7	21.74	2.65%
Refundables	9.24	1.13%
Steel Cans & Aluminum Foil	3.62	0.44%
Cardboard	2.44	0.30%
Other Recyclable Paper	2.44	0.30%
Landfill	**301.48**	**36.7%**
Other Waste	97.81	11.9%
Hygiene/Diapers/Pet Pads	64.28	7.8%
Non-Recyclable Plastic	54.93	6.7%
Other Textiles	26.74	3.3%
C&D Waste	20.47	2.5%
Non-Recyclable Glass & Ceramics	14.34	1.7%
Garbage Bags	9.53	1.2%
Non-Recyclable Paper	6.31	0.77%
Concrete, Gravel, Rock	5.41	0.66%
Non-Recyclable Metal	1.69	0.2%
Depot	**45.89**	**5.6%**
Donatable Items and Textiles	23.96	2.9%
Scrap Metal	6.09	0.7%
Glass Food Containers	4.44	0.5%
E-waste and Other Electronics	4.73	0.5%
Hazardous and Special Products (HSP)	3.10	0.4%
Hazardous and Special Waste (HSW) Paint	2.33	0.3%
HSW AUOMA	0.94	0.1%
Styrofoam Packaging	0.32	0.04%
Grand Total	**820.52**	**100%**

Appendix C: Extended Producer Responsibility Audit Results

The EPR information below is pulled from their respective subcategory in the audit. It shows materials that are currently not diverted through the recycling program and will be in April 2025. EPR metals are aerosol cans and should be diverted through other programs.

	Garbage	
Sub-Category	**kg**	**%**
Non-Recyclable Plastic		
EPR Flexible	12.38	1.51%
EPR Rigid	5.94	0.72%
Non-Recyclable Paper		
EPR Paper	2.79	0.34%
HHW		
EPR Metal	0.31	0.04%
Glass		
Food jars	4.44	0.54%
Total	**25.86**	**3.2%**

Appendix D: Photographs of Audit

Garbage Sample and Sort Location

Sorting area set up

Sample sorted coarsely

Sample unloaded from truck

Recyclable Material

Mixed paper

Plastic #1-#7

Metal containers

Refundables

Mixed paper

Cardboard

Recyclable Material

Cardboard with plastic overwrap
(items should be separated)

Other recyclable paper

Rolled up newspapers

Organic Material

Food waste

Compostable Paper

Food in packaging

Food waste

Yard and garden waste

Pizza

Organic Material

Food unopened

Yard and garden waste

Landfill Material

Construction wood

Other waste-product in containers

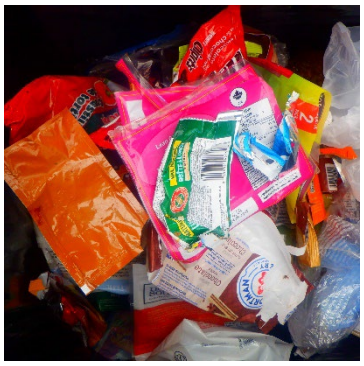
Vacuum hose

Construction waste - drywall

Flooring swatch deck

Other textiles – not donatable

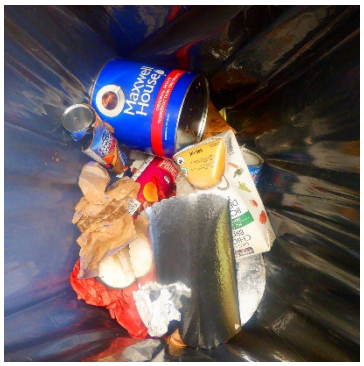
Landfill Material



Non-recyclable plastic today.
EPR flexible plastic

Non-recyclable plastic today.
EPR rigid plastic

Non-recyalble plastics



Non-recyclable paper

EPR paper in April 2025

Other Divertible Program Items

Batteries

Electronics

AUOMA items

Reusable/donatable items

Toys and unopened balloons

Scrap metal