WASTE AWARENESS AND ACTION TO REDUCE HOUSEHOLD WASTE

PROJECT REPORT

FOR APSC 461: GLOBAL ENGINEERING LEADERSHIP COURSE

BY

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MEMO

TO: Dr. Paul Winkelman, APSC 461 Instructor

CC: Norm Dooley, member of the Riley Park South Cambie Community Vision Group

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DATE: July 04, 2019

SUBJECT: Project Report: Waste Awareness and Action to Reduce Household Waste

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Purpose

The purpose of this report is to present the problem statement, methods used and findings of the study and make recommendations on how to reduce the amount of waste sent to landfills and divert it to recycling waste stream.

Background

This project engages the Riley Park South Cambie community members to consider the amount and type of waste that they produce and to consider steps that a family can realistically take to reduce the amount of material that it sends to the landfill.

Process and Results

The project had three phases to be precise: recruitment of participants and initial survey; tracking household waste for 7 days and analysing results to present recommendations. These steps are discussed in detail in the report.

The responses of initial survey and insights gleaned from the tally sheets are presented and discussed. The recommendations presented in the report would help the audience to understand the current situation and increase awareness on how they can contribute to improve the situation.

If you have any questions or need further information, please contact the authors at wastemanagementubc@gmail.com. Thank you.

ABSTRACT

On average, Canada generates 720 kg of waste per capita per annum and the province of B.C generates 573 kilograms waste per capita per annum. The City of Vancouver has a Greenest City Action Plan with a vision for Zero Carbon and Zero Waste city. We engaged with the Riley Park South Cambie (RPSC) Community Visions group to conduct a waste awareness study among the residents of the RPSC area and provide relevant recommendations to improve the situation. The project consists of four major stages: recruitment, data gathering, analysis, and conclusions and recommendation to help the RPSC community. Upon analysis of the results, it was found that on an average participant dispose 9.6 plastic bottles/containers in 7 days and that around 70% of the participants feel dissatisfied or very dissatisfied with how the government is dealing with retail packaging (styrofoam and single-use plastics) that contributes most to the garbage waste. To deal with these issues, we have presented recommendations such as: increasing recycling depots in the city; imposing penalty and heavy taxes on manufacturers; and increasing waste awareness through various digital media and community events.

ACKNOWLEDGEMENTS

We wish to express our deepest gratitude to our course instructor Dr. Paul Winkelman, for giving us this opportunity to engage with community. We thank Norm Dooley and Veronica Yakoleff from Riley Park South Cambie Community Visions group for their support and involvement throughout the project. We would also like to acknowledge the winner of student science fair for sharing her experiences.

Lastly, we are extremely thankful to all the participants who devoted their time and energy by participating in our study.

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1.0 INTRODUCTION

Untreated waste contributes to environmental problems including habitat destruction, surface and groundwater pollution, and other forms of air, soil, and water contamination. On average, Canada generates 720 kg of waste per capita and the province of B.C generates 573 kilograms waste per capita, ranking second to Nova Scotia in generating the lowest amount of waste per capita (Waste Generation Environment Provincial Rankings, 2012). British Columbia seeks to further lower waste generation and has set provincial waste disposal targets with a long-term goal of lowering the municipal solid waste disposal rate to 350 kg per person by 2020/21 (Environmental Reporting BC, 2019). In 2017, the waste disposal rate for Metro Vancouver region was 477 kg/person. The City of Vancouver has a Greenest City Action Plan with a vision for Zero Carbon and Zero Waste city.

The community partner for this project is the Riley Park-South Cambie (RPSC) community of the City of Vancouver. RPSC Community Vision group is one of the Vancouver City Council mandated citizens' advisory groups that represents one of the 16 city areas of Vancouver. The RPSC area extends from 16th to 41st Avenues between Fraser and Oak Streets covering the areas of Riley Park and South Cambie. RPSC works with the City Planning Department to provide input into planning and development initiatives in this area. Increasing the amount of household waste that is recycled has become a major goal for the City of Vancouver during the last two decades (Dooley Norm, 2019). However, the amount of overall waste has not significantly declined. The vision of RPSC is to enlighten and empower its community members to generate less waste to make a meaningful difference.

The principle of "Solid Waste and Resource Management Plan" of the City of Vancouver is the avoidance of waste through an aggressive waste reduction campaign and through the recovery of materials and energy from the waste that remains in the disposal sites. The first strategy is to minimize waste generation by transferring additional waste management responsibilities from local taxpayers & governments to producers, manufacturers, and consumers that use them to provide the appropriate market mechanism to encourage more sustainable manufacturing and consumer choices. (Metro Vancouver, 2010). The second strategy is to maximize reuse, recycling and material recovery which can be increased by improving the opportunity for reuse and by increasing the effectiveness of existing recycling programs. Private sector recycling is also an option to achieve this goal. The third strategy is to recover energy from the waste stream after material recycling and using this energy generated from

waste to be used for electricity or heating purposes. Waste-to-energy means any process that converts waste material to energy and heat, including the production of fuel which is subsequently combusted for these purposes Non-recyclable material can be used as fuel. (Metro Vancouver, 2010)

Strategies (City of Vancouver, 2019) that are currently underway to deal with the issue:

1. Greenest City Action Plan by the City of Vancouver

The GCAP outlines ten goal areas and 15 measurable targets to guide Vancouver toward becoming the greenest city in the world by 2020. The plan was approved by City Council in 2011. The Greenest City Action Plan is divided into 10 goal areas addressing three overarching areas of focus:

- Zero Carbon
- Zero Waste
- Healthy Ecosystems

2. Zero Waste 2040

Zero Waste 2040 is a long-term strategic vision for Vancouver to achieve the goal of zero waste by 2040. It has been adopted as a strategic policy framework to guide future decisions regarding the management of solid waste from Vancouver.

3. Waste Wizard tool

It is an online tool in which residents can enter to see how to recycle or safely dispose of it.

4. Van Sort

It is an online waste sorting game to increase waste awareness.

5. Notification reminders for collection schedule

Residents can sign up for reminders by email, text message, voicemail, or tweet, and import the area's schedule into their online calendar.

6. Preventing illegal dumping

Offenders can be fined between $100 to $10,000 under the Street and Traffic Bylaw.

7. Annual rates billed for garbage collection based on the size of the bin registered

The annual rates billed to property taxes for garbage and green waste collection are based on the size of bins registered to the property.

Challenges associated with strategies include:

- The motivation of the community
- Limited supplies of bins, bags, and baskets and the associated costs
- Shortage of Landfill sites and Recycling Plants
- Risks to ensuring public safety while handling waste such as glass scraps
- The increasing cost of collecting recyclables due to a ban on scrap plastic import by countries such as China (Globe & Mail, 2019)

2.0 PURPOSE OF THE PROJECT

Waste reduction efforts have become more and more important as the B.C. population continues to increase, landfills approach their capacity for receiving new waste, and the mandate to reduce greenhouse gas emissions from waste disposal grows. (Ministry of Environment, BC, 2016). This project engages the community members to consider the amount and type of waste that they produce and to consider steps that a family can really take to reduce the amount of material that it sends to the landfill. The purpose of the project to increase waste awareness among community members and to suggest recommendations on how to reduce the amount of waste sent to landfills and divert it to recycling waste stream. This project is to educate people to adopt the 3R process- Reuse, Reduce & Recycle.

The city already has plans, policies, and programs in place to support the Greenest City Plan, but the biggest challenge is to motivation & awareness of the community to commit to the cause. Another challenge is to increase public community engagements in such initiatives and to bring together the native & immigrant population alike. The purpose of the community partner for this project is to understand the waste generation patterns for a household and provide them with the necessary tools and guidance to reduce the amount of waste that they generate. It is a challenge to alter the habits & behavior of any individual, so the focus of the project has been more towards diverting waste from landfill to recycling stream instead of decreasing the amount of overall waste.

3.0 PARTNER ORGANIZATION, PARTICIPANTS, AND COMMUNITY

The partner organization of our project is the RPSC Community Vision group which is one of the Vancouver City Council mandated citizens' advisory groups. Majority of the participants are from the RPSC region which is between Fraser & Oak Streets from 16 Avenue to 41st Avenues. A few participants are from outside these boundaries as the major recruitment was done in the Farmer's Market. Below is the list of stakeholders for this project:

1. RPSC: The main stakeholder & project sponsor is the RPSC Steering Committee as this project is conducted in boundaries of RPSC and the committee represents the residents and their needs. The Committee provided the team with information about the specific sectors in the area and resident list that were keen to participate in such environment-focused studies. The committee benefits from having better waste management in their community and awareness in their residents can bring active participation & cooperation from the residents in activities of the committee in the future.

2. Other stakeholders: The sub-committees of RPSC such as Gardening, Arts & Culture, Housing, and Traffic are other stakeholders. For instance, the Gardening Committee represents the Seed to Sky Garden group which is one of the largest community-based garden groups in the city comprised of around eighty families. As the residents in this group are active members interested in gardening activities, they are concerned about nature & environment. It is beneficial for them if the waste generated from households can be converted to manure & composts for the garden. The membership of the other subcommittees is deeply connected to the residents and can be a catalyst to bring the change of reducing household waste.

4.0 GOALS AND OBJECTIVES OF THE PROJECT

This project's purpose is to provide to the community a better understanding about their waste generation and waste awareness. After our initial meeting with the community representatives, the scope of the program was determined to be open for residents and non-residents of the Riley Park South Cambie area. Because of this, it was possible to approach more people on public events.

Furthermore, our primary goal was to quantify the awareness of household waste, recycling services, and waste disposal among the community members. By doing this, our team also aims to create awareness on the colossal amount of waste that is being generated and sent to landfills every day, where this ultimately increases the greenhouse effect on the atmosphere.
Finally, our team aims to motivate our participants about being the change in the community by being active participants in recycling activities.

Our main goals can be summarized to:

- Measure community's level of participation in recycling, reusing and reduction of waste activities.
- Estimate the total amount of waste per household in a 7 days period.
- Quantify the community's level of awareness about recycling services offered in the city of Vancouver.
- Identify the main component of waste.
- Educate people about what materials can be recycled and how to properly dispose them.

5.0 APPROACH & METHODS OF DELIVERY

This section presents the approach and methods adopted to carry-out the study.

5.1 Initial Preparation

As part of our initial preparations, our team had an initial meeting with our community ambassadors where we discussed the project timeline, scope of the project, data acquisition tools, recruitment process and further steps.

5.2 Scope and Project's Timeline

After our initial meeting with the community ambassadors, it was decided that this study will be open to all type of participants from Vancouver city, no matter their neighborhood, race and/or age with the objective of approaching a bigger public and therefore general results.

Regarding our timeline, our project is consisted of the following steps (Figure 1):

Figure 1: Study process

5.3 Questionnaire and tally sheet elaboration

The main goal of this study is to understand waste generation patterns and awareness of waste production amongst members of Vancouver city. For this reason, our study required participant's input through a survey and a tally sheet.

While designing our survey, the top priority was to minimize the number of participants leaving this study. Aiming to mitigate this risk, we created a flexible and easy-to-answer type of questions. As literature has suggested, according to Innovation Science and Economic Development Canada (2018), the most common ended question in questionnaires are rating scales, multiple choice and Yes/No questions. After analyzing those, we designed our questionnaire with a variety of these type of questions. For more information regarding tally sheet refer Appendix B.

Our survey was designed to measure qualitatively their recycling habits and identify any knowledge gaps. For this reason, we sent a list of possible close ended questions to our community partner for review. After we received their feedback, we finished our survey with 21 questions, 20 being closed-ended type and one open-ended question. This survey was published electronically through an online tool called "Survey Monkey". The reason behind using an electronic survey rather than on paper was the easy access to these. As Tenforde, Sainani, & Fredericson (2010) suggest, electronic surveys are a cost-effective way of acquiring data from participants because of their easy accessibility and data management.

Another main goal was to create awareness about the amount of waste that is being produced daily. According to Rajan, Fredeen, Booth & Watson (2018), waste tracking seems to be an effective way of increasing awareness of waste production. However, tracking waste by weighing garbage can be time consuming and difficult to analyze. Taking those points in consideration our team decided to use a tally sheet for waste monitoring. Participants were able to specify the quantity of items used, those being recyclable and non-recyclable items. These items were divided in categories including (cans, organics, containers, etc.). Those categories contain elements that our team identified as being commonly used on regular basis. The waste monitoring program consisted of a 7 days period that could be done according to the participant availability. Furthermore, part of our waste monitoring tools was an adaptation from a former winner of Student Science fair.

5.4 Participants recruitment

After our initial meeting with the community ambassadors, the recruitment process of participants was as follow:

- Our team created a general invitation message to all community members. This was sent to the community mailing list by our community contact.
- Community members that were interested in participating for this study sent back an email as instructed on our invitation.
- On May 25th, our team assisted to the local farmers market. Where we had the opportunity to explain and invite assistants to our study.

Our invitation email was sent to 190 community members and it is estimated that our team approached about 50 people at the farmers market. From our invitation email (190 people) only eight people showed

interest in the study (4.2% success). However, regarding the 50 people that were approached in the farmers market 30 people showed interested in this study (60% success), being farmers market our best way to recruit participants. From those two methods our total number of participants were 38, from which 21 people filled the survey and only 13 people complete the study (tally sheet and survey).

Moreover, people who agreed to participate in our study had to sign a consent form. This had information about our purpose, how the study is meant to be conducted, risks and benefits of the study, contact information and how data privacy was handled. This consent form was signed by participants at the farmers market and electronically signed by our mailing list participants.

5.5 Data collection and waste tracking period

Because of privacy concerns about the participants' data, our team decided to assign a unique id to all participants. Then, our team sent an initial email to all participants along with an electronic version of our tally sheet, study instructions, their assigned id for the study, the survey link, a reference sheet with information related to recycling (the correct placement of items according to their bins) and an electronic version of a consent form to those members recruited over the mailing list. Then participants had about 15 days to complete the survey and fill up their tally sheets. During that period, our team monitored the progress of participants by sending following up emails as well as answering any questions that may have occurred during the progress of this study.

5.6 Data analysis and final steps

Two weeks after the beginning of our study, our team received the survey results and the tally sheets back from the remaining participants. This information was interpreted for any interesting insight that is discussed on the next section. It is important to highlight that this report will be shared with the RPSC community contact.

6.0 RESULTS

This section highlights the main results of the survey and tally sheet, and it provides possible correlations to explain the trends of these results.

6.1 Survey Results

This section focuses on the highlights found from the results of the survey.

6.1.1. Profile of Participants

A total of 21 people filled out the online survey. The survey captured some basic demographics such as the age range and the number of occupants per household. Participants were asked to report if their residence is within the Riley Park-South Cambie boundaries and the type of dwelling they live in. These answers are presents in Table 1 and Figure 2. Responses to these questions helped us to better understand the main demographics characteristics of the participants. As it can be seen in Table 1, two thirds of the participants were residents of Riley Park-South Cambie while the rest were participants from other parts of the city. All data in this report are representative of both groups.

Table 1: Demographics

Question	Response options	Response (%)
Do you live within the Riley Park-South Cambie boundaries? (16th to 41st Avenues between Fraser and Oak Streets)	Yes	66.67
	No	33.33
What is your age range?	19-24	23.81
	25-34	4.76
	35-44	19.05
	45-54	9.52
	55-64	9.52
	65+	33.33
How many occupants are there in your home, including yourself?	1-2	71.43
	3-4	19.05
	More than 4	9.52

Figure 2 shows that four-in-ten (43%) participants live in single-detached houses, 38% live in apartments, and 14% live in condominium.

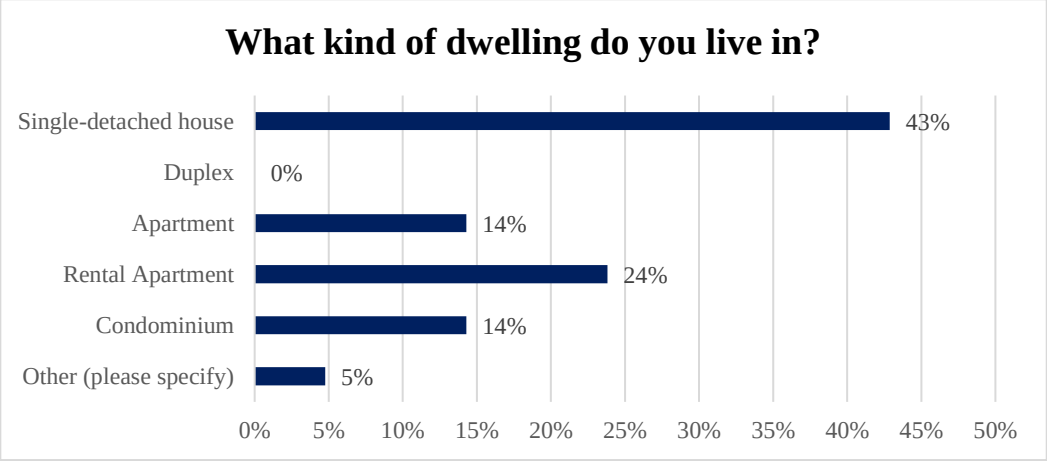

Figure 2: Participants' type of dwelling

6.1.2. Recycling Practices

The survey included questions that aimed to understand the participants' recycling practices, including knowing what they recycle, what they do when they are unsure if an item is recyclable, how often they use reusable bags for grocery shopping, and how they dispose of some commonly used items such as plastic bags, foam containers, and pizza boxes. The graphs in this section reflect the entire base of respondents, regardless of housing type or age.

One of the questions of the survey asked participants what items they recycle at home. This question displayed a list of 10 categories which are the ones listed as recyclable items according to Recycle BC. Participants were asked to select the items they recycle, giving them the option to select as many items as needed. As seen in Figure 3, out of all the items, paper, plastic containers and glass containers were the most prevalent categories, with 90% of participants reporting that they recycle these items; the least prevalent items were foam packaging and other flexible plastics (33% each).

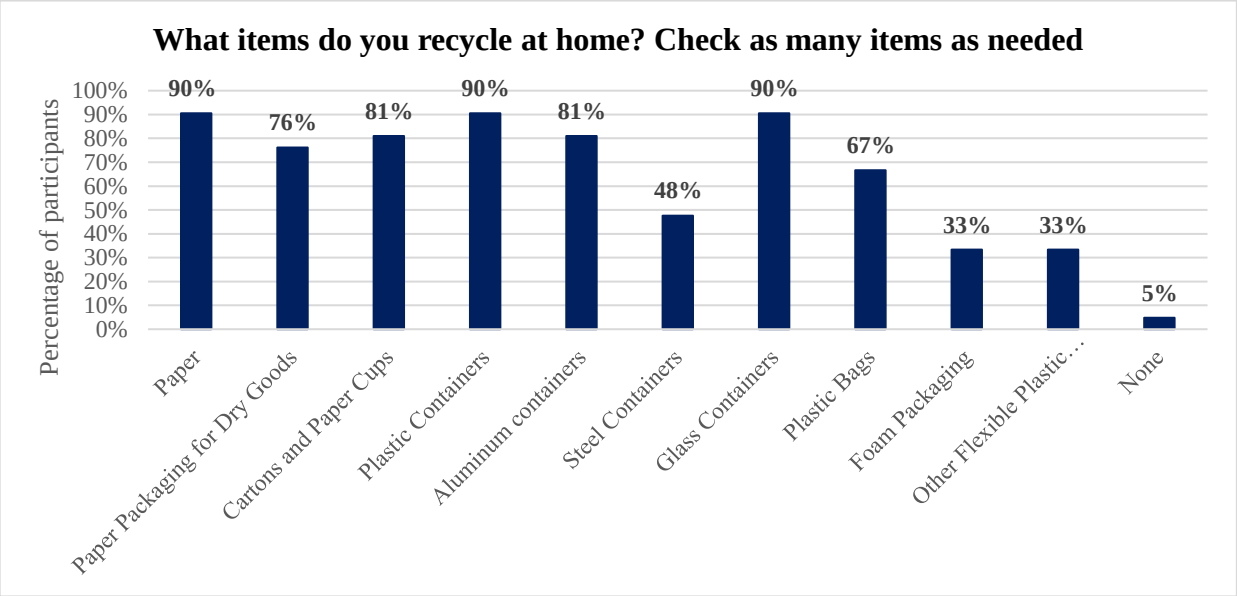

Figure 3: Items That Participants Recycle

Participants were asked to select from a list of options what they normally do when they are unsure whether an item is recyclable. Figure 4 represents participants' responses to this question, from which about 52% of the participants said that they generally place an item in the garbage bin (black bin), around 20% consult online/Recycle BC website, and nearly 19% of the survey respondents will place an item in the recycling bin even if they are unsure. The remaining 9.52% representing "Other" will ask someone for help or consult their paper copy of the City of Vancouver Accepted Materials List for recycling.

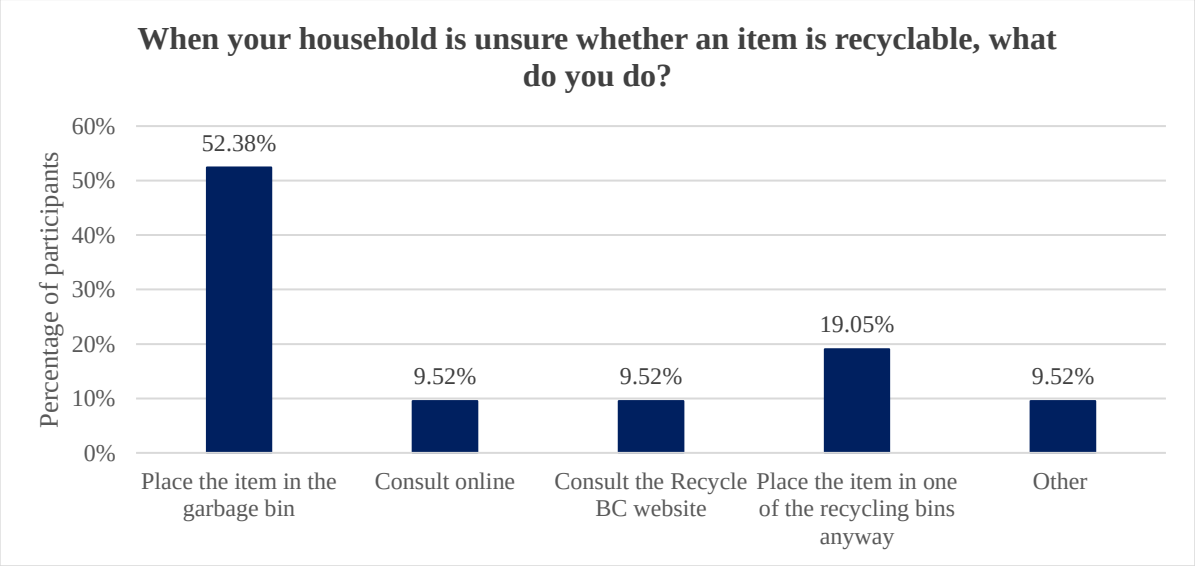

Figure 4: Participant's actions when unsure whether an item is recyclable

Another recycling practice is the use of reusable bags for grocery shopping as compared to the conventional single-use plastic bags. As presented in Figure 5, 72% of the participants reported that they always/very often use reusable bags, 14% sometimes, and 14% reported that they rarely use reusable bags for grocery shopping.

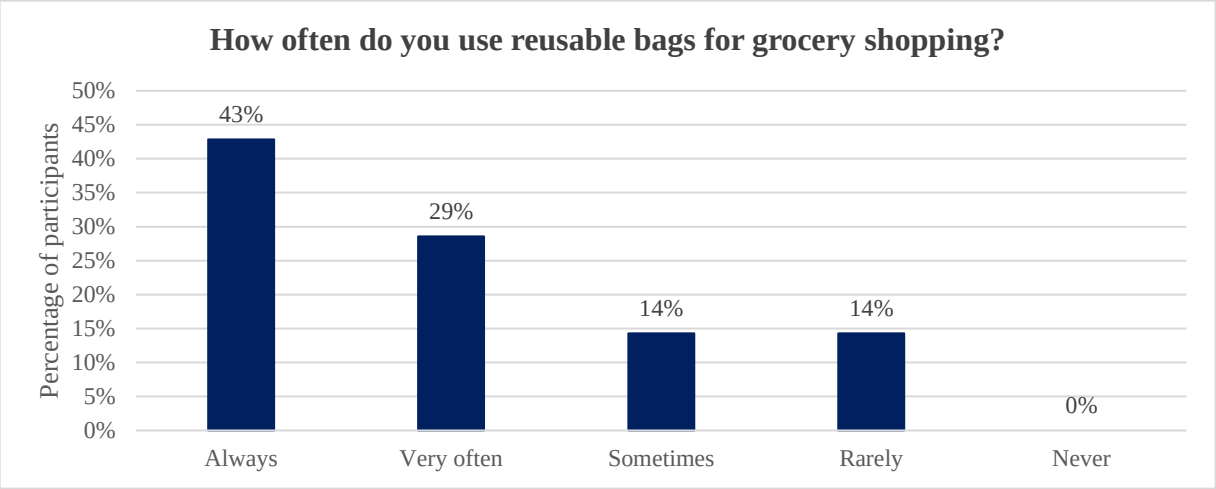

Figure 5: Participants frequency of usage of reusable bags for grocery shopping

Participants were asked to identify how important it is for them to find recycling services at a business or establishment they normally frequent. The survey question asked participants to select one of these five options: not at all important, not so important, somewhat important, very important, and extremely important. Figure 6 shows that about half of the respondents (52%) said that it is very important that a business/establishment they frequent has recycling services, followed by 38% who expressed it is extremely important, and only 10% stated that it is somewhat important. The main highlight of these results demonstrates that all the participants are somewhat concerned about finding recycling services wherever they go. This also shows the level of waste awareness among participants and their intention to reduce waste by recycling even outside of their homes.

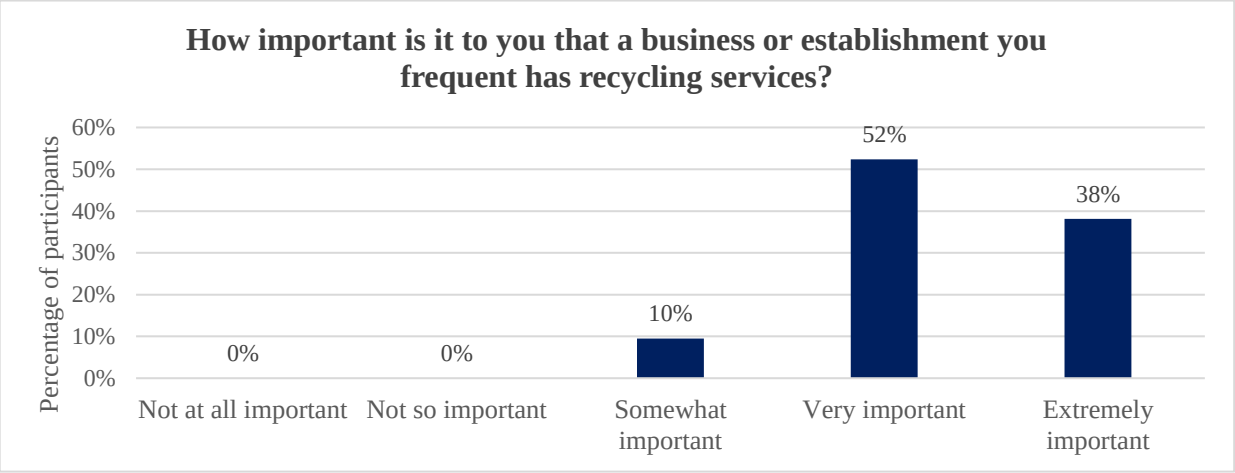

Figure 6: Level of importance regarding business having recycling services

Figure 7 shows what the participants would do if they were to dispose of any foam container. From the responses, about three quarters of the survey respondents would throw foam containers into the garbage bin (black bin) to be later sent to landfill. The other 19% said that they would drop off the foam containers at recycling depots, and only 5% mentioned that they would throw a foam container into the mixed containers bin (blue bin).

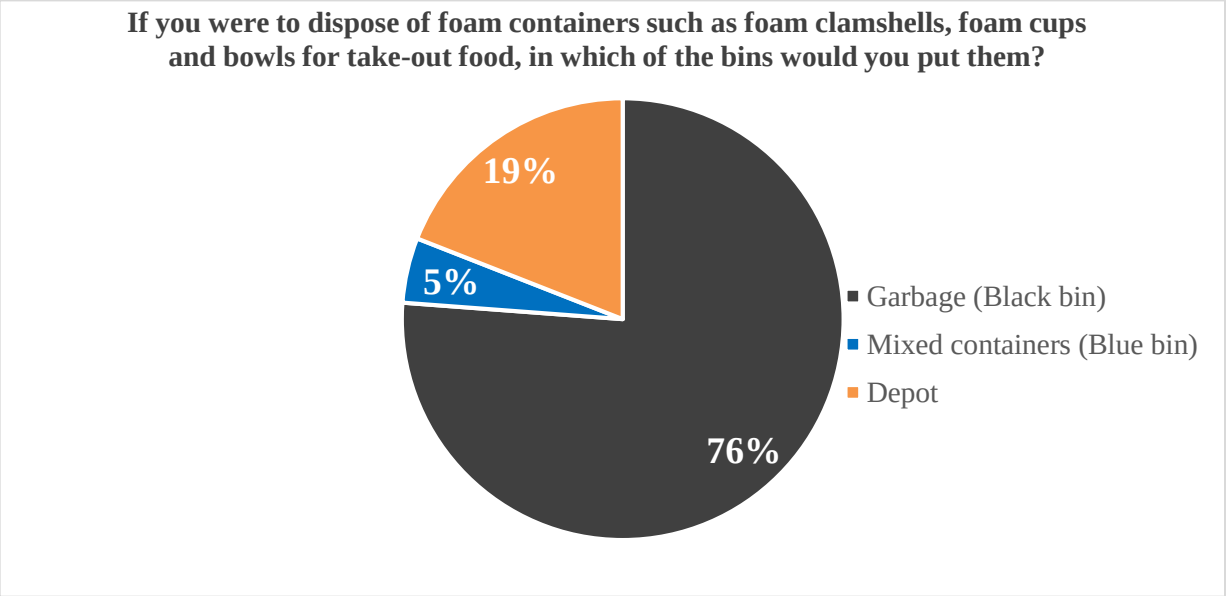

Figure 7: Participants Practices for Disposal of Foam Containers

Figure 8 illustrates the participants responses to what they would do if they were to dispose of an oily pizza box. It shows that around 40% would throw a pizza box into the organics bin (green bin), 30% would throw it into the mixed paper products bag/cart (yellow bag/cart), 17% would throw the pizza box into the garbage bin (black bin), and around 10% of the participants do not know how to dispose of a used pizza box.

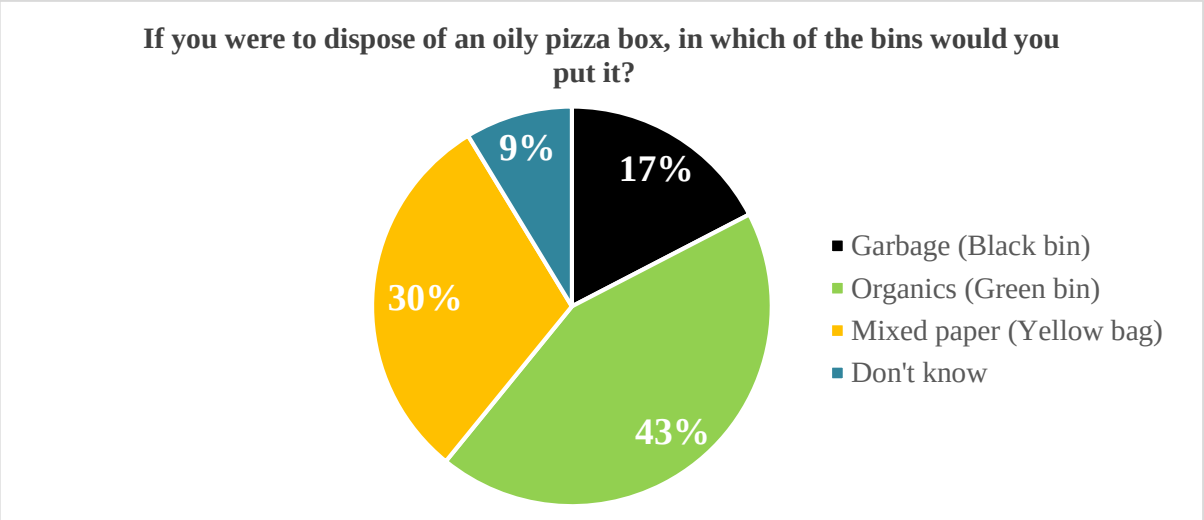

Figure 8: Participants practices for disposal of pizza

Figure 9 represents the participants responses to what they would do if they were to dispose of a plastic bag. The results show that half of the participants would drop off a plastic bag at a recycling depot, 45% would throw it into the garbage bin (black bin), and only 5% would throw a plastic box into the mixed containers bin (blue bin).

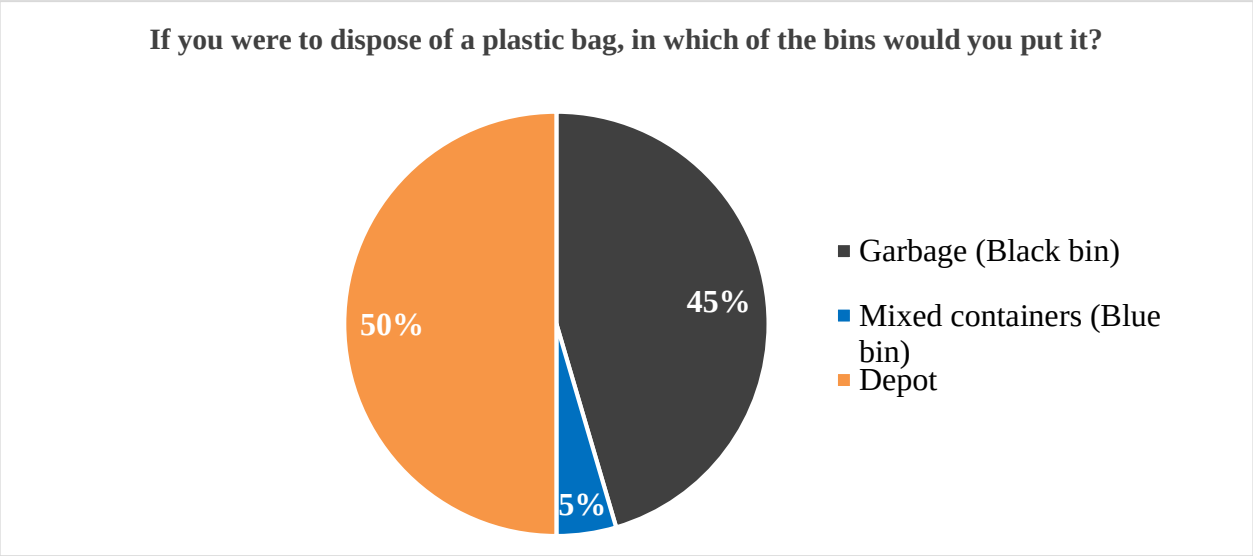

Figure 9: Participants practices for disposal of plastic bags

6.1.3. Participants' satisfaction with how the Government manages retail packaging for consumers

One of the survey questions asked participants to express their level of satisfaction on how government is managing retail packaging for consumers. Participants were asked to select one option among these four categories: very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied and very dissatisfied. Figure 10 shows that around 70% of the participants responded that they feel dissatisfied/very dissatisfied with how the government is dealing with retail packaging, followed by near 19% who expressed they are neither satisfied nor dissatisfied with the government, and lastly 10% who said they are satisfied with the how government manages retail packaging.

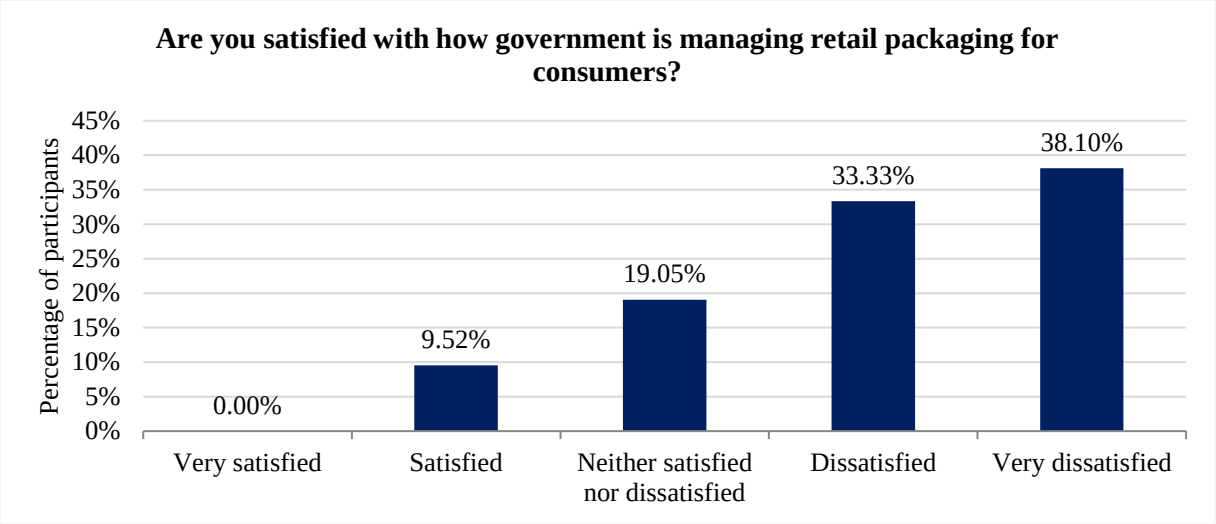

Figure 10: Participants' level of satisfaction with how government is managing retail packaging for consumers

For further analysis, it was determined to compare whether the level of satisfaction is affected by the participants age, thus, the survey responses were classified into two age categories: 19-34 years old, and 35+ years old. Figure 11 shows that 50% of the participants between 19 and 34 years old are neither satisfied nor dissatisfied with how government is managing retail packaging, followed by 33% who said are satisfied and 16.7% who feel very dissatisfied. On the other hand, nearly all the participants (94%) with 35 years old and more feel dissatisfied/very dissatisfied with how the government is handling retail packaging for consumers, and only 6.7% expressed that are neither satisfied nor dissatisfied. This suggests that there is an apparent correlation between the previously mentioned satisfaction and the participants age.

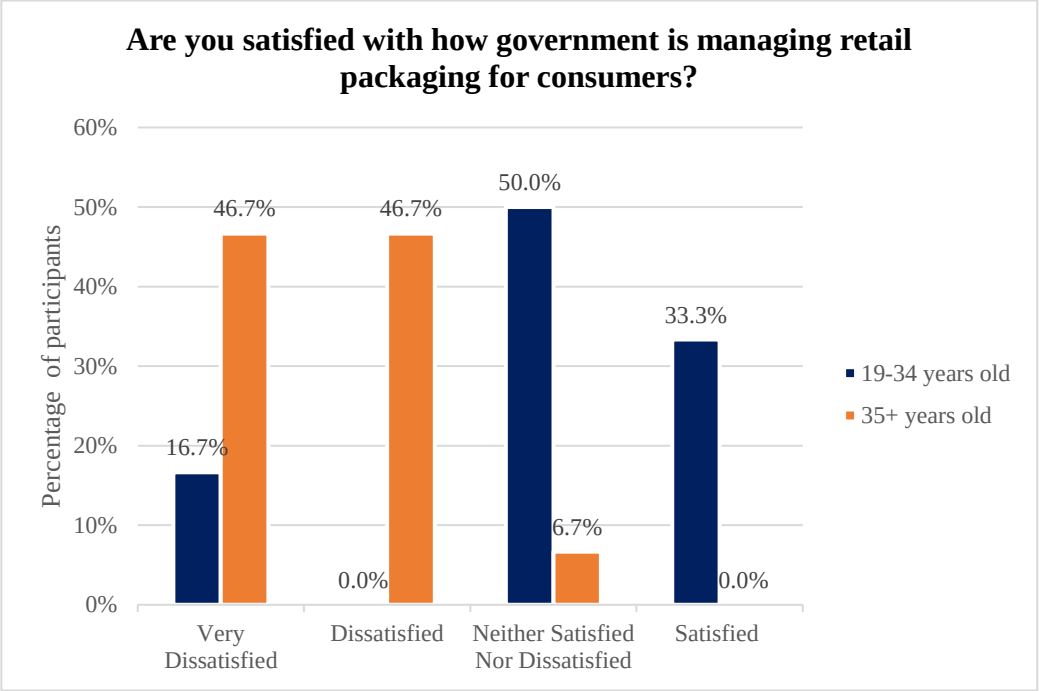

Figure 11: Level of satisfaction on how government is managing retail packaging for consumers

6.1.4. Results by type of dwelling

In this section participants responses were segmented based on their type of dwelling into two groups: residents who live in single-detached houses, and residents who live in rental apartments/condominiums. The difference between these two groups is that recycling in multi-family's homes such as apartments and condominiums is brought to carts in a central location in their buildings, while residents living in single-detached homes recycle curbside.

As presented in Figure 1, 43% participants reported to live in single-detached homes while the rest live in apartments or condominiums. Figure 12 shows that among all the recycling categories there is no major difference in the responses based on the type of dwelling, which suggests that the type of home residents live in does not affect what people recycle in their homes.

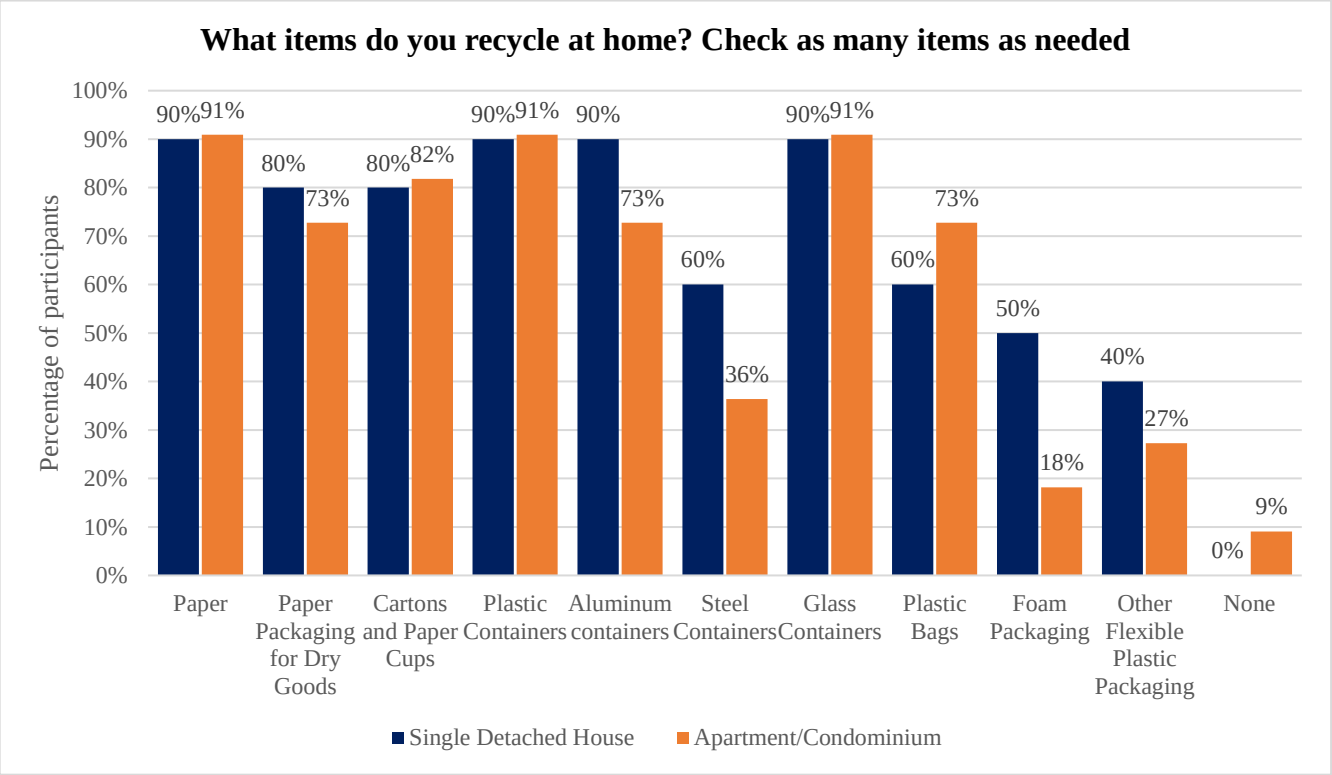

Figure 12: Items that participants recycle per type of dwelling

Participants' awareness of the City's waste collection schedule for their area is shown in Figure 13. Figure 13 (a) illustrates that only about half of the total participants are aware of their assigned waste collection schedule, while the other half do not know their waste collection schedule. However, once the responses are divided based on the type dwelling, Figure 13 (b) shows that there is big difference in responses between the residents living in single-detached houses and the residents living in apartments/condominiums.

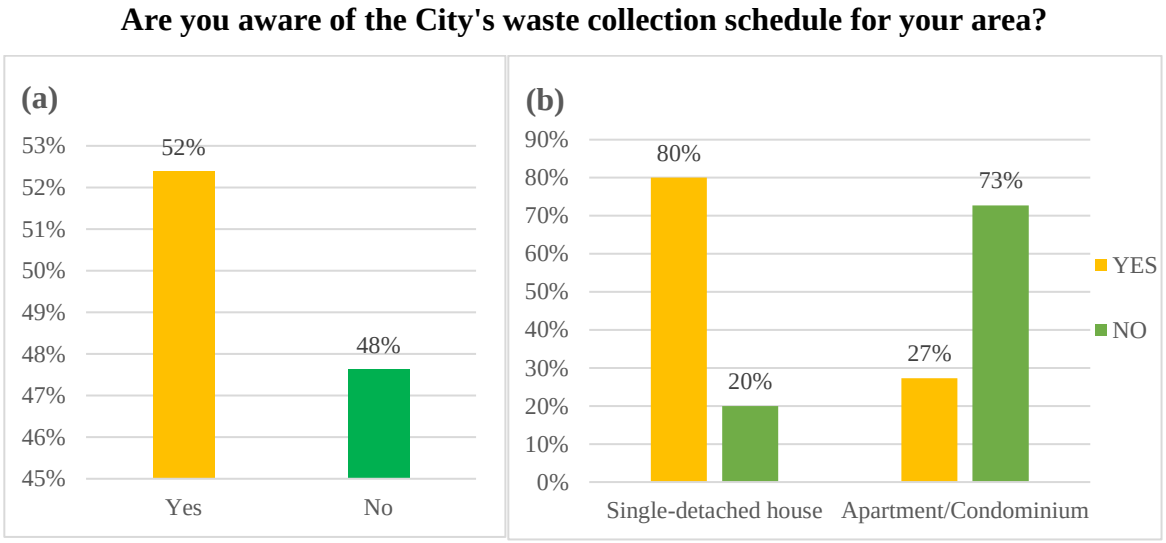

Figure 13: Participants' awareness of their assigned waste collection schedule. (a) Total responses, and (b) Responses by type of dwelling.

Most participants (80%) living in single-detached houses said that they are aware of their waste collection schedule, while the rest (20%) were not aware of their schedule. This contrasts the responses given by people living in apartments/condominium where only 27% of them are aware of their waste collection schedule.

Since recycle BC has a network of depots across British Columbia where residents can drop off packaging and paper free of charge (Recycle BC), participants were asked to indicate whether they are/are not aware of this network of depots across the city. Figure 14 (a) shows the total responses from participants, and Figure 14 (b) shows the same responses classified according to the type of dwelling. From Figure 14 (a), the results show that about 70% of the participants do know that Recycle BC has network of depots. Based on the type of dwelling, Figure 14 (b) shows that 80% of participants living in a single-detached house are aware of the network of depots, whereas, only 55% of the residents living in apartments/condominiums gave the same response.

Do you know that Recycle BC has a network of depots across BC where residents can drop off packaging and paper free of charge?

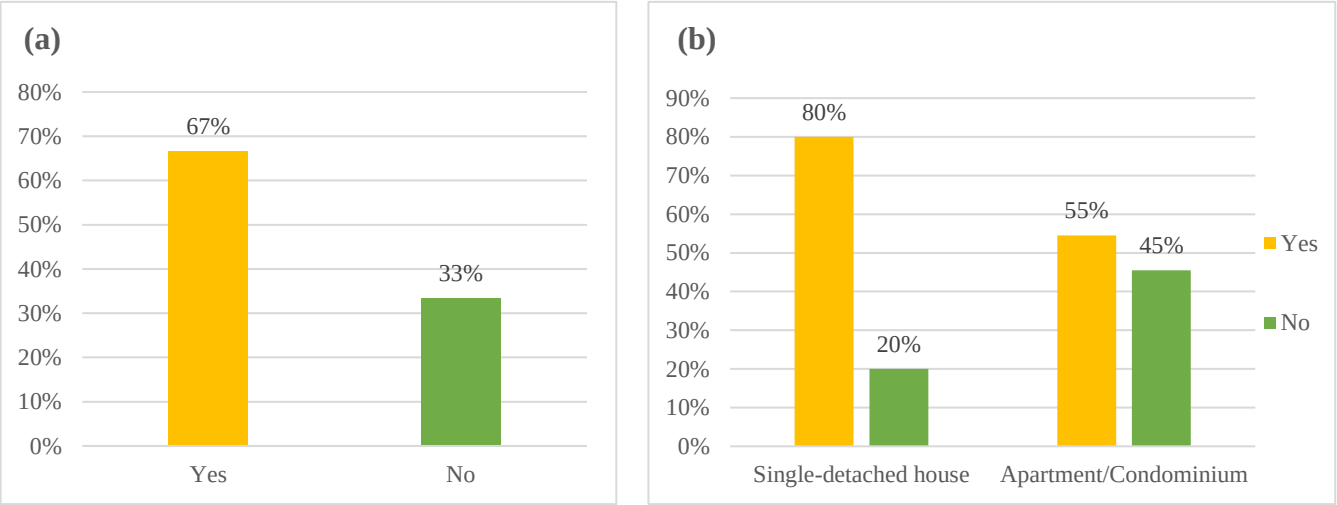

Figure 14: Participants' awareness of the existence of Recycle BC's network of depots. (a) Total responses, (b) Response by type of dwelling.

6.2 Tally Sheets Results

This section presents the results of the tally sheet. From the 21 people who initially filled out the survey, only 15 people finished this 7-days waste monitoring program. Figure 15 shows the average of items that people throw away in a period of 7 days. It shows that in average participants dispose of around 15 sheets of paper, 9.6 plastic bottles/containers, 8.6 cardboard pieces (including cereal boxes, snack boxes, etc.), 5.5 plastic bags, and 5.3 metal cans in 7 days. These items are the most common thrown-away among the participants.

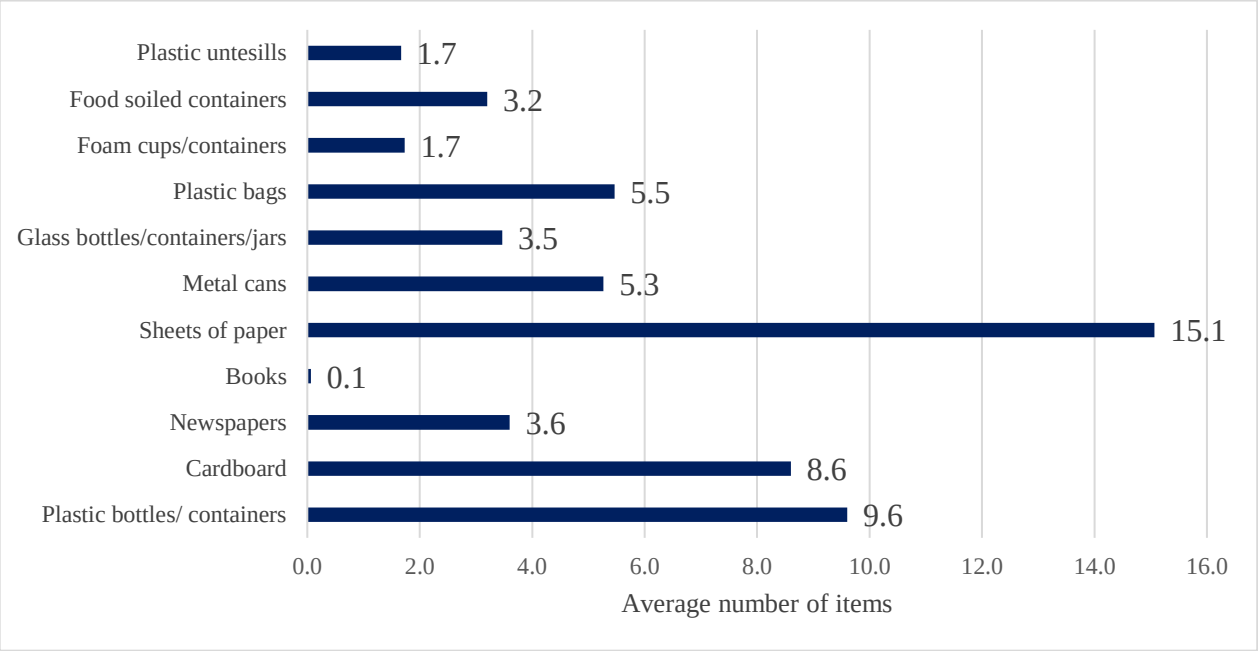

Figure 15: Average number of items discarded per participant during a seven-day period.

7.0 DISCUSSION

As previously mentioned, there were only 21 participants who filled out the survey and 15 who completed the waste tracking tally sheets. This means that this study's sample size is relatively small, and the results might not be representative of the actual situation. However, this section aims to provide general insights to explain the results which can serve as a guideline for future projects and citizens interested in raising waste awareness and taking steps to reduce household waste.

The survey found that most participants (Figure 5), 71%, use reusable bags for grocery shopping, suggesting that they are conscious of the environmental impact of plastic bags. As reported by the City of Vancouver on its website, around 2 million plastic shopping bags are disposed in the garbage in Vancouver each week (City of Vancouver, 2019). According to Ellen McArthur Foundation and The New Plastics Economy initiative, at this rate, there will be more plastic in our oceans than the weight of fish by 2050 (Recycle BC). Although these plastic bags are recyclable at depots across British Columbia which are managed by Recycle BC, they often end up in the wrong places, making them difficult to recycle and harming the environment. This is reflected in our survey: only 50% of the participants would recycle plastics bags in a depot (See Figure 9), whereas the rest will throw them in the garbage and some (5%) will even put them in the recycling bin. The tally sheet results showed that a person throws away 5.5 plastic bags in average per week.

Given these results, it seems that there is a need to expand educational efforts personally and by government's campaign on how to properly dispose of plastic bags and to continue encouraging people to increase their use of reusable bags. Several cities in B.C. have banned plastic bags in recent years, including Victoria, Salmon Arm and Tofino (Victoria News, 2019). The city of Vancouver has not yet banned plastic bans, but it has created a Single-Use Item Reduction Strategy that according to the city, will "dramatically reduce waste from single-use items" (City of Vancouver, 2019). This strategy was approved by Council on June 5, 2018, and it mentions that the plan for reducing plastic bags usage will start on November 2019 by introducing a by-law requiring business license holders to have reduction plans for plastic and paper bags and report on the amount of plastic and paper bags they distribute. Between 2021 to 2025 is when the City will evaluate the need to introduce a distribution ban on plastic and paper bags, depending on the reduction achieved and amounts in garbage and litter. According to the City of Vancouver, the Single-Use Item Reduction Strategy was developed through an extensive consultation and engagement program in which over 6,500 individuals, businesses, and organizations

provided input. The survey they conducted showed that 90% of Vancouver residents surveyed indicated that they already use reusable bags at least some of the time in order to curb their use of single-use items (City of Vancouver, 2018). These results approximate the results of our survey in which most participants (71%) also reported they use reusable bags. Given that most of the people already use reusable bags for shopping, it seems that eventually eliminating single-use bags in Vancouver would be positively received by the public.

In addition to a large percentage of people using reusable bags for grocery shopping, vast majority of participants, 90%, said that it is very or extremely important to them that a business has recycling services. These results suggest that participants care about recycling and that they have high levels of awareness about the importance of recycling. However, the results also suggest that the challenge remains in educating the public on its specifics, because regardless of whether a resident lives in a single-detached house or apartments/condominium, when a resident does not know how to recycle an item, approximately half (52%) throw the item in the garbage, 20% consult online/Recycle BC website and 19% recycle the item even if they are unsure. The remaining "Other" will ask someone for help or consult their paper copy of the City of Vancouver Accepted Materials List for recycling (See appendix Survey Results Q13).

In British Columbia, there are some specific items that can only be returned to a depot for recycling. These include foam packaging (e.g. Styrofoam) and plastic bags. Our survey examined the recycling practices of participants in regard to these two items along with food-soiled pizza boxes which were assumed to be items that are commonly placed in the wrong bins. The results showed, that in fact, these three items are not being properly recycle in the correct bin. Figure 8 shows that around 40% would correctly throw away an oily pizza box into the organics bin (green bin), 30% would throw it into the mixed paper products bag/cart (yellow bag/cart), 17% would throw the pizza box into the garbage bin (black bin), and around 10% of the participants do not know. In the case of foam containers that can only be recycled at depots, only 19% of the participants said that they would throw foam containers at such depots for recycling, while most of the participants (76%) would thrown them in the garbage. Regarding plastics bags, half of the participants said that they would drop off a plastic bag at a recycling depot. The possible reason to the wrong recycling of foam containers and plastic bags could be that as shown in Figure 14 (a), about a third of the participants do not even know that Recycle BC has a network of depots across BC responsible for the recycling of packaging and paper products.

The reason behind more people properly recycling plastic bags than foam containers at the designated depots might be that foam containers are generally bulky items, so people will find it difficult to carry them to a depot. This is not case for plastic bags which can be easily compacted and placed in a relatively small bag. Also, two-thirds of the participants are residents of RPSC, and as Figure 16 shows, the six recycling depots nearest to the Queen Elizabeth Park, selected as reference point for the RPSC community, are located outside of the RPSC boundaries and it will likely require public or private transportation to get to these depots since the walking time is more than twenty minutes. Another reason for this finding might that there are supermarkets such as Safeway which have recycling bins only for plastic bags and which might be more familiar to customers, thus, explaining the higher participants' practices of dropping off plastic bags at recycling depots. Not recycling properly can reduce the ability to effectively recycle material or meet the requirements of recycling markets. When recycling bins are contaminated, they are often sent to landfills. (Recycle BC, 2019). According to an article published by CBC News in April 2018, Vancouver has one of the lowest rates of contaminated recycling in the country. Vancouver boasts a contamination rate of just 4.6 per cent, a small figure when compared to cities like Toronto, at 26 per cent, and Edmonton, at 24 per cent (CBC News, 2018).

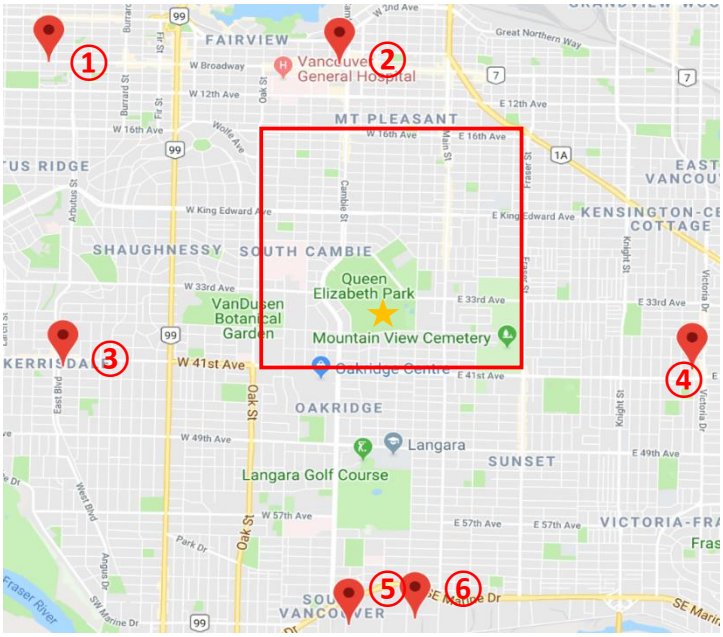

Figure 16: The six nearest Recycle BC's recycling depots to Queen Elizabeth Park

1. *London Drugs Broadway & Vine: 2230 W Broadway*
2. *London Drugs, West Broadway: 525 West Broadway*
3. *London Drugs, Kerrisdale: 2091 West 42nd Avenue*
4. *London Drugs, 41st and Victoria: 5639 Victoria Drive*
5. *Vancouver Zero Waste Centre: 8588 Yukon Street*
6. *South Van Bottle Depot: 1622 Salt Street*

The survey also revealed that most participants are recycling many of the 10 categories for recyclable items. As shown in Figure 3, the three most popular categories among the participants are paper, plastic containers and glass containers. This is a positive finding suggesting that participants are trying to recycle which helps municipalities to divert residential waste from landfills. By practicing recycling, participants are not only helping to reduce the pollution of toxic chemicals and the greenhouse gasses emissions released by waste into the environment, but they are also reducing the need for raw materials, allowing for forests and other natural sources to be preserved (Cuffari, B., 2016). Having a closer look to this finding according to the type of dwelling, it was shown in Figure 11 that the type of housing participants live in does not affect what people recycle at their homes. The three most popular categories (paper, plastic containers and glass containers) were found to be the same for both groups of participants, the ones living in single-detached houses and the participants living in apartments/condominiums. This suggests that the difference in recycling practices, curbside recycling for residents of single-detached

houses and multi-family recycling for apartments/condominiums, is not a factor in how aware the participants are of the importance to recycle their waste.

As shown in Figure 13(b) results revealed that most (80%) of the single-detached house residents are aware of their waste collection schedule compared to only 27% of the apartment/condominium residents. The reason behind this could be that curbside recycling is practiced by residents in single-detached homes which requires them to know their waste collection schedule, whereas residents living in apartments or condominiums typically have a central location in their building where they throw away their garbage and recycling which is then taken care of by a property manager or a private company. These results are not alarming given that most of the people living in single-detached houses do know their waste collection schedule, but there is still a small percentage (20%) of them that do not know it which suggests that they are probably not following recycling practices and are not properly classifying their waste. Therefore, educational efforts about waste collection schedule should target the 20% of the residents of single-detached homes that are not aware of their waste collection schedule.

Another interesting finding based on the type of dwelling was that the vast majority of single-detached house residents (80 %) knew that Recycle BC has a network of depots compared to only the 55% of apartments/condominiums residents who responded the same. This finding suggests that a big portion of participants living in apartments/condominiums may not be practicing recycling of items such as foam packaging, plastic bags and overwrap, since the unique method to do it is by dropping off those items at the designated recycling depots. In addition to this group of participants, the remaining 20% of single-detached house residents may reflect the same behaviour. Assuming that this is the reality among the mentioned participants, it is relevant for the RPSC Visions Group to put educational efforts into better informing the community about the existence of Recycle BC's depots around the area, like the ones shown in Figure 16.

Regarding how participants feel about how the government is managing retail packaging for consumers presented in Figure 11, results showed that about three quarters (71.43%) of the participants are dissatisfied with the government. The level of dissatisfaction was found to be higher among the older participants (35+ years old) as compared to their younger counterparts (19-34 years old). This finding might suggest that since the older participants are more likely to have more experience in interacting

with various governments they are able to better contrast the current government strategies with approaches of past governments. Similarly, these participants can be considered as better witnesses of the increasing use of retail packaging for the sale of consumer products. Hence, based on the long experience with governments and the more prolongated observance of the increasing use of retail packaging, it might explain why the older participants feel that the current government is not properly managing retail packaging for consumers. In fact, according to Ipsos (2018) in its survey for Global News reveals that around 64% of Canadians with 35 years old and over feel that the current federal government has fallen short to meet their expectations which might include recycling issues such retail packaging. This is contrasted to only 37% of Canadians between 18 and 34 years old who expressed the same. Based on this brief analysis, it can be determined that there is a need for future projects to conduct more extensive analysis into what are the root causes of the overall low level of satisfaction among the participants in regard to how the government is managing retail packaging. For instance, a suggested analysis might evaluate the effectiveness of the methods used by the government to inform of their actions to the community.

Finally, regarding the tally sheet results presented in Figure 15, the average values for the items such as plastic bottles, sheets of paper, cardboard products and plastic bags serve to provide the participants with a global idea of the most consumed and thrown-away items among this group of people. In general, the purpose of proportionating the participants with a tally sheet was to allow them to quantify their disposal of garbage, compost, and recycling, which activity aimed to create self-awareness among the participants about their possible excessive waste disposal. Also, by letting the participants monitor their waste, this activity could have made them realize the importance to consult online or other sources on how to properly recycle not commonly used materials.

8.0 CONCLUSION AND RECOMMENDATIONS

The project was started with an aim to understand the waste generation patterns for a household and provide the family members with the necessary tools and guidance to reduce the amount of waste that they generate. This report had determined the current waste awareness among community members by analyzing the results of survey and tally sheets. As discussed in previous section, the purpose of a tally sheet was to allow the participants to quantify their disposal of garbage, compost, and recycling, which was aimed to create self-awareness among the participants about their possible excessive waste disposal.

Increasing self-awareness is just one thing. Apart from this, there are other challenges present that impact the waste generation: increase in consumption of single use plastics among consumers; controlling the manufacturers with new policies to use sustainable materials/recycle friendly materials to generate recyclable waste; and imposing high taxes on manufacturers for not following recycling friendly practices/policies, keeping in mind this would not affect consumers.

Upon analysing the results, we have identified some of the factors that might have improved our results. These potential roadblocks are 1) the timeframe of entire study was not enough to recruit huge number of participants and therefore difficult to generalise the result for whole community; 2) deciding the contents of tally sheet, i.e. how much information would be enough for the participants i.e. simplicity vs. ambiguity; 3) approaching people to diligently take part in the study; and 4) how much reliable are the results? This is the most difficult part as you are not aware about the participant's compliance in tracking the waste.

8.1 Recommendations

On basis of results obtained from the study, the following recommendations would be useful to increase the waste awareness among the residents of the area:

- Recycling application: A mobile application to find out what recyclable material goes where, check the area's collection day, find the nearest depot location, and receive notifications about the area's recycling pick-up.

- Promoting existing application and resources though various community events. For example, Waste Wizard tool and VanCollect app by city of Vancouver which is useful to know upcoming collection schedule and receive weekly collection reminders.
- Increasing the number of recycling depots in city and making people aware of their locations.
- Issuing a laminated reference sheet that contains information about what-waste-goes-where for people who are not technology friendly.
- Introducing a rewards system to encourage people to follow recycling practices and to sort the waste correctly. These points could be redeemed in shops, malls, etc.

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APPENDICES

Appendix A: Consent Form

Consent Form

Waste Awareness and Action to Reduce Household Waste

Primary student contact/researcher:	**Nishtha Chawla (nishthachawla08@gmail.com)**
Student researchers:	**Dheeraj Kaushik, Diego Nunez, Christian Brazales, Felipe Solano**
Principal Investigator:	Paul Winkelman, Sessional Instructor Department of Mechanical Engineering Faculty of Applied Sciences, University of British Columbia pwinkel@mech.ubc.ca

Purposes of the Project

The purpose of the project is to measure people's awareness of the waste problem with the help of a questionnaire that will be conducted using an online survey tool. Recruited participants will be asked to quantify and qualify the waste generated over a period of 7 days.

Our aim is not only to monitor the waste generation but also to empower citizens to generate less waste.

How will this study be conducted?

Participation in the study is entirely voluntary. This project will provide the participants with a tally sheet and reference list of materials to monitor their waste production. At the end of 7-day period, one brief meeting will be held with each participant (chosen method/via by the participant) to gather results, administer the follow-up questionnaire, discuss their observations and steps that each participant considers needed to reduce waste.

What are the associated benefits and risks?

We feel there is minimal risk with this study. If you are uncomfortable with any of the questions we ask, you do not have to answer and can discontinue at any time. Please let one of the study staff know if you have any concerns. It is possible you may benefit from contributing your input and others may also benefit from what we learn from this study.

Contacting Researchers

The research is being conducted by Nishtha, Dheeraj, Diego, Christian, Felipe as part of a course (APSC 461), under the instruction of Dr. Paul Winkelman, Mechanical Engineering. For more information about the research and the course, contact Nishtha Chawla at nishthachawla08@gmail.com or Paul Winkelman at pwinkel@mech.ubc.ca.

Confidentiality

We will insure that your identity is kept strictly confidential in a number of ways. Only researchers (Nishtha, Dheeraj, Diego, Christian, Felipe) and the principal investigator, Paul Winkelman will have access to the survey data, waste tracking data and questionnaire data.

Interviews will be conducted by researchers (Nishtha, Dheeraj, Diego, Christian, Felipe). Researchers will be taking notes during interviews and interview notes will be analyzed for themes.

Your identity will not at any point be linked to statements you have made. All data will be stored in a locked filing cabinet and will not contain respondents' identifying information. All documents will be identified only by pseudonym. The key to these pseudonyms will be kept by the investigators and will not be publicly released under any circumstances. You will never be identified by name in any reports derived from the completed study.

_____
_

Your rights

We do not believe there are any risks to you associated with your participation in this study. We believe that you may benefit from this opportunity to discuss your opinions. Your participation is entirely voluntary, and you are free to refuse to answer any question, end the interview or withdraw from the study at any time. If you have any questions or want further information about the study, please contact Paul Winkelman (pwinkel@mech.ubc.ca). If you have any concerns about your rights as a research subject and/or your experiences while participating in this study, you may contact the Research Subject Information Line in the UBC Office of Research Services at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to you. Your participation or non-participation is this study will not impact your relationship with RPSC Community. Your signature below indicates that you consent to participate in this study and that you have received a copy of this consent form for your own records.

Printed Name……

Signature……..

Date…….

Appendix B: Tally Sheet

"WASTE AWARENESS AND ACTIONS TO REDUCE HOUSEHOLD WASTE"

							
Day	**Plastic bottles/ containers**	**Cardboard (cereal box, snack box, etc)**	**Newspapers**	**Books**	**Sheets of paper**	**Tin, aluminum, and steel cans**	**Glass bottles/ containers/jars**
EXAMPLE	**5**	**1**	**1**	**0**	**0**	**2**	**1**
DAY 1							
DAY 2							
DAY 3							
DAY 4							
DAY 5							
DAY 6							
DAY 7							

Day									Organics 			
	Plastic bags	**Foam Cups/ Containers**	**Food-soiled containers**	**Plastic utensils**	**Others** Select the size of your container *Please check instructions* Small ( ) Medium ( ) Large ( ) Extra Large ( )				Select the size of your container *Please check instructions* Small ( ) Medium ( ) Large ( ) Extra Large ( )			
EXAMPLE	**3**	**1**	**1**	**2**	**0 -25%**	**Up to 50%**	**Up to 75%**	**Full**	**0 -25%**	**Up to 50%**	**Up to 75%**	**Full**
						✓				✓		
DAY 1												
DAY 2												
DAY 3												
DAY 4												
DAY 5												
DAY 6												
DAY 7												

Appendix C: Instructions for Tally Sheet

Tally sheet Instructions

Important: please fill out the tally sheet after the initial survey at.

https://www.surveymonkey.com/r/wastemanagementubc

1.- Please enter the number of items in each category that are consumed in your household in each of the seven days.

Example: If you throw away three glass bottles on Day 1, you would write 3 under the Glass bottles/containers/jars column.

2.- To estimate the amount of **organic waste** and **others** (garbage category), please select the closest size of your bags at home using the following chart.

Example: If your bin bag approximates to the dimensions of a small bag then you would check (✓) "Small" on the tally sheet.

3.- For the **organic waste** and **others** (garbage) categories, please estimate only the daily amount produced in percentage according to your own bag. Note that these are not cumulative values.

Example: If on Day 1 you estimated that you filled half of your organics bin/bag, you would check (✓) "Up to 50%" on the tally sheet. And, if on Day 2 you add around 25% more of waste to the same bin/bag of Day 1, you would check 0-25% on the tally sheet.

4.- Food soiled containers include: hot dog sleeve, pizza/burger box, soiled paper, salad box of any material.

Appendix D: Reference Sheet

Mixed Paper

Newspapers and mixed paper are now accepted together.

Mixed Containers

More items are now accepted including paper cups, cartons, Tetra Paks and other containers.

Food Scraps + Yard Trimmings

Wrap your scraps in newspaper. Plastic bags are not accepted.

Garbage

By recycling paper, containers and food scraps, garbage going to the landfill has been reduced by 40%.

Mixed Paper

PLEASE REMEMBER:

1. Newspaper can be placed into your yellow or blue bag; or, if you live in an apartment or condo, into your Mixed paper or Newsprint cart.
2. Cut down cardboard so it can fit easily inside your recycling bag; or, if you live in an apartment or condo, inside your mixed paper cart.
3. Flatten plastic milk jugs and other containers to save space.
4. Plastic bags and Styrofoam are not accepted in the blue box or the multi-family recycling program.

NEED A BAG OR BLUE BOX?

Replacement or additional bags and boxes are provided at no charge. Here are your options:.

1. Pick up in person.

- **Recycling Depot:** 377 West Kent Avenue North
- **Engineering Services:** Fifth Floor, 507 West Broadway 8:30 am to 5 pm, Mon. to Fri.
- **Vancouver City Hall:** Ground Floor Rotunda, 453 West 12th Avenue 8:30 am to 5 pm, Mon. to Fri.

2. Order by phoning 3-1-1.

WHAT DO I DO WITH RECYCLABLES NOT ACCEPTED IN THE CITY'S RECYCLING PROGRAMS?

Please refer to the *Take-Back Guide* **at vancouver.ca/takeback** to find out how to recycle appliances, medication, electronics and more.

NEW AT DROP-OFF DEPOTS:

The following items can now be dropped off at designated depots including the City's recycling depots at the transfer station or landfill. For a full list of depots visit: **vancouver.ca/recyclingdepots**

Note, these items are not accepted in your blue box or container cart.

Mixed Containers

Food Scraps + Yard Trimmings

For households with City Green Bin service. If you have food scraps collection service from a private hauler, please contact your service provider for information.

RECYCLE YOUR FOOD SCRAPS IN THREE SIMPLE STEPS:

1. Collect your food scraps in a kitchen container. Wrap your scraps in newspaper, put them in a paper bag or line a kitchen container with newspaper to reduce odour and mess.
2. Empty the contents of a kitchen container into your Green Bin.
3. Set out your Green Bin for weekly collection, even if it's not full.

Please remember: No plastic bags, even those labeled biodegradable or compostable.

Garbage

For households with City Garbage service.

PLEASE REMEMBER:

1. Keep food scraps & food-soiled paper out of the garbage and landfill. Instead, recycle them by placing them in your designated Bin.
2. Ensure that all garbage is in bags before placing in your bin. No loose garbage.
3. Do not overfill your bin. The lid must close completely.

HAVE EXTRA GARBAGE?

By recycling all your food scraps, paper, cardboard and recyclable containers, you will produce less garbage. If you do have extra garbage here are some options:

1. Set out extra garbage in a standard-sized garbage bag with a sticker (see right), available for $2 each at Vancouver Safeway stores, most community centres and City Hall. Maximum bag size is 70 cm by 90 cm. Maximum weight is 20 kg (44 lbs). Set out extra bags beside your bin on collection day.

2. Take extra garbage to the Vancouver Transfer Station or landfill.
3. Consider ordering a larger bin. To change your garbage bin size or order another bin phone 3-1-1.

CITY OF VANCOUVER | GREENEST CITY 2020 **FOR MORE INFORMATION:** Visit vancouver.ca Phone 3-1-1 TTY 7-1-1

Appendix E: Survey Questions

Waste Awareness and Action to Reduce Household Waste

Thank you for participating in our survey.

We are a group of five UBC engineering students enrolled in a Global Leadership in Engineering summer course. This survey is part of our community project "Waste Awareness and Actions to Reduce Household Waste". Through this project, we, in collaboration with RPSC, seek to understand the level of waste awareness of residents from the Riley Park – South Cambie area and how to formulate actions to reduce the amount of waste that is generated every week.

The survey should only take less than 7 minutes, and your responses will be kept strictly confidential.

Questions marked with an asterisk (*) are required.

If you have any questions about the survey, please email us: wastemanagementubc@gmail.com

We really appreciate your input!

OK

* 1. Please enter the ID number assigned to you

NEXT

Section 1 of 3

* 2. Do you live within the Riley Park-South Cambie boundaries? (16th to 41st Avenues between Fraser and Oak Streets)

- ○ Yes
- ○ No

3. What is your age range?

- ○ 19-24
- ○ 25-34
- ○ 35-44
- ○ 45-54
- ○ 55-64
- ○ 65+

4. How many occupants are there in your home, including yourself?

- ◯ 1 - 2
- ◯ 3 - 4
- ◯ More than 4

5. What kind of dwelling do you live in?

- ◯ Single-detached house
- ◯ Duplex
- ◯ Apartment
- ◯ Other (please specify)
- ◯ Rental Apartment
- ◯ Condominium

PREV NEXT

Section 2 of 3

6. How important is it to you that a business or establishment you frequent has recycling services?

- ◯ Extremely important
- ◯ Very important
- ◯ Somewhat important
- ◯ Not so important
- ◯ Not at all important

7. Are you aware that the city of Vancouver provides people with five different types of bins/boxes/bags for waste collection and sorting?

- ◯ Yes
- ◯ No

8. Are you aware of the City's waste collection schedule for your area?

- ◯ Yes
- ◯ No

9. Do you know that Recycle BC has a network of depots across BC where residents can drop off packaging and paper free of charge?

- ◯ Yes
- ◯ No

10. Which type of the following bins do you use every week? Check as many items as needed

- [ ] Garbage (Black Bin)
- [ ] Food scraps + yard trimmings (Green Bin)
- [ ] Mixed containers (Blue Bin)
- [ ] Glass bottles + jars (Grey box)
- [ ] Mixed paper (Yellow Bag)
- [ ] None

PREV NEXT

Section 3 of 3

11. What items do you recycle at home? Check as many items as needed

- [ ] Paper
- [ ] Paper Packaging for Dry Goods
- [ ] Cartoons and Paper Cups
- [ ] Plastic Containers
- [ ] Aluminum containers
- [ ] Steel Containers
- [ ] Glass Containers
- [ ] Plastic Bags
- [ ] Foam Packaging
- [ ] Other Flexible Plastic Packaging
- [ ] None

12. How often do you make sure to clean items before adding them to the recycling bins?

- ○ Always
- ○ Very often
- ○ Sometimes
- ○ Rarely
- ○ Never

13. When your household is unsure whether an item is recyclable, what do you do?

- ○ Place the item in the garbage bin
- ○ Consult online
- ○ Consult the Recycle BC website
- ○ Place the item in one of the recycling bins anyway
- ○ Other (please specify)

14. If you were to dispose of a plastic bag, in which of the bins would you put it?

- [ ] Garbage (Black Bin)
- [ ] Food scraps + yard trimmings (Green Bin)
- [ ] Mixed containers (Blue Bin)
- [ ] Other (please specify)
- [ ] Glass bottles + jars (Grey box)
- [ ] Mixed paper (Yellow Bag)
- [ ] Depot only

15. How often do you use reusable bags for grocery shopping?

- ◯ Always
- ◯ Very often
- ◯ Sometimes
- ◯ Rarely
- ◯ Never

16. If you were to dispose of an oily pizza box, in which of the bins would you put it? (pizza box with food crumbs and oil spots)

- ☐ Garbage (Black Bin)
- ☐ Food scraps + yard trimmings (Green Bin)
- ☐ Mixed containers (Blue Bin)
- ☐ Other (please specify)
- ☐ Glass bottles + jars (Grey box)
- ☐ Mixed paper (Yellow Bag)
- ☐ Depot only

17. If you were to dispose of pots, pans, and other metal cookware, in which of the bins would you put them?

- ☐ Garbage (Black Bin)
- ☐ Food scraps + yard trimmings (Green Bin)
- ☐ Mixed containers (Blue Bin)
- ☐ Other (please specify)
- ☐ Glass bottles + jars (Grey box)
- ☐ Mixed paper (Yellow Bag)
- ☐ Depot only

18. If you were to dispose of foam containers such as foam clamshells, foam cups and bowls for take-out food, in which of the bins would you put them?

- ☐ Garbage (Black Bin)
- ☐ Food scraps + yard trimmings (Green Bin)
- ☐ Mixed containers (Blue Bin)
- ☐ Other (please specify)
- ☐ Glass bottles + jars (Grey box)
- ☐ Mixed paper (Yellow Bag)
- ☐ Depot only

19. How do you dispose of old clothing, textiles, and shoes?

- ☐ Garbage (Black Bin)
- ☐ Food scraps + yard trimmings (Green Bin)
- ☐ Mixed containers (Blue Bin)
- ☐ Glass bottles + jars (Grey box)
- ☐ Other (please specify)
- ☐ Mixed paper (Yellow Bag)
- ☐ Depot only
- ☐ Give it away/donate

20. Are you satisfied with how government is managing retail packaging for consumers?

- ◯ Very satisfied
- ◯ Satisfied
- ◯ Neither satisfied nor dissatisfied
- ◯ Dissatisfied
- ◯ Very dissatisfied

21. What idea or suggestion do you have that will improve recycling in Vancouver?

PREV DONE

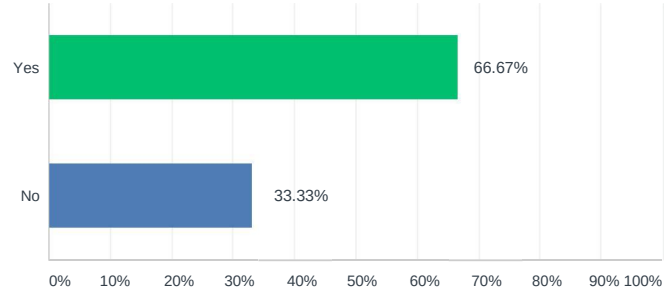
Appendix F: Survey Responses

Q1 Please enter the ID number assigned to you

Answered: 21 Skipped: 0

Q2 Do you live within the Riley Park-South Cambie boundaries? (16th to 41s Avenues between Fraser and Oak Streets)

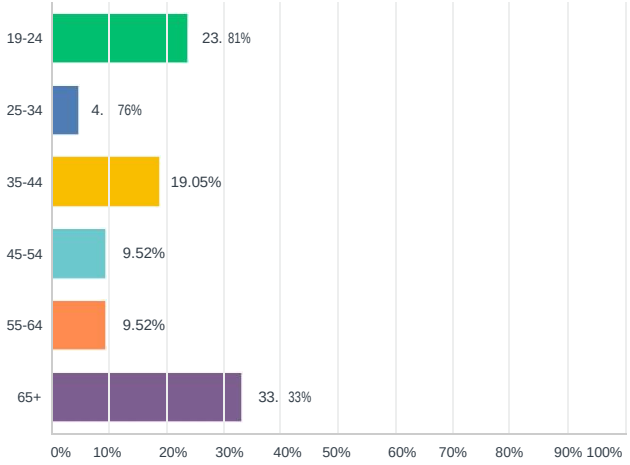
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	66.67%	14
No	33.33%	7
TOTAL		21

Q3 What is your age range?

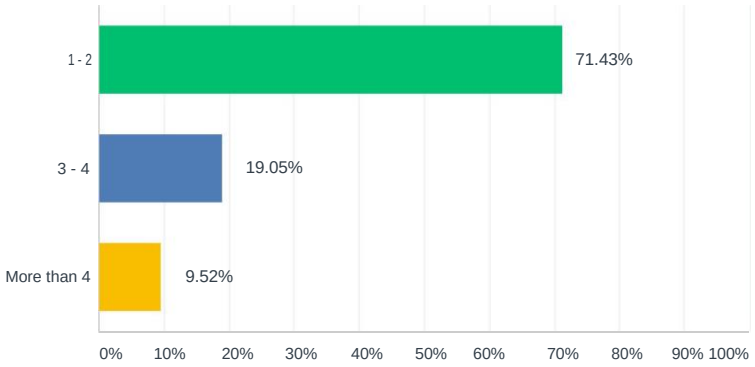
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
19-24	23.81%	5
25-34	4.76%	1
35-44	19.05%	4
45-54	9.52%	2
55-64	9.52%	2
65+	33.33%	7
TOTAL		21

Q4 How many occupants are there in your home, including yourself?

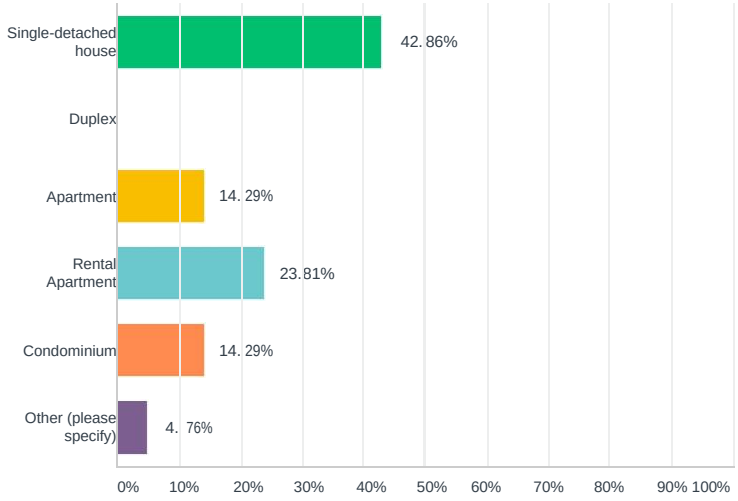
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
1 - 2	71.43%	15
3 - 4	19.05%	4
More than 4	9.52%	2
TOTAL		21

Q5 What kind of dwelling do you live in?

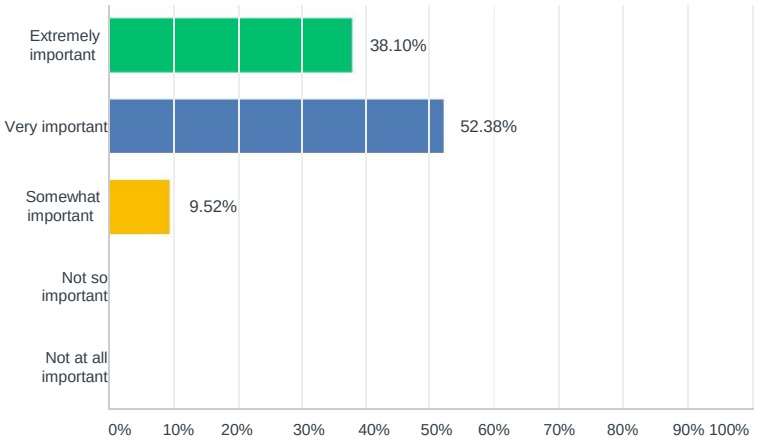
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Single-detached house	42.86%	9
Duplex	0.00%	0
Apartment	14.29%	3
Rental Apartment	23.81%	5
Condominium	14.29%	3
Other (please specify)	4.76%	1
TOTAL		21

Q6 How important is it to you that a business or establishment you frequent has recycling services?

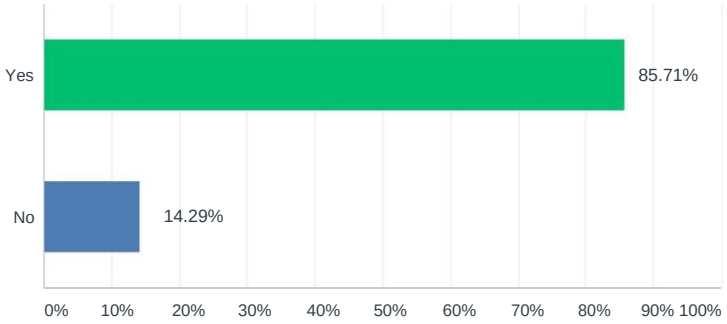
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Extremely important	38.10%	8
Very important	52.38%	11
Somewhat important	9.52%	2
Not so important	0.00%	0
Not at all important	0.00%	0
TOTAL		21

Q7 Are you aware that the city of Vancouver provides people with five different types of bins/boxes/bags for waste collection and sorting?

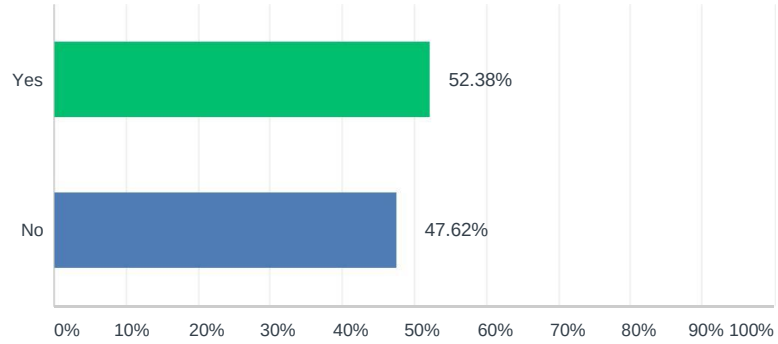
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	85.71%	1
No	14.29%	
TOTAL		2

Q8 Are you aware of the City's waste collection schedule for your area?

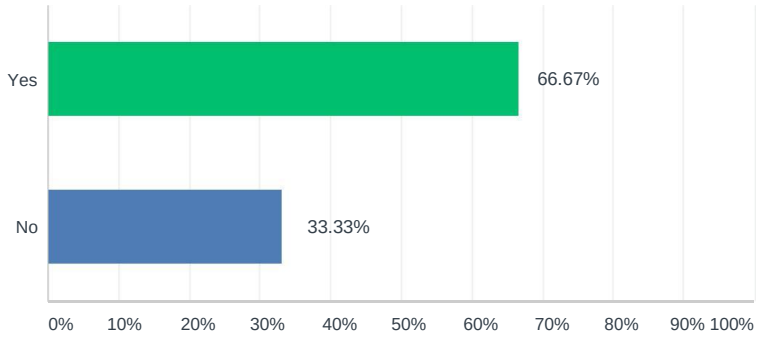
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	52.38%	1
No	47.62%	1
TOTAL		2

Q9 Do you know that Recycle BC has a network of depots across BC where residents can drop off packaging and paper free of charge?

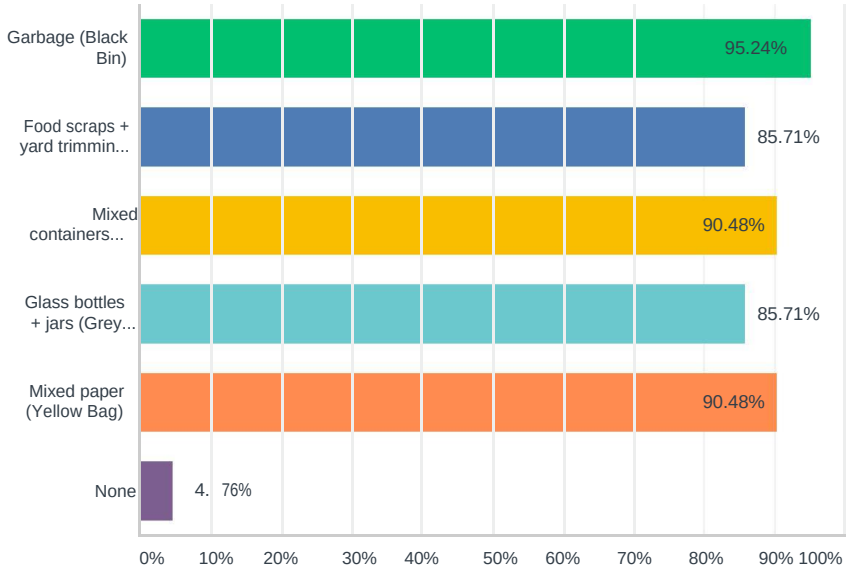
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	66.67%	14
No	33.33%	7
TOTAL		21

Q10 Which type of the following bins do you use every week? Check as many items as needed

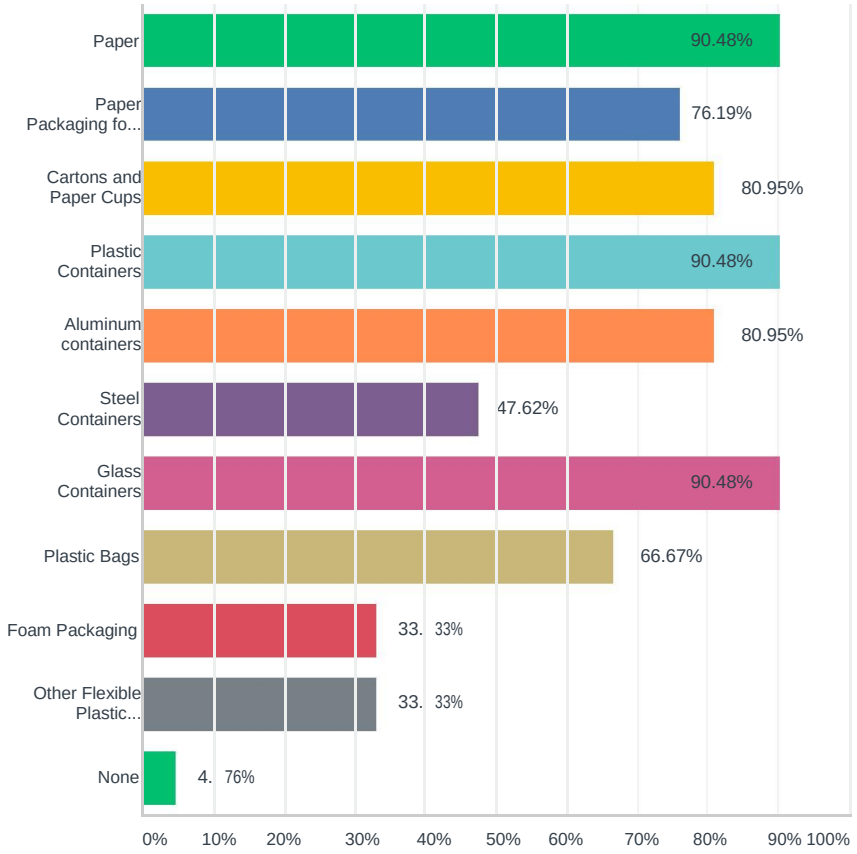
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Garbage (Black Bin)	95.24%	20
Food scraps + yard trimmings (Green Bin)	85.71%	18
Mixed containers (Blue Bin)	90.48%	19
Glass bottles + jars (Grey box)	85.71%	18
Mixed paper (Yellow Bag)	90.48%	19
None	4.76%	1
Total Respondents: 21		

Q11 What items do you recycle at home? Check as many items as needed

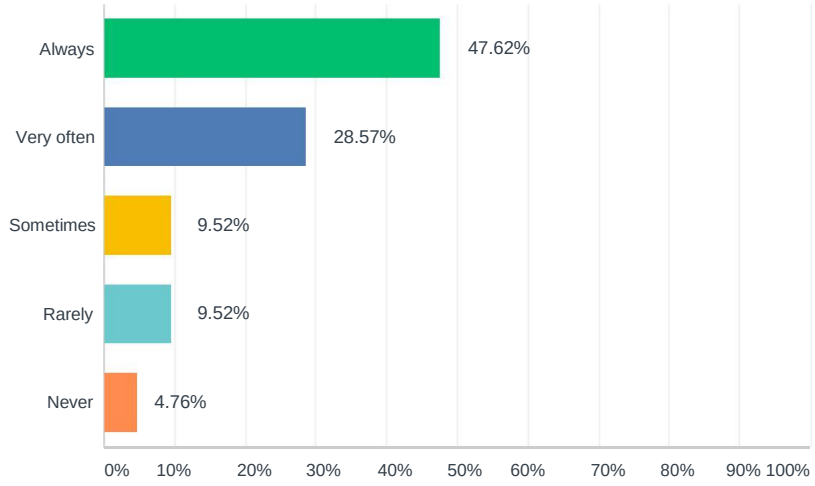
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Paper	90.48%	19
Paper Packaging for Dry Goods	76.19%	16
Cartons and Paper Cups	80.95%	17
Plastic Containers	90.48%	19
Aluminum containers	80.95%	17
Steel Containers	47.62%	10
Glass Containers	90.48%	19
Plastic Bags	66.67%	14
Foam Packaging	33.33%	7
Other Flexible Plastic Packaging	33.33%	7
None	4.76%	1
Total Respondents: 21		

Q12 How often do you make sure to clean items before adding them to the recycling bins?

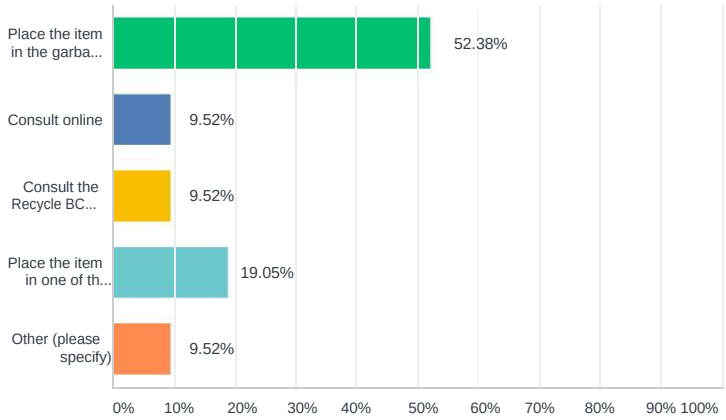
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Always	47.62%	10
Very often	28.57%	6
Sometimes	9.52%	2
Rarely	9.52%	2
Never	4.76%	1
TOTAL		21

Q13 When your household is unsure whether an item is recyclable, what do you do?

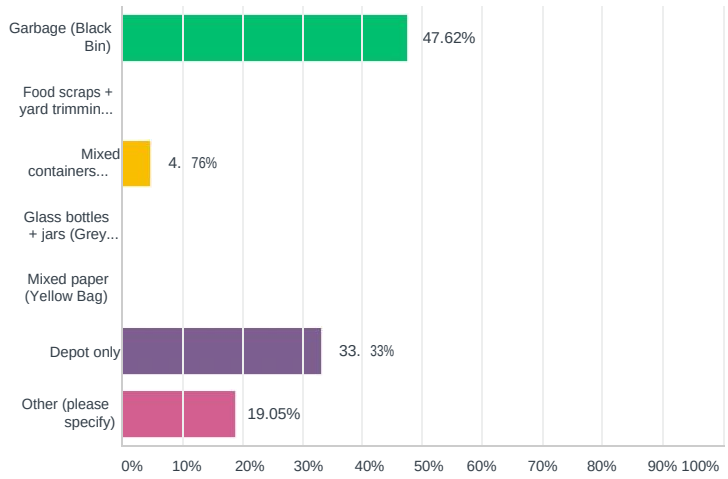
Answered: 21 Skipped: 0



ANSWER CHOICES		RESPONSES	
Place the item in the garbage bin		52.38%	11
Consult online		9.52%	2
Consult the Recycle BC website		9.52%	2
Place the item in one of the recycling bins anyway		19.05%	4
Other (please specify)		9.52%	2
TOTAL			21

Q14 If you were to dispose of a plastic bag, in which of the bins would you put it?

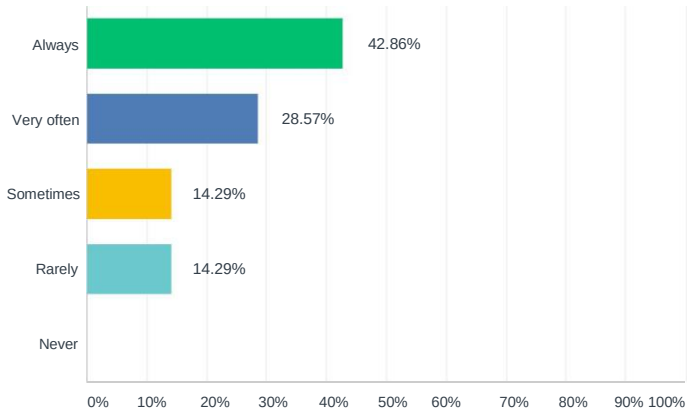
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Garbage (Black Bin)	47.62%	10
Food scraps + yard trimmings (Green Bin)	0.00%	0
Mixed containers (Blue Bin)	4.76%	1
Glass bottles + jars (Grey box)	0.00%	0
Mixed paper (Yellow Bag)	0.00%	0
Depot only	33.33%	7
Other (please specify)	19.05%	4
Total Respondents: 21		

Q15 How often do you use reusable bags for grocery shopping?

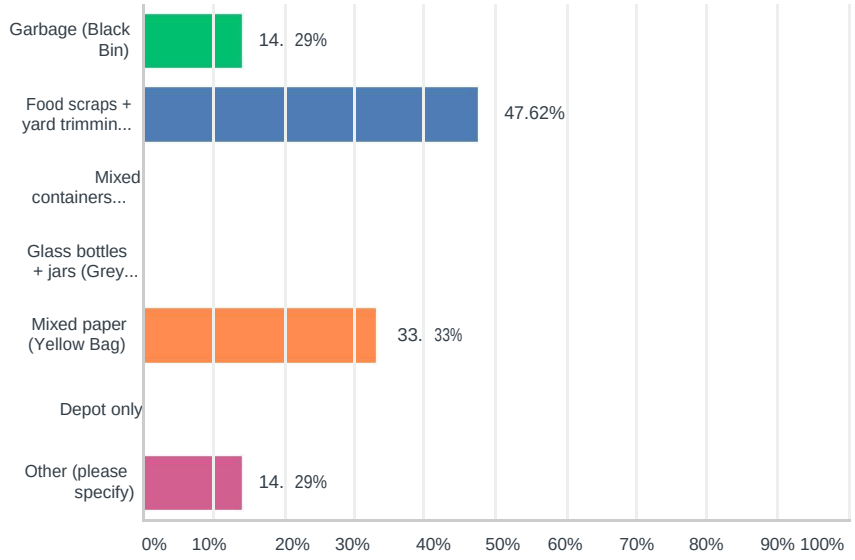
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Always	42.86%	9
Very often	28.57%	6
Sometimes	14.29%	3
Rarely	14.29%	3
Never	0.00%	0
TOTAL		21

Q16 If you were to dispose of an oily pizza box, in which of the bins would you put it? (pizza box with food crumbs and oil spots)

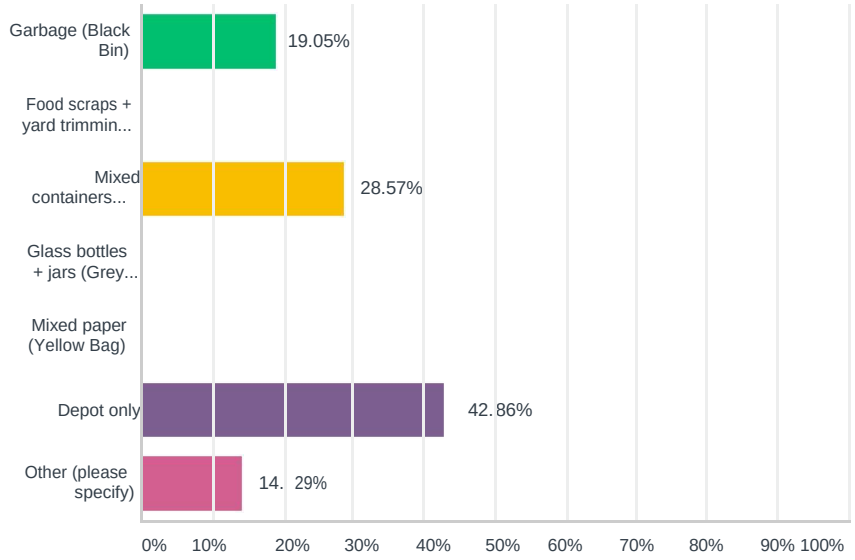
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Garbage (Black Bin)	14.29%	3
Food scraps + yard trimmings (Green Bin)	47.62%	10
Mixed containers (Blue Bin)	0.00%	0
Glass bottles + jars (Grey box)	0.00%	0
Mixed paper (Yellow Bag)	33.33%	7
Depot only	0.00%	0
Other (please specify)	14.29%	3
Total Respondents: 21		

Q17 If you were to dispose of pots, pans, and other metal cookware, in which of the bins would you put them?

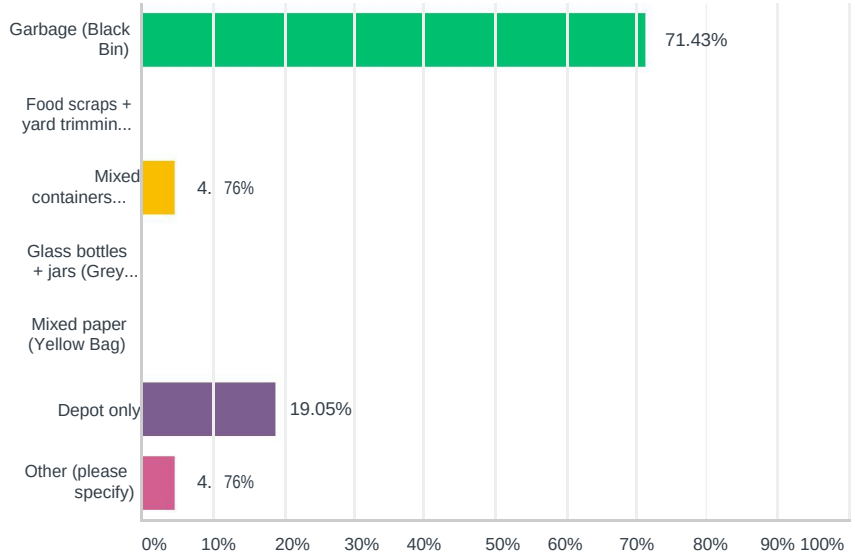
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Garbage (Black Bin)	19.05%	4
Food scraps + yard trimmings (Green Bin)	0.00%	0
Mixed containers (Blue Bin)	28.57%	6
Glass bottles + jars (Grey box)	0.00%	0
Mixed paper (Yellow Bag)	0.00%	0
Depot only	42.86%	9
Other (please specify)	14.29%	3
Total Respondents: 21		

Q18 If you were to dispose of foam containers such as foam clamshells, foam cups and bowls for take-out food, in which of the bins would you put them?

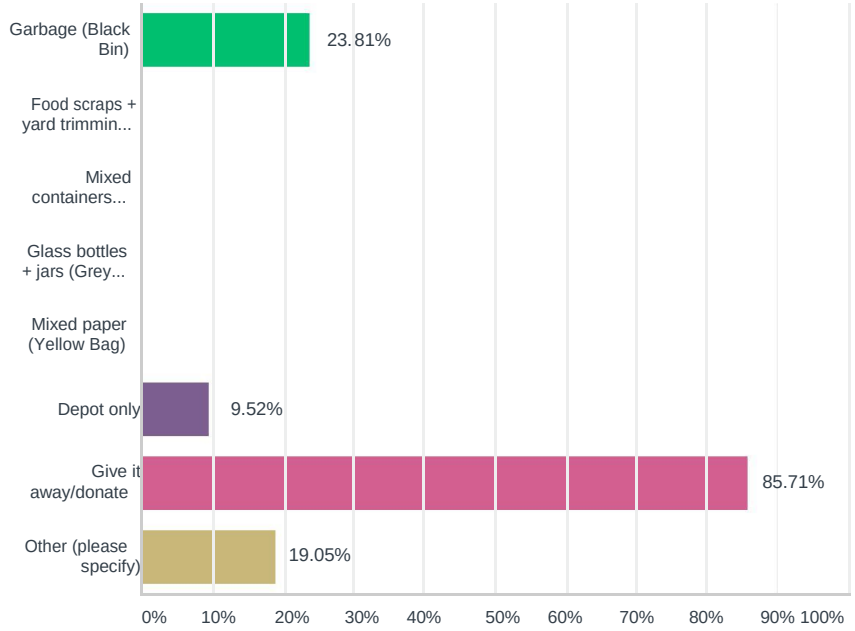
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Garbage (Black Bin)	71.43%	15
Food scraps + yard trimmings (Green Bin)	0.00%	0
Mixed containers (Blue Bin)	4.76%	1
Glass bottles + jars (Grey box)	0.00%	0
Mixed paper (Yellow Bag)	0.00%	0
Depot only	19.05%	4
Other (please specify)	4.76%	1
Total Respondents: 21		

Q19 How do you dispose of old clothing, textiles, and shoes?

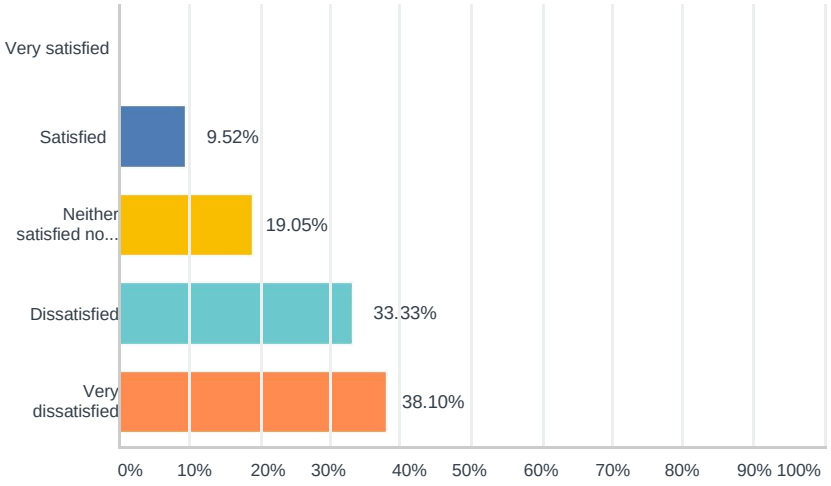
Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Garbage (Black Bin)	23.81%	5
Food scraps + yard trimmings (Green Bin)	0.00%	0
Mixed containers (Blue Bin)	0.00%	0
Glass bottles + jars (Grey box)	0.00%	0
Mixed paper (Yellow Bag)	0.00%	0
Depot only	9.52%	2
Give it away/donate	85.71%	18
Other (please specify)	19.05%	4
Total Respondents: 21		

Q20 Are you satisfied with how government is managing retail packaging for consumers?

Answered: 21 Skipped: 0



ANSWER CHOICES	RESPONSES	
Very satisfied	0.00%	0
Satisfied	9.52%	2
Neither satisfied nor dissatisfied	19.05%	4
Dissatisfied	33.33%	7
Very dissatisfied	38.10%	8
TOTAL		21

Q21 What idea or suggestion do you have that will improve recycling in Vancouver?

Answered: 20 Skipped: 1

- I am located just outside your study areas, on the southwest corner of Oak and King Edward. I'll let you decide if you want to include me in your study. Need to update RecycleBC website - I went to 3 places trying to recycle styrofoam, 2 of which had stopped accepting it more than 3 years ago! More curbside recycling for foam, flexible plastic or more depots in more neighborhoods. Ban plastic bags from grocery stores, work with federal government to limit/ban excessive packaging from imported goods.
- provide more benefits for people recycling, like monetary compensation
- Make it easier and clearer to general population.
- Improve clarity of what goes where
- More information on what is actually recyclable and how you can ensure it will be. More emphasis on reusable containers.
- make search on recycle website better. I find when I search for a place to dispose of an item I get taken to a general info site with too much info to read
- Pick up of plastic bags. More attention paid to apartment and condo buildings. Send out student interns to assess what is going into the various containers and give written

feedback to users of the system. Some of my neighbours have difficulty in knowing how to handle their waste and recyclables.

- I think that the container for organic waste (a yellow and green bin used at my apartment building) is poorly designed, as there is NOT a good "lip", running all the way around the rim, to securely hold the plastic bag liner. Often the bag slips off part of the rim, such that a portion of the bag slumps into the interior of the bin. People just continue to toss organic waste into the bin, such that the waste lands on the exterior of the plastic bag liner.
- Provide periodic pick-up of items currently not included in the regular recycling service. For example, metal, paints, electronics, wood. Also, provide an annual big item pick up of furniture and appliance items. The latter is done elsewhere.
- Expand on the types of items to recycle. In light of the problems with recycling; i.e. few markets, then we must seek better alternatives. There should be more emphasis on the "reduce and reuse". The manufacturers should be held responsible for the excessive plastic packaging of goods. Food stores are in a similar category and MUST reduce the amount of plastic packaging of produce, meats & fish. There should be a return to more paper packaging that is easily composted or recycled. The former is the better option.
- some recycling is dependent on having a car--somewhat counter-productive
- Better carbon taxing -More incentives for businesses to use recycled plastics -ad campaigns for confusing sorting items
- Our house is trying to do zero waste. We have minimum amount of garbage or recycling. Only 5-10% of items on recycling bin are actually getting recycled so the best is not to use packaging and buy in bulk sections of the stores using your own reusable bags
- More initiatives such as this study
- More detail on what is and isn't recyclable.
- Ban plastic bags and regulate single use plastics and coffee cups somehow.
- More compost or recycling containers in businesses/ downtown core.
- print on the outside of recycling containers what items can be deposited
- More access to large item recycling. We live in an area under lots of construction and people dump garbage all the time (chairs kids toys etc) they do not have access to vehicles to take them to Kent street or are not willing to pay. The City needs to find a way to help with this. Maybe once a month a recycling truck for larger items