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Student Research Report

AMS Food and Beverages Outlets Operational Sustainability

Aman Saxena, Guilio Pregolato, Janani Murthy, Sri Apoorva Kota

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AMS FOOD AND BEVERAGES OUTLETS OPERATIONAL SUSTAINABILITY

Project Report

Aman Saxena, Giulio
Pregolato, Janani Murthy, Sri
Apoorva Kota
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EXECUTIVE SUMMARY

The University of British Columbia recently developed a zero-waste action plan to reach towards sustainability leadership. Participating in this collective effort, the SEEDs initiative collaborated with AMS Food and Beverage services to investigate food ware procurement and a potential source of cross contamination within the NEST building. We developed an inventory of food ware outputted by each outlet and investigated the likelihood of back-of-house waste sorting leading to cross-contamination; finally, we made short observations that we deem useful for policy makers. The primary stakeholders are the food and beverages outlets of the NEST (both AMS and non-AMS operated), the general staff of the NEST, and our SEEDs community partners. To fulfill the objectives of the project, key staff of AMS governed food outlets were interviewed and handed out surveys especially prepared for this project. The data collected were analyzed and reported in two forms: qualitative and quantitative. Our key findings are:

- Back-of-House sorting is informal, yet unlikely to result in cross contamination, since only garbage is collected in a black bag. Outlets are opposed to standardization of bins or colour coded bags due to space and procurement complications.
- The centralized procurement of AMS outlets contributes to their purchasing power and sustainable practices. This could be leveraged to raise the sustainability efforts of non-AMS outlets within the NEST.
- Changes in waste management must be done in agreement with AMS operational staff, UBC Sustainability and UBC Building Operations.

Keywords: Sustainability, Waste Reduction, Alma Mater Society, Single-Use Materials, Key Staff

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1.0 INTRODUCTION

The University of British Columbia (UBC) is a global center for research and teaching, consistently ranked among the 40 best universities in the world[1]. Over the years, UBC has been a pioneer in actively endorsing sustainability. With a commitment to transform the entire UBC campus into a living laboratory, the strategic plan called “Shaping UBC's Next Century,” obligates all aspects of the University to lead globally and locally in sustainability and wellbeing across the campuses and communities[2]. The university has accomplished a lot in recycling, and waste reduction and its stratagemms include the development of a comprehensive Zero Waste Action Plan to move towards becoming a zero-waste campus. The action plan that was initiated in 2011 has been instrumental in diverting 67% of all campus waste from the landfill[3]. However, reduction of the remaining 33% depends on reducing the operational garbage of UBC, and much of this garbage is recyclable, with the predominant materials being food scraps, paper, and plastic. Therefore, the current focus is on various food outlets that are being operated across the campus under UBC Food services, Alma Mater Society (AMS) and other private franchises.

The Alma Mater Society(AMS) of the University of British Columbia Vancouver, is the student society of UBC Vancouver that exists to advocate student viewpoints and ensure the needs of students are met by the University Administration and the Provincial and Federal governments[4]. AMS Food and Beverage Department is the second largest provider of food services on campus, owned and operated by the students of UBC. The department is committed to providing sustainable and locally produced foods whenever possible, supporting applied learning on food-related issues, reducing waste, and fostering positive changes through staff training, menu design, and various community events. With a waste generation of approximately 400tons annually from the AMS operations and business produce alone[5], minimizing waste remains one of the top priorities. One of the significant contributors to the waste generated by the AMS is from single-use materials and food wastes produced by major eateries operating in “The Nest.”

“The Nest” was started by AMS with a mission to create a welcoming space for all students to eat, shop, study, and socialize while leading the way in sustainability practices and goals. It also ensures that the center of campus remains a student-centered hub of activity with a focus on the

needs and desires of all students on campus[6]. This building of a thousand functions also experiments with novel low-emission materials, passive air conditioning, solar-powered cooling systems, rainwater retention and a rooftop garden. Specifically, surrounding waste production and management, the Nest invested in a composting system[5], and an electronic tracker of the amount of waste produced [7]. Beyond structure, the AMS is also experimenting with policy, so they set guidelines for single-use food ware procurement[8][9]. To evaluate the current efforts and inform the next innovations, adequate tracking and data on waste production are necessary. Hence, the first step of the project involved preparing an inventory of the single-use food ware because the latest effort to catalog all single-use food ware in the Nest is now outdated by two years[10]. The second step of our project was to understand how the waste was sorted in the kitchen which is also known as the back-of-house waste sorting facility. Also, we acquired data from non-AMS owned outlets to check the consistency of waste management practices across AMS Nest.

2.0 PURPOSE OF THE PROJECT

The purpose of this project is to aid achieving sustainability targets of the UBC Zero Waste Action Plan to increase overall diversion rates to 80% diversion by 2020 as well as to decrease operational waste disposal to landfill/incineration steadily, despite campus growth, toward the long-term aspiration of a zero-waste campus. The purpose of our project is in line with SEEDs mission to improve the quality of educational, social, and personal lives of the students of UBC. In addition, it also facilitates the development of integrative, problem-focused learning by engaging in interdisciplinary projects that integrate educational opportunities as an overlay or complement to traditional majors and minors as stated in the Strategy 14 of “Shaping UBC's Next Century.”

3.0 PARTNER ORGANIZATION, PARTICIPANTS, AND COMMUNITY

Partner organization for this project is Alma Mater Society of British Columbia-Vancouver (AMS) is the student union that constitutes over 54,000 students, for the UBC's point grey (PG) campus in Vancouver. It is a non-profit organization, that takes initiatives for the betterment of

students that includes, education, health, social and personal lives[4]. The AMS in this project helped our group by giving it an opportunity to communicate with the stakeholders, to get a better understanding of the issues and provide guidance throughout. Besides, it helps as a gateway to collaboration for staff, faculty, and community partners and facilitates active learning [11].

The stakeholders in this project include the managers/key staff of the eight food and beverage outlets located in AMS Students Nest that are governed by the AMS. Stakeholders for this project are as following:

- Grand Noodle Emporium offers Asian food that includes classic Chinese take-out and a wide variety of pan-Asian menu for dine-in.
- Iwana Taco offers an excellent variety of delicious Mexican food that includes different types of tacos, burritos, and quesadillas.
- Honour Roll is a fresh, modern take on sushi offering maki rolls, nigiri, and other specialty Japanese food items like donburi bowls and bento boxes with taking out or dine in options. They are Vancouver's one of the few certified Ocean Wise sushi restaurants.
- Pie R square pizza is UBC's one of the favorite outlet for pizza lovers. It offers great choices for pizza slices or a whole pizza.
- The Pit is the successor of AMS' legendary student bar, it offers signature burgers and a list of great drinks available on campus.
- The Gallery 2.0 is one of the most crowded food and drinks place in the AMS. It offers tasty drinks and savory finger foods at their location.
- Blue Chip Café offers a wide selection of baked goods, savory snacks, vegan and gluten-free treats. Besides, they serve salt spring coffee and smoothies.
- Ph Tea is the best bubble tea spot on the UBC campus. It offers a large variety of bubble teas with a take-out option.
- Porch is an excellent place for vegetarian and vegan food lovers that offers great choices for build-your-own-bowls that include smoked tofu, baked falafel or quinoa croquettes either made to go or grab and go.

As the project aims at refining the existent strategy and reducing the waste generation of the AMS building, besides AMS governed outlets non-AMS governed outlets were also considered for the project. Outlets that falls under this criterion are as follows:

- Liquid Nutrition offers 100% organic and plant-based diets along with functional beverages which are dairy free, gluten free and soy free. Most of the beverages are made up of fruits, veggies, almond milk, coconut water, grains, nuts and pure Canadian maple syrup.
- Grocery Checkout is a grocery store that meets daily needs of the UBC students and others. It sells all the different types of essential materials like fruits, vegetables, snacks, etcetera.
- The Delly sells an extensive assortment of fresh sandwiches, wraps, and salads. This shop started at the Granville Island in the year 1976, and then expanded its branches in UBC campus.
- The Soup Market is one of the best places to visit that offers a great variety of beverages and soups.

The AMS governed outlets have a common interest in the project that aims at reducing the waste generated from their operations and disposal of the waste generated such that it supports the common goal of Zero Waste Generation. Moreover, their interest is to upgrade single-use food ware inventory and change their waste management practices such that all the waste generated can be composted in the Citypod (composting machine installed in the AMS).

To maintain the consistency in the project, our group checked the waste management practices of the non-AMS governed food and beverages outlets to check, if they are, in accordance with the AMS waste reduction and management policies.

4.0 GOALS AND OBJECTIVES OF THE PROJECT

The goal of our project is to reduce operational waste generation and refine waste management strategies for positively contributing to the waste management priorities of the AMS. The objectives of our project are:

1. To prepare an inventory of single-use food ware utilized in the AMS owned as well as the Non-AMS owned outlets.
2. Suggest policy changes to standardize the procurement of single-use foodware materials.
3. To review the back-of-house waste sorting practices in the AMS owned as well as the Non-AMS owned outlets and to determine the causes for contamination.
4. In conjunction with UBC's zero waste action plan, discover opportunities for changing practices to minimize waste contamination.
5. Evaluate the effectiveness of colored bags in reducing cross-contamination in back-of-house sorting.

5.0 APPROACH AND METHODS OF DELIVERY

The method of delivery involved face-to-face interviews and collecting survey responses. Face-to-Face interviewing and personally handing out the questionnaires to the stakeholder helped in receiving detailed responses since the assistance with terminology and understanding of question was provided efficiently. Conducting one-one interviews with workers, food outlet managers and AMS managers help in answering open-ended questions.

Our significant stakeholders are eateries that serve a variety of cuisines. The kind of food being served and the mode of dining preferred (i.e., Dine-in or Takeaway options) at each of these outlets are essential factors dictating the type of single-use materials purchased as well as the back-of-house sorting conditions. The quantity of food being served is also a parameter to select single-use containers as the capacity desired by the outlet may not be available in all material types. Therefore, we met the managers of each outlet during a meeting with Daniel Coculescu, the Interim Food and Beverage Manager and our point of contact with AMS. During this meeting, we inquired about their priorities for procuring materials, their back-of-house sorting and front house sorting methods.

After the meeting, we met with Sandra Diewert, the Purchasing and Storeroom Manager of the NEST. She gave us ample information on back-of-house sorting and transport to the loading bay, as well as multiple potential sources of cross-contamination of waste and some suggestions on how to address them. She also introduced us to the staff at some AMS outlets so we could record their waste sorting on site. We obtained Sandra's consent to report her name since she is an

essential point of contact and her identity would easily be discovered from her position, which is relevant to all the data we collected.

Since all AMS staff we interacted with were eager to engage and promote sustainable practices of waste management, we found it unlikely that information was twisted. Still, interviewing is a subjective endeavor, and our results may be biased towards representing the AMS positively since all of our interactions were with them.

To document all the single-use materials in each outlet we developed a questionnaire. We decided to build upon previous work done under SEEDS, our community partner, so we updated a questionnaire from 2016 with feedback and insight from Bud Fraser, the Senior Planning and Sustainability Engineer at SEEDS. The resulting form is in Appendix B and was used to track which materials were used for each type of food ware that the outlets require. By assessing the different types of materials used by each outlet we can inform decisions surrounding their ecological impacts. This is especially significant for UBC's Zero Waste Goal, which depends on phasing out any garbage generated.

We filled the questionnaire for all the AMS outlets in the storeroom during the conversation with Sandra, then entered each non-AMS food outlet to document their food ware. The questionnaire is objective, but it cannot record the amounts of each type of waste produced.

6.0 RESULTS

6.1 QUALITATIVE DATA

From conversation and meetings, we recorded the following insights on the workings of back-of-house waste management and food ware procurement:

- Cross contamination from outlets back-of-house is unlikely for the following reasons
 - Waste is separated in outlets, then joined in collective storeroom bins (of each type), then sent to the loading bay.
 - Outlets only use one garbage bag, so switching bags during transport is unlikely.
 - Food outlets often struggle with lack of space, so their waste separation is done on carts and buckets to optimize space and transport to the collective storeroom bins. This factor was expressed in response to the suggestion of standardizing bin sizes.

- Waste volume is small (and bins are emptied out daily), so outlets do not feel the need for garbage bags aside from a general garbage bin. This factor was expressed in response to the suggestion of using color-coded bins.
- Bins are not labeled, but the staff in each outlet is small, and the waste is visible in each cart shelf or bin, so employees quickly learn how to sort waste and where to take it in the storeroom collective bins.
- The storeroom is a key component of procurement and waste management
 - All AMS outlets share the storeroom and depend on the Purchasing and Storeroom Manager (currently Sandra Diewert) for procurement of their food ware. This office is also where waste is collected from most outlets, so it is central to setting sorting behaviors across all AMS outlets.
 - Engaging storeroom staff is crucial to the successful development and implementation of any sustainability policy acting upon food ware and waste management.
 - Recently, the storeroom and procurement manager initiated a phasing out of unmarked plastic straws in favor of paper straws, which at the time of our interview were still being delivered.
 - Aside from procurement decisions, a large amount of waste can be diverted by training staff to only offer specific utensils when necessary. For example, Sandra reported a significant reduction in the consumption of straws and plastic takeaway bags once outlet staff were instructed to keep them out of sight and provide them only when asked for.
- Policy-level decisions must be made in conjunction with UBC Sustainability and UBC Building Operations
 - Front-of-house waste management is complicated by the interactions with UBC custodial staff, since they may operate under conflicting instructions from UBC and from AMS.
 - Changes in bin placement and bag color coding must occur in a UBC-wide scale since it is UBC custodial staff that will be responsible for upkeep.

- There are multiple unexplored routes to cross-contamination in waste.
 - Front-of-house waste management uses clear bags for all waste collected, but inaccuracy in sorting can result in bags that are difficult to tell apart.
 - Sandra Diewert reported the frequent occurrence of people sifting through the collective recycling bin at the loading bay to collect valuable recyclable materials. The sifting activity could be a source of cross-contamination as well as a loss to the NEST since the organization pays fees to compensate for environmental impacts and are expected to recover part of those costs with recycling efforts. The impact of this activity has not yet been evaluated.

Fig. A shows the Back-of-house waste sorting in Iwanna Taco. Garbage is kept in the only bin with a bag, soft plastics are kept in a blue box, organics are kept in a white box, cardboard is kept on the upper shelf of the cart, and recyclable containers are kept in other shelves of the cart. This informal system avoids cross-contamination since it does not use more than one black bag, and outlet managers expressed that the limited space would make it difficult to use standard bins for each type of waste collected. Each day the waste is taken to the storeroom and emptied out into the shared larger bins. During the meeting, other food outlet managers described similar systems for sorting.



Figure A: Back of house waste sorting in Iwana Taco (food outlet)

Fig. B shows the recycling bins. Plastics in black, cardboard in red, organics in green. Outlets collect their garbage and join it in this bin. No bag is used, so cross-contamination is unlikely.



Figure B: Recycling Bins

6.2 QUANTITATIVE DATA

The raw data collected describing the material used for each food ware and each outlet is in appendix A. Below is the processed data, arranged to display the type of waste produced by each outlet.

Table 2: Types of waste produced by each outlet

Part 1:

		Grand Noodle	Honour Roll	Pi R2	The Pit	Gallery	Iwanna Taco	Porch
Garbage	Foil Wrap						✓	
	Unmarked Plastic							
	Other Garbage							
Recycling	Metal			✓				
	Plastic	✓	✓	✓				✓
	Recyclable Paper	✓	✓					✓
	Glass							
Organics	Compostable Plastic							
	Soiled Paper **	✓	✓	✓	✓	✓	✓	✓
	Wood	✓	✓					✓
	Cardboard	✓		✓				
	Sugarcane Fiber		✓		✓	✓	✓	
Paper			✓					

* Some pastry bags have a compostable plastic window; **Includes waxed paper products and wrappers with compostable plastic window

Part 2:

		Phtea	Blue Chip	Soup Market	Delly	Liquid Nutrition	Grocery Checkout	Ready Made Food Stuffs
Garbage	Foil Wrap							✓
	Unmarked Plastic	✓		✓	✓	✓	✓	✓
	Other Garbage							✓
Recycling	Metal							✓
	Plastic	✓	✓	✓		✓	✓	✓
	Recyclable Paper		✓	✓	✓	✓		✓
	Glass							✓
Organics	Compostable Plastic				✓			
	Soiled Paper **		✓	✓	✓	✓	✓	
	Wood							
	Cardboard		✓					✓
	Sugarcane Fiber			✓				
Paper			✓					✓

Table 2: Count of outlets that output each type of waste

Garbage	Foil Wrap	2
	Unmarked Plastic	6
	Other Garbage	1
Recycling	Metal	2
	Plastic	10
	Recyclable Paper	8
	Glass	1
Organics	Compostable Plastic	1
	Soiled Paper **	12
	Wood	3
	Cardboard	4
	Sugarcane Fiber	5
Paper		3

7.0 DISCUSSION

7.1 BACK-OF-HOUSE WASTE SORTING

Results from *back-of-house sorting section* explained above, suggest that back-of-house sorting techniques effectively implement AMS's goal of waste sorting into appropriate streams. The waste bins don't bare specific labels and are assigned arbitrarily. Since the sorting is done within small areas, workers are entirely made aware of the sorting methods, and they unerringly sort wastes into arbitrarily determined waste bins. As wastes are collected in transparent plastic bags, it is unlikely that cross-contamination of wastes occurs during off-loading of garbage from AMS Nest. During stakeholder's bi-weekly meeting, AMS food outlet managers were against the usage of colored plastic bags as it would exceed the outlet's budgetary constraint in the purchasing front. In the meeting, there was also a pushback on the usage of standard bins due to space limitations.

7.2 AMS FOOD SERVICE WARE

As per our survey results presented in the above section, all AMS food outlets use compostable and recyclable paper/plastic food service ware. Survey results indicate that AMS food outlets have fortuitously implemented the usage of sustainable materials across food outlets. While it is acknowledged that these outlets use sustainable food service ware, it should be admitted that potentially high volume of waste generated by selling of readymade food items, such as cold drinks cans, juice bottles, sandwiches, at all of AMS outlets contribute to the largest range of garbage. Amongst AMS outlets, Iwanna taco and PH Tea generate a considerable amount of garbage. Iwanna Taco's usage of insufoil and PH Tea's extensive usage of unmarked plastic straws and unmarked plastic lids contribute to the accumulation of a large amount of garbage. On the contrary, other non-AMS outlets such as Grocery checkout, Liquid nutrition, Delly and Soup Market also contribute to some garbage due to their usage of unmarked plastic straws.

Choosing alternatives to replace non-recyclable utensils and straws at Grocery checkout would not be a hassle as they are not widely used. Whereas, in outlets such as liquid nutrition and PH Tea, picking an alternative for plastic straws would be challenging as plastic straws are central to their business ideas. As straws are cheap, cling wraps maintain humidity and insufoil maintains temperature it is convenient and effective to use them. Consequently, the waste generated by these materials is substantial. In order to reach UBC's zero waste goal, these materials need to be replaced. However, it is hard to find reasonable alternatives that match their performance without compromising function.

In the recent past, AMS decided to phase out all the unmarked plastic straws replacing them with paper straws. However, this alternative is unlikely to be implemented at PH Tea. Additionally, it was noted that plastic carry bags were rarely provided and were offered purely upon customers' request.

7.3 NON-AMS FOOD SERVICE WARE

Non-AMS food outlets such as Delly, Soup Market displayed various levels of awareness in food ware procurement. Delly is using compostable and biodegradable materials that would majorly contribute to compost. Although Delly uses compostable, recyclable straws, it offers unmarked plastic with cling wrap that is dispensed as garbage.

Grocery checkout is adopting several unmarked plastic utensils, that pile up garbage. Usage of unmarked plastic straws at Liquid Nutrition, Soup Market, and Grocery Checkout amounts to a considerable amount of garbage. Some overlap of AMS materials were found at non-AMS outlets, in that, the outlets used a clamshell paper box made of plant fiber. On the contrary few outlets have unique foodware for branding purposes, such as PH Tea with plastic straws and plastic wrap lid and grand noodle with cardboard boxes, etc. Making bulk purchases would ensure that more expensive sustainable products are affordable. Additionally, using similar materials across food outlets would make it easier for the customer to sort out service ware at garbage sort-it-out bins.

7.4 FUTURE DIRECTIONS

Sandra Diewert, AMS Purchasing, and Storeroom manager recommended a few points towards future directions. Sandra suggests that bulk purchasing of standardized materials would not only lower the costs and ease of storage, but it would also make sorting more accessible for students.

Moreover, she pressed a need to evaluate the impact of sifters in the back-of-house waste bins. While sifters forage for recyclable materials, perhaps, this could lead to cross-contamination. AMS invests capital on the purchase of recyclable materials, expecting returns on disposal of recyclable wastes, but this goal is not achieved due to the act of sifters. Once the implementation of paper straw is successful, it is essential to perform periodic audits to evaluate its outcome, especially at the PH Tea outlet, where straws play a central role in their business idea.

Sandra pointed out that the replacement of plastic cutlery with wooden cutlery failed, as customer raised concerns over the presence of food chips in the food. It is recommended to employ a dedicated staff, who would separate valuable recycling from general recycling. This would guarantee better outcomes and higher returns from the Encorp Pacific, recyclable garbage collector.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Our project aimed at assessing the possibility of decreasing operational waste generated by the AMS Nest, which also aids in the reduction of overall waste disposal to landfill/incineration

steadily, and assists in moving towards the long-term aspiration of a zero-waste campus. It also addressed the immediate goal of increasing the overall diversion rates from the landfill to 80% by 2020. To realize the purpose of this project our team, consisting of students from diverse academic backgrounds, focused on creating an inventory of all single-use materials distributed in the AMS Nest as well as investigating back-of-house waste sorting and the likelihood of cross-contamination. In addition to our existing stakeholders comprising of the 8 AMS owned food outlets, we included the non-AMS outlets that are also operating in “The Nest” to assess the possibility of any practices by the latter that may undermine the waste reduction efforts by AMS authorities. To accomplish the objectives of our project, we employed the methodology of conducting face-to-face interviews with workers, food outlet managers and AMS managers as well as collecting responses to the questionnaires developed for documenting all the single-use materials by interacting with Sandra Diewert, Purchasing & Storeroom Manager for the AMS outlets. Our findings from analysis of the data collected by aforementioned methods concluded that the back-of-house sorting techniques effectively implement AMS’s goal of waste sorting into appropriate streams, despite not being labeled uniformly. Also, except the usage of insufoil, unmarked plastic lids and straws, AMS owned food outlets have implemented the usage of sustainable materials across food outlets. Non-AMS owned food outlets also adhere to the sustainability standards of the AMS owned eateries, excluding the usage of unmarked plastic straws and utensils due to issues related to procurement cost.

Based on the results from our analysis, we have the following recommendations that effectively decrease operational waste generated by the AMS Nest and refine the waste management strategies to positively contribute to the waste management priorities of the AMS:

- The results of this analysis rule out the possibility of cross-contamination from back-of-house sorting facility of the outlets and hence, it is recommended to evaluate the possibility of Front-of-house waste management facility because usage of clear bags for all waste collected creates a possibility of inaccuracy in sorting that can arise in bags that are difficult to tell apart.
- To eliminate the usage of unmarked plastic utensils, lids and straws from Non AMS owned outlets, it is recommended to centralize the procurement of standardized food ware materials as the uniformity of food ware will ease the process of sorting while

disposal as well as reduce purchasing cost of sustainable materials for small outlets with minimal capacity to invest in sustainable materials.

- To achieve better outcomes and higher returns from the Encorp pacific, it is recommended to employ dedicated staff to separate valuable recycling from general recycling.
- It is recommended to evaluate the impact of sifters in the back-of-house waste bins as foraging for recyclable materials could lead to cross contamination as well as reduce returns on disposal of recyclable wastes compared to the expectations of AMS.
- Finally, it is recommended that the AMS operational staff discuss with the UBC Sustainability and UBC Building Operations to expel the possibility of complicated interactions with UBC custodial staff due to conflicting instructions from UBC and from AMS. It is also crucial to institutionalize the changes in bin placement and bag color coding on a UBC-wide scale to ease its maintenance by UBC custodial staff.

9.0 REFERENCES

- [1] The University of British Columbia, “The University of British Columbia,” 2017. [Online]. Available: <https://www.ubc.ca/about/>.
- [2] S. Plan, “READ: 2018 UBC Strategic Plan Full,” 2018.
- [3] UBC Sustainability, “Waste Action Plan,” 2017. [Online]. Available: <https://sustain.ubc.ca/campus-initiatives/recycling-waste/what-ubc-doing/waste-action-plan>.
- [4] Wikipedia, “Alma Mater Society of the University of British Columbia Vancouver,” 2017. [Online]. Available: https://en.wikipedia.org/wiki/Alma_Mater_Society_of_the_University_of_British_Columbia_Vancouver.
- [5] Alma Mater Society of the University of British Columbia, “AMS Sustainability Initiatives,” 2018. [Online]. Available: <http://www.ams.ubc.ca/sustainability/initiatives/>.
- [6] Alma Mater Society of the University of British Columbia, “Alma Mater Society of the University of British Columbia Vancouver,” 2018. [Online]. Available: <http://www.ams.ubc.ca/studentsociety/>.
- [7] B. Lowe *et al.*, “Digital Waste Management System,” 2014.
- [8] C. Planning, “UBC Food Service Ware Procurement Guidelines Achieving sustainable purchasing at food outlets and campus events,” no. August 2016.
- [9] UBC Sustainability, “WASTE ACTION PLAN,” 2016. [Online]. Available: <https://sustain.ubc.ca/campus-initiatives/recycling-waste/what-ubc-doing/waste-action-plan>.
- [10] A. Cheng, “Towards Achieving Zero Waste at UBC : Food Service Ware,” 2016.
- [11] UBC, “20-Year Sustainability Strategy,” p. 20, 2014.

10.0 APPENDICES

APPENDIX A: Food Outlet Service Ware Survey Data

The table below shows the raw data of materials used for each food ware offered at each AMS food outlet, as well as ready-made products (bottles, cans, yogurt containers, chip bags, granola bars, etc.). Ready-made products are considered separately since the material procurement decisions are made by their companies of origin.

Raw data of materials

Food ware \ Outlets	Grand Noodle	Honour Roll	Pi R ²	the Pit	gallery	Iwanna taco	Porch
A. Hot drink cups	-	-	-	-	-	-	-
B. Hot drink lids	-	-	-	-	-	-	-
C. Cold drink cups	-	-	-	-	-	-	-
D. Cold drink lids	-	-	-	-	-	-	-
E. Bowls (liquids)	recyclable paper	recyclable paper	-	-	-	-	recyclable paper
F. Bowl lids	recyclable plastic	recyclable plastic	-	-	-	-	recyclable plastic
G. Take-out containers	recyclable cardboard	plant fiber paper/ plastic bowl	foil box/ cardboard box	plant fiber paper	plant fiber paper	plant fiber paper	recyclable plastic
H. Take-out container Lids	-	recyclable plastic	-	-	-	-	recyclable plastic
H. Plates	-	-	paper	-	-	-	-
I. Utensils	-	-	recyclable plastic	-	-	-	-

J. Chopsticks	plain wood	plain wood	-	-	-	-	-
K. Straws	paper	paper	paper	paper	paper	paper	Paper
L. Wrappers	-	-	-	paper	-	insulwrap (foil-paper composite)	waxed paper
M. Napkins	paper	paper	paper	paper	paper	paper	Paper
N. Pastry Bags	-	-	paper (w/ window)*	-	-	-	-
O. Takeaway bags	-	paper	-	-	-	-	-

Food Ware \ Outlets	Phtea	Blue Chip	Soup Market	Delly	Liquid Nutrition	Grocery Checkout	Ready Made Food Stuffs
A. Hot Drink Cups	-	Recyclable Paper	Recyclable Paper	Plant Fiber Paper	Recyclable Paper	-	-
B. Hot Drink Lids	-	Recyclable Plastic	Recyclable Plastic	Composta ble Plastic	Recyclable Plastic	-	-
C. Cold Drink Cups	Recyclable Plastic	Recyclable Plastic	-	-	Recyclable Plastic	-	Glass/ Metal/ Recyclable Plastic/ Cardboard
D. Cold Drink Lids	Unmarked Plastic Wrapper	Recyclable Plastic	-	-	Recyclable Plastic	-	Metal / Recyclable Plastic
E. Bowls (Liquids)	-	-	Recyclable Paper	Plant Fiber Paper / Composta ble Plastic	Recyclable Plastic	-	Recyclable Plastic
F. Bowl Lids	-	-	Recyclable Plastic	Composta ble Plastic	Recyclable Plastic	-	Coated Foil

G. Take-Out Containers	-	Cardboard	Plant Fiber Paper	Plant Fiber Paper	-	Recyclable Plastic	Recyclable Plastic / Cardboard
H. Take-Out Container Lids	-	-	-	-	-	Recyclable Plastic	-
H. Plates	-	-	-	-	-	-	-
I. Utensils	-	-	Recyclable Plastic	Compostable Plastic	-	Unmarked Plastic	-
J. Chopsticks	-	-	-	-	-	-	-
K. Straws	Paper	Paper	Unmarked Plastic	Compostable Plastic	Unmarked Plastic	Unmarked Plastic	Unmarked Plastic
L. Wrappers	-	-	-	Paper / Plastic Wrap	-	-	Coated Foil
M. Napkins	Paper	Paper	Paper	Paper	Paper	Paper	-
N. Pastry Bags	-	Paper (W/ Window)*	Plain Paper	Waxed Paper	-	-	-
O. Takeaway Bags	-	Plastic (Upon Request)	Plastic (Upon Request)	-	-	Plastic	-

APPENDIX B: Food Outlet Service Ware Survey

Food outlet name: _____

Date: _____ Time: _____

A. Hot drink cups

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper

- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product

name(s) _____

—

B. Hot drink lids

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product

name(s) _____

—

C. Cold drink cups

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product

name(s) _____

—

D. Cold drink lids

- Certified Compostable paper or other fiber

- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product

name(s) _____

—

E. Bowls (liquids)

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product

name(s) _____

—

F. Bowl lids

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product

name(s) _____

—

G. Take-out containers

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product
name(s) _____

—

H. Take-out containers

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product
name(s) _____

—

I. Plates

- Certified Compostable paper or other fiber
- Recyclable Plastic (marked with a recycling number)
- Conventional coated paper
- Compostable Plastic
- Unmarked Plastic
- Expanded Polystyrene

Product
name(s) _____

J. Utensils (forks, knives, spoons)

- Plain wood or bamboo
- Recyclable Plastic (stamped with a recycling number)
- Coated wood or bamboo
- Compostable Plastic
- Unmarked Plastic
- Other (specify) _____

Product

name(s) _____

—

K. Chopsticks

- Plain wood or bamboo
- Recyclable Plastic (stamped with a recycling number)
- Coated wood or bamboo
- Compostable Plastic
- Unmarked Plastic
- Other (specify) _____

Product

name(s) _____

—

L. Straws

- Recyclable Plastic (stamped with a recycling number)
- Compostable Plastic
- Unmarked Plastic
- Other (specify) _____

Product

name(s) _____

—

M. Wrappers (e.g. Sandwiches, burritos)

- Plain paper
- Certified compostable paper
- Plastic or wax coated paper
- Aluminum foil
- Insulated aluminum foil
- Other (specify) _____

Product

name(s) _____

—

N. Napkins

- Plain paper
- Certified compostable paper

Product

name(s) _____

—

O. Pastry Bags

- Plain paper
- Waxed paper
- Paper with plastic window
- Paper with compostable plastic window
- Other (specify) _____

Product

name(s) _____

P. Takeaway bags

- Plain paper
- Plastic
- Compostable plastic

Other (specify) _____

Product
name(s) _____
—

Q. Other item: _____

Material(s) _____

Product
name(s) _____
—

R. Other item: _____

Material(s) _____

Product
name(s) _____

S. Other item: _____

Material(s) _____

Product name(s) _____