

**Alternative Systems for Zero Waste User Engagement**

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# Alternative Systems for Zero Waste User Engagement

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Prepared for the UBC SEEDS Program

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## **Abstract**

To improve the recycling habits of students living in residence housing on the campus of the University of British Columbia, a review of behavioural intervention techniques to promote recycling has been conducted. A redesign of the waste and sorting room at the Marine Drive residence has been proposed as a pilot project. The improved room design includes a recycling pathway with an improved layout, the addition of audio and visual prompts and improved signage. By implementing the recycling pathway at residence buildings on campus, the University of British Columbia will be one step closer to achieving their goal of diverting 70% of their waste by 2016.

## Introduction

To become a more sustainable institution, the University of British Columbia (UBC) has pledged to achieve a 70% waste diversion by 2016 through recycling and composting. In order to reach this goal, there are numerous strategic sustainability plans and campus initiatives being implemented and developed at the moment. One of which, is to increase the waste diversion rate for all student housing on campus. Based on an earlier study done by through UBC's Social Ecological Economic Development Studies Program (SEEDS), it was documented that the Marine Drive student residence has total waste diversion rate was only 17.2%, which is poorly performed in comparison to other student residences on campus. The Marine Drive Residence has a single drop-off point for all four waste streams in the basement of each tower. In addition, it was noted that the contents of the garbage at this residence was primarily composed of recyclable and compostable material. Hence, there exists a great urgency to examine the current practice and propose improvements to the waste management system to be implemented at Marine Drive. The key aspects identified and needing further improvement during the tour of the facility are the use of signage and the user engagement in the waste room. The focus of this project is on modifications to the recycling room. Therefore, a recycling pathway incorporating 3-Dimensional (3-D) visuals, warm lighting and written and verbal prompts is proposed to transform the existing waste room into an inviting environment to users in hope to encourage more recycling and composting at this residence. A list of additional recommendations that may enhance user's recycling and composting experience at the Marine Drive residence can be found in the Appendix.

## Concept

### The Recycling Pathway

Upon entering the recycling room a welcome note will sound welcoming the user to the room. There will be a removable divider or wall on their left such that the user is able to walk forward or to the right. Directly in front of the entrance door on the floor, a green path will start, ending with a green arrow. Floor graphics and signage will be used to depict acceptable material in front of the line of bins. 3-D posters accented with lighting will be located above the bins informing users of the proper recyclable material. An "ideal disposal bin diorama" will be located to one side of the bins. After depositing, the user returns to the pathway to towards the next disposal area. Each new path begins with a visual prompt on the floor reminding users that the previous recyclable material, is not allowed past this point. Similar 3-D posters will be displayed above the bins and an ideal disposal bin diorama will be displayed next to the actual bins. The actual garbage bin will have a 3-D poster but the lighting will be absent.

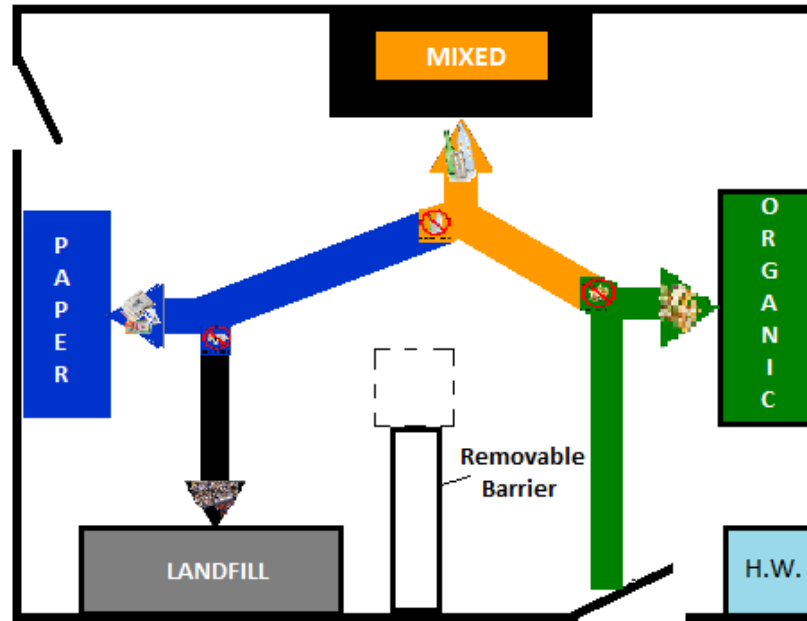


Figure 1: Room configuration in the recycling pathway.

When the user has finished sorting their garbage they will follow the recycling path in reverse returning them to the entrance. On the back of the door there will be a full length mirror and sign, thanking them for sorting their waste. Before leaving, users will have the option to clean up in the hand washing station located near the entrance.

Signs with informational prompts will be present at various locations around the room.

## Design Considerations

### The Recycling Pathway

The recycling pathway has been designed to divert the paths of the users in the recycling room. Currently, when users enter the recycling room, they are confronted with a wide open space and a plethora of options for recycling. Users have the ability to go directly to the bin they desire, which is positive as it allows for easy access to recycling areas but negative in that users can walk directly to the large open garbage receptacles and avoid recycling completely.

The organic bins have been located first on the recycling pathway, the mixed container recycling is second and the paper recycling is third. It is also recommended that a hand washing station be located adjacent to the organic bins and the exit.

### The Barrier

A removable barrier in the center of the room limits movement of the user in the recycling space by dividing the room in half. Upon entering, the only options presented to users are organic recycling on the right and mixed container recycling directly ahead. There is not a direct path to the garbage bins without passing all other recycling options. Shopping malls are often designed to be labyrinths so that people spend more time navigating the corridors and consequently have a longer opportunity to

purchase items (Passini, 1996); the barrier is designed based on this principle. Three removable barrier options are displayed below in Figure 2.



Figure 2: Removable room divider for pathway barrier.

### Colour

The arrows and signage colours were based on the existing colours scheme, in coordinating the Metro Vancouver standardized recycling colours. The most immediate recommended change is the association of the black bins with mixed container recycling. The existing bins in the Marine Drive Residence building can remain, but it is recommended that the UBC Sustainability Office consider choosing a colour, such as orange, to associate to mixed container recycling. This will avoid confusion with garbage bins which often tend to be black. The recommended colours of the arrows on the recycling pathway are summarized in Figure 3. For additional information on the colour choices, refer to Appendix A: Additional Information.

Green	Organics
Blue	Paper Recycling
Orange	Mixed Container Recycling
Black	Garbage

Figure 3: Recommended arrow colours for recycling pathway at UBC's Marine Drive Residence.

### Audible Prompts

The correct prompts remind, encourage and motivate people to recycle. If a verbal prompt is to be presented upon entering and exiting, it must be applicable to all audiences and encourage more or better recycling. Studies suggest that prompts should target the individual in competition with others and should be customized for different subgroups of recyclers. Based on research one can split up recyclers into three groups non-regular recyclers (who do not recycle often), situational recyclers (who recycle based on convenience) and avid recyclers (who will recycle regardless of circumstances). (Sirakaya-Turk, Baloglu, & Mercado, 2013; Witmer & Geller, 1976). It is proposed that prompts be designed to promote recycling for the non-regular recyclers and the situational recyclers. Possible prompt alternatives upon entrance are:

- Don't let your bottles end up in the landfill: Sort it Out!

- Reduce Waste: Recycle your paper here!
- Recycle: 80% of students in this building do it!

## Floor Graphics

Floor graphics are a great way of catching attention, as people are always instinctively scanning the ground as they walk (Yellow Dog Blog, 2009). Floor graphics are most effective when they are linking or guiding the user to an item that is at eye level, and in this case the floor graphics will lead to the recycling bins (Wiedyk, 2013). They are effectively used in retail advertising, as they catch the eye of consumers and influence their decision making (Weil, Ph, Miltenberger, & Crosland, 2012).

Wayfinding decisions have two components a behavior and an object, for example “turn right and walk up the stairs” (behavior) “and look for the purple sign” (object). Following a familiar path can be done without paying particular attention to the operations involved. The floor arrows represent a familiar path that users will unconsciously follow (Passini, 1984). This effectively simplifies the wayfinding decision so that users focus on the object which is the desired recycling bin.

Figure 4 shows an example of floor graphics that may be incorporated into the arrows of the recycling pathway to provide additional examples of where each material belongs. The landfill graphic was chosen for the garbage to act as a visual reminder of where the items placed in the garbage bin end.



*Figure 4: Floor graphics for the arrows in the recycling pathway.*

Figure 5 contains examples of floor graphics that can be placed at the end of each new path to discourage users from bringing inappropriate materials on the next recycling path.



*Figure 5: Floor graphics to be placed at the end of each pathway.*

### Lighting

People are attracted to well and warmly lit environments (Vilar, Teixeira, Rebelo, Noriega, & Teles, 2012). By highlighting the three recycling stations users will be encouraged to visit these locations and spend a few extra moments sorting their waste material.

### 3-D Posters

3-D displays were chosen because studies show that 3-D displays are more effective than 2-D displays. One study showed that 84% of the 3-D viewers were convinced on the advertised product and expressed a higher likelihood of following through with a purchase of the product, as they found the 3-D advertisement was eye-catching (SKOPOS Market Insight, 2010). Additionally, another study stated that the use of 3-D imaging helped to increase memory retention with the audience exhibiting 92% total recall of an advertisement, with 68% of that number showing more of a desire to try a product (Stewart, 2011). An example of a 3-D poster is shown in Figure 6. The items to be displayed on the 3-D and 2-D display boards should be consistent with those recommended by UBC's Sort it Out – What Goes Where. The sample can be found in The items that should be part of the display case have been presented in Table 1. These items are consistent with those recommended by UBC's Sort it Out program on campus.

Table 1 in the Appendix.

### Ideal Disposal Bins

By illustrating which materials should go into a particular recycling bin, proper sorting procedure and user engagement should increase. According to a two-month pilot study done by the University of Washington, the 3-D visuals displaying the "ideal disposal bins" increased the accumulation of recyclables and compostable material in comparison to trash in the bins. Positive feedback from students, faculties and staff also warranted the success of this trial study (University of Washington, 2014). An example of an ideal disposal bin and its location in relation to the other bins and signage is shown in Figure 6.



Figure 6: 3-D Posters and ideal disposal bin examples

### Informational Signage

Research shows that informational prompts and performance feedback prompts have proven to increase recycling rates significantly (Weil et al., 2012). Informational prompts provide information or facts regarding recycling. Here are a few examples of informational prompts that might be effective as signage around the bins or as additional floor signage:

- Glass bottles take over 4,000 years to decompose in a landfill!
- 25 trees are saved every time this paper bin is filled!
- Organic material is recycled to make soil for your garden!

Performance feedback actually has a greater impact on increasing recycling rates than informational prompting (Weil et al., 2012). Performance feedback is more personal, and can influence and educate the user. Performance feedback can include a daily, monthly or yearly tally or score related to recycling habits of the users of the building. Feedback can effectively be displayed over the recycling or composting bin. Here are examples of feedback prompts:

- 30 tonnes of recyclable material was misplaced in the trash last month!
- 80% of residents of this building recycling their plastic bottles!
- 1,200 trees were saved last semester due to the volume of paper recycled!

### Conclusion

Several plans to improve the waste diversion at the University of British Columbia have been put forth to reach the goal of 70% waste reduction by 2016. Among the various ideas are visual and verbal prompts, more effective signage, and layout improvements. The layout improvements include the addition of floor signage in order to create a pathway that will encourage users to sort their waste. The aim of these suggestions is to improve waste reduction by encouraging recycling and making it a positive experience for the students living on campus.



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## Appendix: Additional Information

### Display Case

The items that should be part of the display case have been presented in Table 1. These items are consistent with those recommended by UBC’s Sort it Out program on campus.

Table 1: Items for the display from the UBC’s Sort it Out: What Goes Where (UBC Sustainability, 2014).

Food Scraps	Recyclable Containers	Paper	Garbage
Fruit and veggies Leftover sandwiches Milk and cheese Bones and egg shells Paper towel and napkin Paper cups and plates Wood chopsticks Tea bag Coffee grounds and filters Meat	Plastic #1-5 & 7 (drinking straw) Glass bottles & jars Metal cans (label removed) Recyclable plastic bottles Recyclable plastic cups Paper coffee cups & lids Transparencies Juice boxes Tetrapak containers	Newspapers & magazines Envelopes (with windows and without) Computer paper Cereal boxes Telephone books Sticky notes	Plastic bags Bubble wrap Styrofoam Starbucks and Tim Horton coffee cups Non-recyclable cutlery Pizza boxes Milk cartons Waxed paper

### Colour Information

The colours associated with each bin were reviewed to provide a basis for colour choices for the floor signage. The three photographs presented in Figure 7 were taken on March 14th, 2014 during a visit to the recycling rooms at the Marine Drive Campus. From the photos, it can be observed that the paper recycling bins are blue, the mixed container recycling bins are black and the garbage bins are grey.



Figure 7: Paper recycling, mixed container recycling and garbage recycling in Marine Drive Residence.

The current colour scheme may create confusion or uncertainty, especially when compared to the “Sort it Out.” bins located outside of the residence buildings on campus, which is shown in Figure 8. The “Sort it Out.” bins use blue for paper recycling, grey for mixed container recycling and black for garbage.



Figure 8: “Sort it Out.” bin located on UBC campus (UBC Sustainability, 2014).

In addition to differing from the campus bin colours, the colour selections are inconsistent with the Metro Vancouver recommended standardized colours for public space recycling. Metro Vancouver started this initiative to standardize recycling colour-coding to provide consistency amongst its municipalities and to match curb-side recycling colours. The Metro Vancouver colour selection was based on discussions and surveys with industry professionals (Metro Vancouver, 2009). Figure 9 provides a breakdown of the recommended bin colours by Metro Vancouver. The most notable differences are that Metro Vancouver recommends blue for mixed container recyclables, yellow for paper recyclables and grey for garbage.

Recommended Bin Colour		Material
Black	Grey	Garbage
Yellow		Mixed paper and newspaper
Brown		Corrugated cardboard
Blue		Blue box recyclables
Orange		Refundable beverage containers
Green		Organics
Red		Hazardous materials

Figure 9: Metro Vancouver recommended colour standards (Metro Vancouver, 2009).

Understanding that changing the containers and colours may not be ideal or feasible there are a number of ways to incorporate the standardized colours into the existing bins, as recommended by Metro Vancouver. The standard colours can be on the bin lids, in a band around the bin, or be included when designing the material signage.

## Additional Suggestions

In addition to the proposed recycling room modifications presented in the report, the following items were suggested and have been included to assist investigations in the future.

### Additional Recycling Room Modifications:

- Painting the bins with pictures of what each bin should contain
- Maintaining a stock in the bins of the proper contents
- Adding a door entrance card swipe and quick question
- Placing lids on the garbage bins and removing the lids on the recycling bins

### Building Wide Changes

- Adding recycling bins to each floor (with garbage bins in basement)
- Adding recycling bins standard in each room to encourage presorting
- Having the recycling bins in the main entrances to the residence buildings

### User Engagement

- Post online videos and workshops to be completed by all residents before move in day to educate users on the recycling practices in their new homes
- Have residents sign recycling pledges, and have reminders throughout the year
  - The recycling pledge could also be used in feedback signage, for example: “75% of residents in this building have signed a pledge committing to sort their waste for the current school year!”
- Implementing a bin camera with real time display or peer pressure components
- Compost bin exchange so that residents to remove the barrier of not wanting to clean their bins
- Start a “Green Team” of student volunteers to teach people how to sort their waste. This would be most effective in the first few weeks of classes.

### Apps

- Create an app to track recycling history and also to serve as an information source for recycling queries