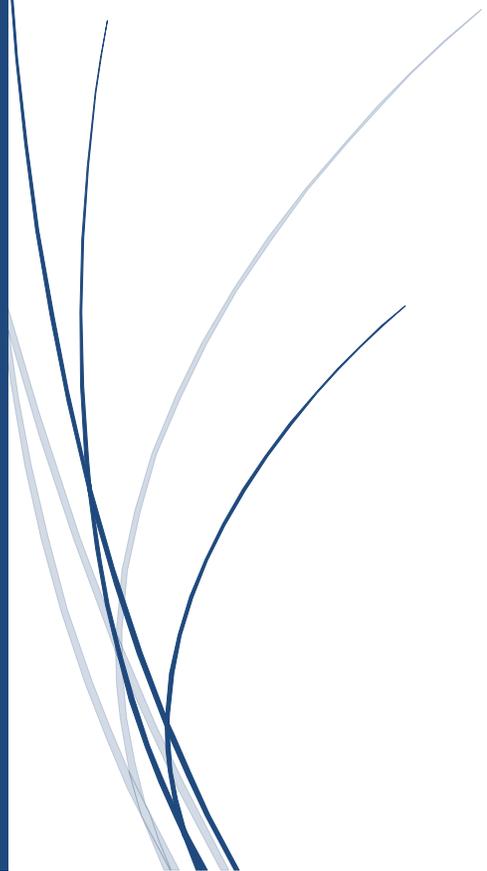




Winter 2019

Waste and Inefficiencies as Identified by Dalhousie University Facilities Management Staff

Final Report



ENVS-SUST 3502 | Campus as a Living
Laboratory

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EXECUTIVE SUMMARY

This research project aimed to survey Facilities Management (FM) staff on the Dalhousie Studley campus in order to gauge their perceptions of waste and inefficiencies on campus. The survey was conducted using a hard copy paper survey which was distributed to break rooms and other areas where FM people would likely be present. The survey was comprised of seven questions in total that asked about things such as waste, water use, and energy efficiency. The questions were designed in a way to allow respondents to offer suggestions and opinions based on observations made while working.

The total population for this study was 219 employees, meaning a sample size of 140 respondents was required in order to achieve a confidence interval of 95%. Limitations and flaws in the study design resulted in only 15 respondents completing the survey. A number of challenges lead to this low response rate, including things such as communication and advertising issues.

Despite the low response rate, some interesting results were still collected. When respondents were asked if they believed electricity was used efficiently on campus, 60% of respondents said no. When respondents were asked if they believed water was used efficiently on campus, 46.7% said no and 40% said yes. Since the sample size for the study was so low, these responses are not statistically significant, nor generalizable to the entire population, but they do point to some interesting opinions that could be looked into further by future research in this area.

Overall, this survey of the FM staff at Dalhousie could be improved if further research is done on this population of people. We recommend that staff are surveyed using an online format in order to increase the response rate. We would also recommend communicating directly with both staff and supervisors in order to advertise the survey and inform staff of the purpose of the research.

INTRODUCTION

The goal of this research project is to understand the perceptions of sustainability issues on the Dalhousie Studley campus from the perspective of its FM staff. The FM staff includes maintenance, grounds, and custodial employees. Since these employees are in daily contact with things such as food, water, energy, and waste, our project aimed to understand how FM staff view the efficiency and environmental sustainability of these areas. Seeing as these employees interact with these different areas of waste and energy every day, we felt as though they would be able to provide unique perspectives and opinions regarding sustainability at Dalhousie. We hoped that our survey would give the FM staff an opportunity to voice the things they have identified as wasteful and provide us with valuable suggestions and information on ways to improve sustainability on campus. The research question that guided this study is as follows: What do Facilities Management (FM) staff identify as areas of waste and inefficiencies in the buildings and practices on the Dalhousie Studley campus?

This research project was inspired by a recent study which looks at the significance of sustainable practices on university campuses (Zhang, Williams, Kemp, & Smith, 2011). This study compared a university campus to small towns due to the similarity in population size and resource use. The researchers found that a growth in the university's population size also means a growth in waste and energy consumption, therefore the researchers argue it is our responsibility to improve the environmental sustainability of our educational institutions (Zhang et al. 2011). Dalhousie has already made some commitments changes with regards to environmental sustainability. For example, Dalhousie has signed onto three international agreements and one national agreement that relate to the importance of improving sustainability and protecting the environment (Dalhousie University, n.d.). There have also been a number of policies and plans created that frame how Dalhousie will address environmental and sustainability issues (Dalhousie University, n.d.). One of the policies that address environmental issues and impacts FM is the Green Cleaning Policy (Dalhousie University, 2013). This policy applies to all Dalhousie campuses and focuses on the purchasing of sustainable products, reducing the usage of these products, and reducing waste in general in FM practices (Dalhousie University, 2013). This policy demonstrates that Dalhousie is open to acknowledging areas of concern. However,

Dalhousie can always be working to improve the implementation of the practices outlined in these policies.

Because of the unique and specific population studied, we believe that our research could lead to new ideas and opportunities for improvements on campus that are in line with the agreements that Dalhousie has already signed onto. With this in mind, it was our goal to make recommendations that could potentially be implemented throughout campus.

METHODS

This research used non-probabilistic sampling methods. We took an inductive approach as we began with an observation of what the perceived inefficiencies are at Dalhousie to come to a final theory of what it means for Dalhousie (Palys & Atchison, 2014, p. 11). We also wanted question further where "the common wisdom" about inefficiencies on Studley campus is generated (Palys & Atchison, 2014, p. 35). To answer our research question, we had a target population of FM and custodial staff on the Dalhousie Studley campus. The total population of the staff was 219. Our sample size for a 95% confidence interval was 140 participants. We gained access to this population through the FM Communications Manager, as well as front desk staff at multiple buildings on the Studley campus. To survey the community we used purposive sampling technique of stakeholder sampling (Palys & Atchison, 2014, p. 113). Stakeholder sampling was an appropriate method to use with our intended target population as we only wanted the opinion of a specific group of people, seeing as they are responsible for delivering many of the services related to waste and inefficiencies on campus (Palys & Atchison, 2014, p. 113).

A hard copy paper survey was used to collect data to answer the research question. The survey consisted of a combination of seven, open and close-ended questions. It was useful to have two types of questions because it gave a variety of answers that could be statistically compared as well as allowing participants to give unique answers (Palys & Atchison, 2014, p. 165). After creating the survey, collection boxes were designed to ensure participants' anonymity. The boxes were constructed out of printer paper boxes, with a slit cut through one end and sealed on all other sides with bold coloured tape. A description of the study and a reminder of the survey pick-up date were taped the top of the box. The surveys were distributed

March 13th as a hard copy with collection boxes to the FM Office, Computer Science Building, and the Weldon Law building. The collection boxes were periodically checked to observe response rates and collect completed surveys. It was observed after one week that there was a low response rate therefore collection boxes and surveys were distributed at Howe Hall and Risley Hall as well. The final surveys were collected on March 26th, 2019. Next, we transcribed the open and close-ended questions into spreadsheets. General descriptive statistics were applied to the close-ended questions while the open-ended responses used a combination of deductive and inductive coding.

A number of unforeseen obstacles and learning curves presented themselves throughout this study. One of the main limitations of this research project was the lack of communication between the researchers and our contacts. Slow response times and misunderstandings affected the efficiency of distributing the surveys and therefore limited the number of responses. Another major limitation was the unknown disconnect between the correspondents and the target population due to a lack of access to information on the best methods to reach our target population. This led to a poor advertisement of the survey which may have also affected the response rate.

RESULTS

Since only one specific group (FM staff) was identified in this study, our data did not require any significance testing. The following results are presented using descriptive statistics.

Close-ended questions:

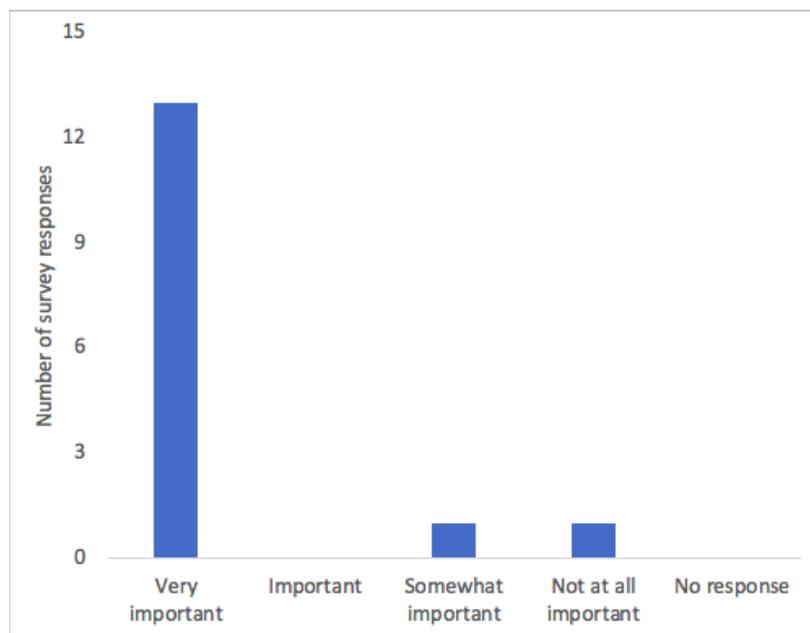


Figure 1. Facilities Management employees' responses to the question "How important are environmentally sustainable practices in your line of work?", delivered on a Likert-type scale. Data collected March 2019 at Dalhousie University (Studley Campus) for ENVS-SUST 3502.

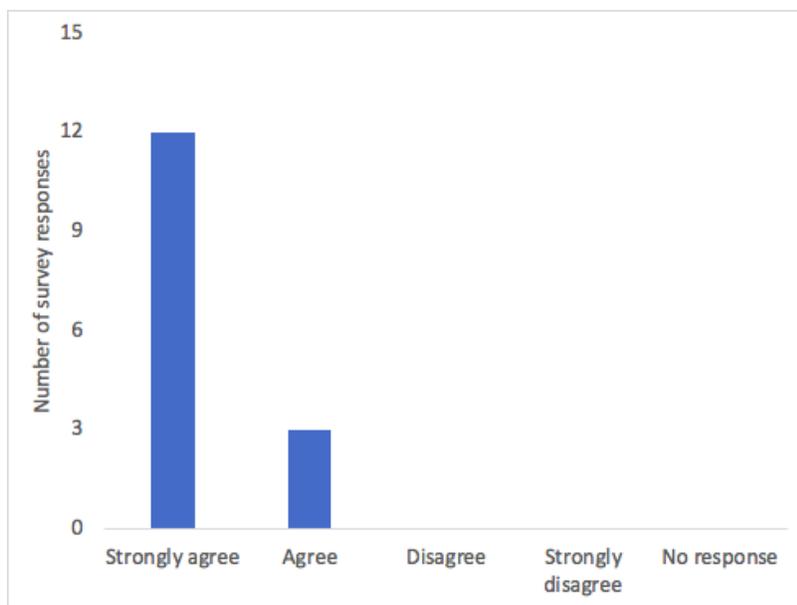


Figure 2. Facilities Management employees' responses to the statement "Excess waste is a significant issue on campus", delivered on a Likert scale. Data collected March 2019 at Dalhousie University (Studley Campus) for ENV5-SUST 3502.

86.7% of participants stated that environmentally sustainable practices were very important in their line of work (Figure 1). 100% of participants stated that excess waste was a significant issue on campus (Figure 2). The responses regarding waste varied slightly, with 12 participants saying they strongly agreed and 3 participants stating they agreed (Figure 2).

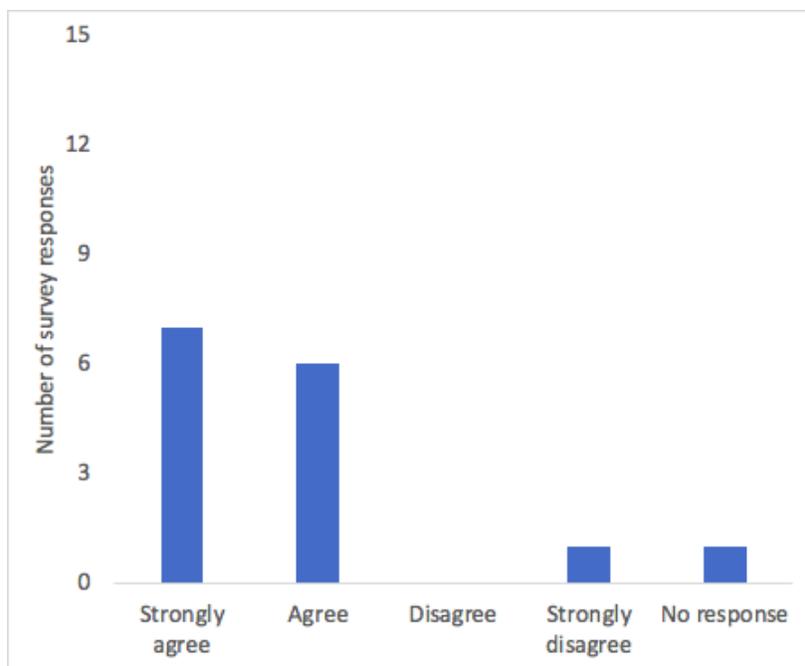


Figure 3. Facilities Management employees' responses to the statement "The implementation of environmentally sustainable practices is a priority for Dalhousie", delivered on a Likert scale. Data collected March 2019 at Dalhousie University (Studley Campus) for ENVS-SUST 3502.

86.7% of participants agreed that environmentally sustainable practices are a priority for Dalhousie. The results for this question were slightly more varied with 7 participants stating they strongly agreed and 6 stating they agreed.

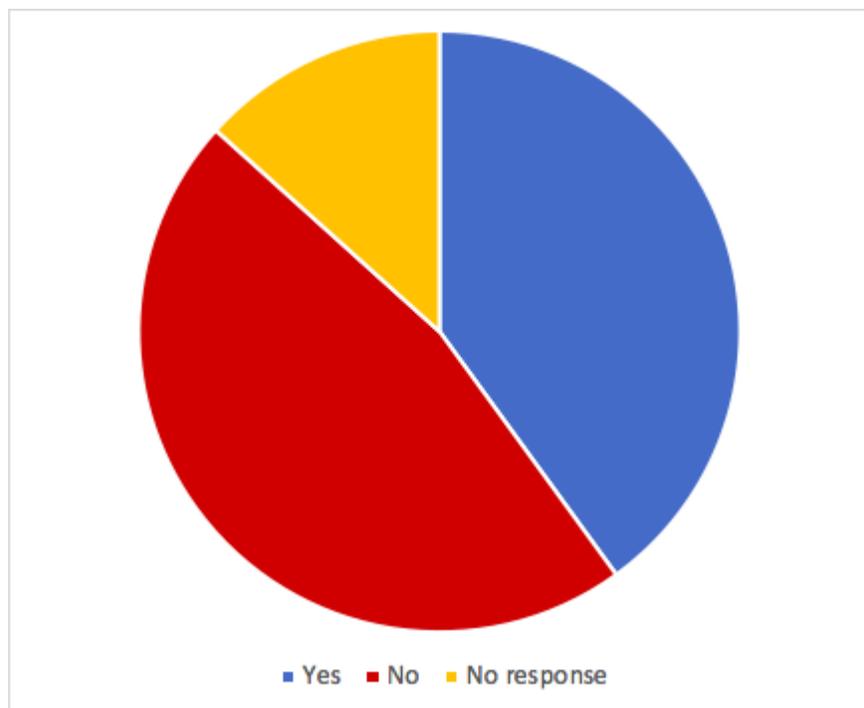


Figure 4. Facilities Management employees' responses to the question "In your opinion, within the context of your work, is water used efficiently on Dalhousie campus?". Data collected March 2019 at Dalhousie University (Studley Campus) for ENV5-SUST 3502.

There was a lack of agreement on the issue of water waste among participants. When asked if water is used efficiently on Dalhousie campus, 46.7% of participants said no, compared to 40.0% who said yes (Figure 4).

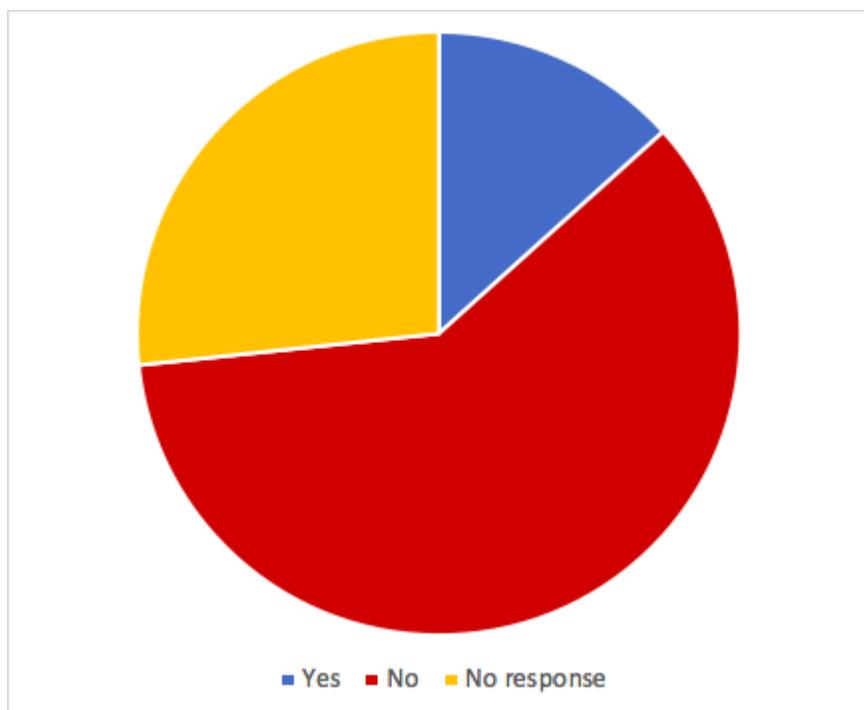


Figure 5. Facilities Management employees' responses to the question "In your opinion, within the context of your work, is electricity used efficiently on Dalhousie campus?". Data collected March 2019 at Dalhousie University (Studley Campus) for ENVS-SUST 3502.

There was a greater consensus among FM staff about electricity waste. When asked if electricity is used efficiently on Dalhousie campus, 60% of participants said no (Figure 5). There were also a greater amount of no responses than other close ended question in the survey (Figure 5). Two participants whom gave no response, indicated in the following open-ended question that they were unsure if their experience with energy efficiency was applicable to all of Dalhousie campus or the context of their work.

Open-ended questions

Participants in this study were asked "In your opinion, within the context of your work, is water used efficiently on Dalhousie Campus?", they were able to circle yes or no, and then we provided an open-ended section where they could explain their response. Of the 15 surveys that were completed, only 10 participants responded to this question. 60% of respondents described inefficiencies in water use at Dalhousie. 40% of these 10 responses indicated washroom faucets

left running by students and staff as notable contributors to water waste. These inefficiencies were also attributed to the slow repair of things such as running toilets and leaky faucets in 30% of these 10 responses. Students were suggested to be the contributors of this water waste in 20% of responses.

The survey also asked for respondent's thoughts on the question "In your opinion, within the context of your work, is electricity used efficiently on Dalhousie Campus?". 10 out of the 15 surveys provided a written response to this question, 90% of which described inefficiencies in electricity use at Dalhousie. 90% of these 10 responses indicated lights being left on in empty rooms as a major contributor to electricity waste at Dalhousie. 40% of respondents suggested that having lights come on only as needed would be a good way to address this issue. Specifically, sensor activated lights or timers were mentioned.

For the question "If you could change one thing within the context of your work, to make Dalhousie more environmentally friendly, what would you change?", there were 11 written survey responses. Of these 11 responses, garbage waste and the proper sorting of said waste was mentioned by 63.6% of participants as something that could be improved. 36.3% of these 11 responses called for better education around waste sorting. 18.1% stated that they would like to see a change in energy waste at Dalhousie, with solar panels and sensor activated lights mentioned specifically.

DISCUSSION

All of the findings and results from this study relate back to our initial research question, which was attempting to understand the areas of waste and inefficiencies that FM employees have identified on the Dalhousie Studley campus. This study intended to provide an opportunity for these employees to offer their opinions and suggestions for ways to improve sustainability and efficiency from a perspective that is not often considered in the upper administration of this institution. By allowing this group an opportunity to offer their perspective on these issues, we gathered some very interesting results and suggestions for improvement.

The results from this study point to some important areas that could be improved on campus, but it is important to note that these results do not represent the perspectives of all FM employees on the Dalhousie Studley campus. As mentioned previously, the total population for this study was 219 employees, meaning we needed to collect a total of 140 responses in order to achieve a confidence of interval 95%. After about 2 weeks of data collection, we received only 15 responses, meaning that the findings from this study are not generalizable or representative of the entire population of FM staff. Despite the lack of a representative sample size, the findings can still be used to identify areas on campus that could warrant more attention. One of these areas is electricity waste. As noted in the results section, 60% of respondents stated that they did not believe electricity was being used efficiently on campus. This was an area where there was more of a consensus on the problem and a possible solution to it. Of the participants who submitted written follow ups to their initial responses 9 out of 10 participants specifically identified the fact that lights were left on for many hours of the day. One participant even identified a storage room light that was left on for 24 hours a day for multiple years. Several participants recommended that the school implement motion activated dimmer switches into all rooms and this would be our suggestion for dealing with this issue as well.

Another issue that stood out in the results was the question about water waste. In our initial planning process we identified water as one of the areas we expected to be major sources of waste. The survey question asking if water was used efficiently on campus returned some interesting results. One of which was the fact that there was a fairly even split with 46.7% saying no and 40% saying yes. Three respondents identified that often they would find dripping taps in the washrooms. Given a similar split in both new and renovated buildings within our study area

as well as the split in our data, one possible explanation could be the age of the faucets as a major cause of the leaks. It is important to note that custodial staff are often assigned to one building meaning that they would only deal with taps of the same age. An area for further research could be to compare the old faucets to the new ones to determine if this is the case. In the responses for the same water question, many respondents also identified the behaviours of students and staff as contributing to the issue of water waste resulting from faucets being left on in publicly used washrooms. Our recommendation would be to replace the old faucets with newer high efficiency ones and also to implement future policies targeted directly at the behaviours of students and staff regarding water use.

In regards to student behaviours around environmental issues, previous research has looked into the connection between students beliefs about the environment, and their actual behaviours. In a study from The Pennsylvania State University, researchers found that while students may identify as “environmentalists” or as having positive environmental attitudes, this does not always translate into environmentally friendly or responsible behaviours (Thapa, 1999). This disconnect between environmental attitudes and environmental behaviours that was identified in this group of students, may also be an issue that is present on the Dalhousie campus. The phenomena identified in this study may be connected to the issue of student and staff behaviour contributing to water waste at Dalhousie as identified in the responses from our survey. If this is the case, more education and programming targeted at improving sustainable behaviours for students and staff may be necessary.

Another recommendation in regards to waste would be to add some sort of training that highlights the importance of sustainable practices in this line of work. This can also be related to a response from the suggestions portion of the survey which stated that in order for Dalhousie to become more environmentally friendly, FM should “Hire one trainer so that all Facilities Management staff are on the same path” (Anonymous, personal communication, 2019). Training in this manner would hopefully serve to increase the number of people who say that sustainability is important in their line of work while also signaling to all employees that these practices are important to Dalhousie seeing as only 86.7% stated that they thought it was a priority for the university.

In the portion of the survey dedicated to suggestions from the FM staff many staff members further identified that garbage sorting was an issue for Dalhousie students. This problem was mentioned by 7 out of the 11 participants who filled in this portion of the survey. Many of these responses highlighted the same area as being the largest source of waste issues, the residence garbage rooms. Based on the low response rate for this question and area of focus, it is difficult to make a suggestion seeing as the responses are not representative for the entire population. Despite not being representative, we believe the number of responses that did identify this as a problem area warrants more attention and research into this specific area.

CONCLUSION

When conducting research into a large and wide ranging issue such as campus waste and inefficiencies, it is important to examine all aspects that play a role in this issue including the thoughts and opinions of facilities and maintenance staff. Our research and final paper should work to fill the gaps in knowledge that Dalhousie might have in terms of its waste reduction plan. It is our hope that this new data can be used to improve on campus sustainability and if the university so wishes, be a starting point in giving the people on the front line of waste disposal a voice in waste reduction strategies.

Overall, our findings indicate that Dalhousie is saying the right things with regards to on campus sustainability issues, but little is actually being done. The results of these closed-ended questions seem to indicate that although the implementation of sustainable practices is indeed a *priority* for Dalhousie, *in practice* there does not appear to be the same commitment to sustainability. Moving forward, Dalhousie needs to create more actionable plans that can be completed on a more frequent basis. Dalhousie also needs to implement strategies for dealing with students lack of interest in properly sorting their waste and turning off lights as these were the most often identified sources of waste on campus. Above all else it is our recommendation that Dalhousie create some sort of continual dialogue with the FM staff to involve their unique insights into future on campus sustainability and waste reduction plans.

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APPENDICES

Appendix i - Blank Survey

Facilities Management Environmental Perspectives Student Survey

This is a research survey conducted for ENVS-SUST3502 Environmental Problem Solving II (Campus as a Living Lab) to try and improve campus sustainability. We believe that the facilities management staff have unique and valuable perspectives of environmental issues on campus and this survey is looking to better understand those perspectives. This survey is completely anonymous and you will not be asked to provide any identifying information. The responses from this survey will be shared in aggregate form only with the ENVS-SUST3502 class, Instructor, teaching assistants and the Sustainability Office. The information will be presented in a cumulative form making it impossible to identify individuals. Quotes may also be shared but there will be no identifying information attached. You have the right to withdraw your participation from the survey at any point while you are writing it. Once you have submitted your survey you will no longer be able to withdraw your participation as it is all anonymous. If you have any additional questions, please contact our team member, Hannah Campbell (hn729962@dal.ca) or, Dr. Amy Mui (amy.mui@dal.ca).

I consent to my responses being used for the purpose of this research project.

1. What department of Facilities Management do you work for?

- a. Facilities person
- b. Custodial Services
- c. Other _____

2. How important are environmentally sustainable practices in your line of work?

- a. Very important
- b. Somewhat important
- c. Not very important
- d. Not at all important

3. Rate how much you agree or disagree with the following statement: Excess waste is a significant issue on campus.

Strongly Agree / Agree / Disagree / Strongly Disagree

4. Rate how much you agree or disagree with the following statement: The implementation of environmentally sustainable practices is a priority for Dalhousie University.

Strongly Agree / Agree / Disagree / Strongly Disagree

5. In your opinion, within the context of your work, is water used efficiently on Dalhousie campus?

- a. Yes
- b. No

Please provide a brief explanation.

6. In your opinion, within the context of your work, is electricity used efficiently on the Dalhousie campus?

- a. Yes
- b. No

Please provide a brief explanation.

7. If you could change one thing within the context of your work, to make Dalhousie more environmentally friendly, what would you change?

Appendix ii - Study Demographic

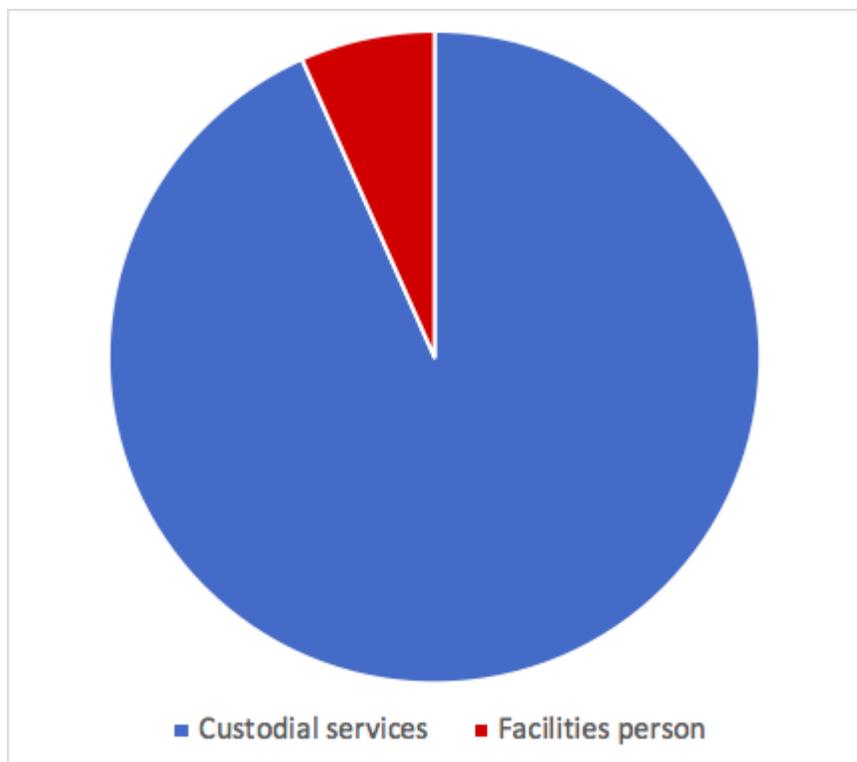


Figure 6 Facilities Management employee's responses to the survey question "What department of Facilities Management do you work for?". Data collected March 2019 at Dalhousie University (Studley Campus) for ENV5-SUST 3502.

Note: This data was not included in the results of our study. When we designed this study we intended to separate our findings into the two demographics of Custodial Services and Facilities. However, we only received one survey response from a Facilities person so we decided against separating out the two different groups.

Appendix iii - Coding for open-ended questions

Note: The coded data was included in this appendix, rather than the raw data, for reasons of confidentiality. The authors felt this to be the best way to protect the anonymity of our survey participants.

Table 1 Coded responses to the open-ended question “In your opinion, within the context of your work, is water used efficiently on Dalhousie campus?”. Data collected March 2019 at Dalhousie University (Studley Campus) for ENVS-SUST 3502. Coding of data was carried out by the authors of this study.

Efficient/Inefficient/Neutral /No response (A priori)	Themes (A posteriori)
Efficient	daily tasks, not in excess
Inefficient	washrooms faucets, students, faculty
Inefficient	embarrassed, appalled, failure, water waste, inefficient, operations
Inefficient	toilets running, slow repair
Inefficient	toilets running, slow repair
No response	-
No response	-
No response	-
Inefficient	washroom faucets, shower, bathtub, students
Inefficient	washroom faucets, long showers

Efficient	not wasting
Neutral	okay, washroom faucets, slow repair
No response	-
No response	-
Efficient	automatic taps, water saving

Table 2 Coded responses to the open-ended question “In your opinion, within the context of your work, is electricity used efficiently on the Dalhousie campus?”. Data collected March 2019 at Dalhousie University (Studley Campus) for ENV5-SUST 3502. Coding of data was carried out by the authors of this study.

Efficient/Inefficient/Neutral /No response (A Priori)	Themes (A posteriori)
Inefficient	waste, sensors, lights
Neutral	computers, servers
No response	-
Inefficient	waste, as needed (sensors?), lights
Inefficient	sensors, lights
No response	-
No response	-
No response	-

Inefficient	waste, students, residence, lights
Inefficient	waste, fridge, lights
Inefficient	improvement, timers (sensors?), lights
Inefficient	lights, residence, waste
Inefficient	lights, t.v., students, buildings
No response	-

Table 3 Coded responses to the open-ended question “If you could change one thing within the context of your work, to make Dalhousie more environmentally friendly, what would you change?”. Data collected March 2019 at Dalhousie University (Studley Campus) for ENVS-SUST 3502. Coding of data was carried out by the authors of this study.

Category (A priori)	Themes (A posteriori)
Electricity	solar panels, energy waste
Waste, Education	education, students, recycling, visual aids, garbage waste, waste sorting
Management	FM leadership, building design, deficiencies
No response	-
Waste	garbage waste
No response	-
No response	-

No response	-
Waste	garbage collection, waste sorting, education, enforcement, students, garbage room (res)
Electricity, Water	energy waste, sensors, water waste, toilets, taps
Waste	surveillance, garbage waste, waste sorting
Waste, Education	students, residence, garbage waste, waste sorting, residence, guidance, education

ACKNOWLEDGEMENTS

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