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Student Assessment of the Environmental Footprint of the McKillop Library, Salve Regina University - Executive Summary

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BIO 140 Humans and Their Environment
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EXECUTIVE SUMMARY

As global warming becomes an ever increasing problem, it is Salve Regina University and the Newport community's job to do their part. In an effort to reduce their carbon footprint, Dr. Chace's Humans' and Their Environment class researched the environmental impact of McKillop library at Salve Regina to gauge it's overall carbon footprint. Our first step was to divide the class into more focused research groups – heating and building, electricity, solid waste, paper waste, and transportation – to more accurately discern the impact the library is having on the environment.

The heating and building group tested for areas of heat loss and temperature change and internal temperature and humidity fluctuation. We also focused on the types of insulation that the building uses and the efficiency of its HVAC – heating, ventilation, and air conditioning – system, as well as the boiler. Finally, we looked at the roof concerns with regards to the leaking problems and have looked into alternatives such as a green roof.

The electricity group focused on the computers, printers, copiers, lights, and elevators in the library and how the library could use their electricity more efficiently. We looked at the electrical bill and used various methods within these subgroups to discover which devices were using up the most electricity.

For the solid waste group, we were mainly focused on how we would be able to eliminate the amount of waste and increase the amount of recycling. The main forms of waste that we found important were ink cartridges, #7 plastic DVD cases, packaging material, books and book covers, and cans and bottles. Dawn Emsellem was a great help in helping us estimate the amount of waste being produced by these products in the library, because there were no exact numbers for any of these types of waste. Our goal was to find a general number of each focus of solid waste, and to find alternatives.

The goals of our project were to determine the amount of the library's paper waste. In order to do this we decided to focus on the total sheets of paper used, the recycling that occurs in the library, the use of recycled paper, and the discarding of books. The methods that were used were talking to library staff about the amount of paper used and the discarding of books, surveying the students who use the library about their recycling practices, and hanging educational flyers about the benefits of recycling.

The transportation group evaluated the carbon emissions of each member of the library staffs vehicles. In order to calculate the overall figure, we sent a mass email to the entire staff asking the type of car they drive and

how far their commute is. Using the data from the type of vehicles, we figured out the average miles per gallon and used a mathematical equation to get the carbon dioxide stamp. We also looked into the option of utilizing the existing public transportation.

As a result, we have discovered the inefficiencies of the library's heating practices and have found other options for the library to consider involving the roof as well as providing facts and figures. The main problem seems to lie in the inefficiencies of the HVAC system. The heating and temperature fluctuations residing on every floor of the library are evident without the use of technology. Simply walking from floor to floor, or even areas of the same floor, it is clear the issue resides. It seems the only solution would be to replace the faulty system. Another option would be to find a heating system that would allow more control of heat in different areas of the building. In addition, the library could invest in installing quality shades in the high sun areas as to allow the temperature inside the library to remain stable. For a more immediate impact, it might be in the library's best interest to lower the average temperature of the building all together about 2-3˚F. Finally, we found to control the leaking and roof issues withstanding, another costly but economically efficient solution in the long run would to be to install a green roof.

We have found that the library is not always using electricity effectively and responsibly. There are lights on when nobody is around and there are computers on when students are not using them. We have discovered that McKillop Library can reduce their greenhouse gas emissions by switching their electricity to GreenStart electricity. By switching to GreenStart electricity through National Grid, the McKillop Library can reduce their carbon dioxide emissions from 965.47 pounds per megawatt to 121.2 pounds per megawatts. The library would also greatly reduce their sulfur dioxide and nitrogen oxide emissions; sulfur dioxide from 896.26 pounds per megawatt to 60.3 pounds per megawatt and oxide emissions from 965.47 pounds per megawatt to 334.2 pounds per megawatts. This solution would increase costs, but if the library executes our other recommendations of shutting off appliances when not in use, it should balance the cost and meet Salve Regina University's goals of stewardship and sustainability.

Although solid waste seems as though it would not be as important to focus on as what the other groups have researched, it can contribute to the decrease of waste in its own right. Currently, $10,000 per year is being spent on ink cartridges. The ink cartridges can be reused, which will reduce how many are being thrown away and it will also do a great deal to reduce the cost by 50-80 percent, since new ink cartridges are much more expensive. Our second focus was #7 plastic DVD cases. About 600 DVDs were received by the library between July 1, 2007

and June 30, 2008. Recently, changing to the Red Tag system caused about 2,400 DVD cases to be thrown away, and our solution for that would be to find an alternative to having hard copies of DVDs by perhaps using an online movie service. Packaging materials do not produce quite this much waste, but currently 20 cardboard boxes are being recycled each week, and 2,000 plastic bags from inside the packages are being thrown away. It is difficult to tell the suppliers how to package their goods, but the library itself can make a change but using more earth-friendly packaging materials such as paper or biodegradable foam peanuts. Books are a huge form of waste in the library, mainly because of the hard book covers that cannot be recycled. About 2,000 are discarded each year, but the exact number is not known. Our suggestion would be for the library to keep better track of the amount of books actually being thrown away in order to see what the amount of waste is before we try to reduce it. Finally, cans and bottles are something that also needs to be focused on because students bring these into the library, and it is important that these are recycled rather than being thrown in the general trash. There are 28 trash bins on the first floor, 17 on the second floor, and 6 on the third. There were recyclables found in several of them, so our plan of action would be to add more recycling bins to each floor in a central location in order to motivate the students to recycle as much as possible.

After researching the amount of paper waste in McKillop Library, the results we found were that overall more could be done to limit the environmental impact the library has due to the amount of paper waste. There are recommendations that can help reduce the amount of paper waste. In the short term, the library could rearrange the location of the trash barrels and the recycling bins. Having an overwhelming amount of trash barrels could inhibit the amount of paper recycling. Also the library could closely monitor the janitorial staff to make sure that the recycled products are being placed in the recycling bins and not in the dumpster with trash.

After receiving the answered questionnaire from the staff, we started with the type of vehicle. For each car, we calculated the average miles per gallon. After getting the average, we multiplied that number by 19.4 lbs of CO2 per gallon. Using this information, we are able to calculate the exact amount of pounds of carbon dioxide each of their cars put into the atmosphere on their daily commute to work each day. After calculating each car's CO2 emission, we simply multiplied by 5 to get the weekly total, and then multiplied by 4 to get the monthly total. We found that each month, the staff releases 2,760 pounds of carbon dioxide into the atmosphere just by driving to work. We obtained a list of where the library staff lives in order to determine alternative transportation routes to increase vehicle efficiency and reduce carbon dioxide emissions. With the data and implementation of the methods,

the library staff will have a good idea as to where RIPTA services are in their area. After conducting our research we found that the library can greatly reduce their carbon emissions by driving less, driving more fuel efficient vehicles, and utilizing public transportation.

The library has a large impact on the environment due to the five areas of study. Our groups have come up with helpful recommendations based on extensive research and hopes that the library staff and the University administration will consider the majority of these options. The heating inefficiencies of the building mainly lie in the replacement of the HVAC system, as well as a possibly reducing the overall temperature of the library. It is also plausible to consider the replacing of the roof to one a green roof. The library should also shut off devices such as computers, printers, copiers when they are not in use and dim the lighting where it is still adequate for studying. To switch to the GreenStart through National Grid would also greatly reduce the library's impact on the environment. Switching to alternative methods of discarding solid waste would mean a lot less going to the landfills and more items being recycled**.** Adding recycling bins and keeping track of exactly how much waste is being produced is something of great importance to the library, and finding out alternative methods to what is being done with DVD cases and packaging materials would also lessen the amount of solid waste. Close monitoring of the janitorial process would greatly improve the paper waste practices of the library. The rearranging as well as addition of more paper recycle bins versus trash cans would be beneficial. Utilizing RIPTA would be extremely beneficial to the environment. We understand that people enjoy driving their cars for a variety of reasons, so the director of the library could possible come up with some sort of incentive to encourage the staff to ride the bus.