

Camden Park Environmental Education Centre

Environmental Audit Report For Public School

Prepared by Year 4 and 5 students and Mr with the assistance of the staff of Camden Park EEC.

The findings in this report will provide baseline data to assist the school in developing a School Environmental Management Plan (SEMP).

1. Solid Waste Audit

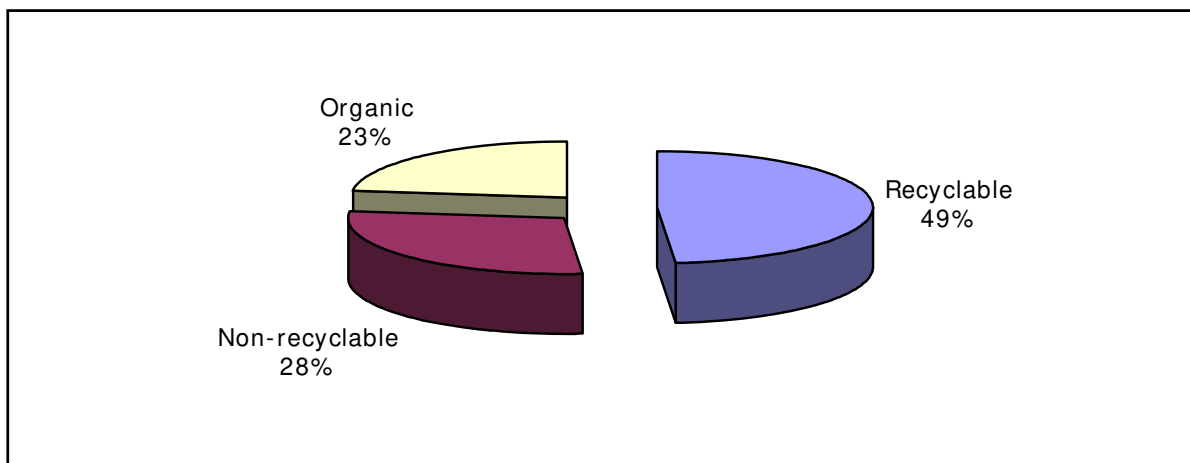
The solid waste audit involved students sorting through and classifying the previous days waste. The aim is to reduce the amount of landfill, as well as cutting the schools waste removal costs which are approximately \$1235 per year.

The solid waste sampling procedure enabled the students to visualise the total amount of solid waste generated in one day and the proportion of the waste that could have been composted, avoided, re- used or recycled.

Bin volume was used as a unit of measurement as it is easier for stage 1 – 3 students to visualise number of bins than relative weights. It is generally accepted, however, that relative weight is more meaningful as a measure of the amount of waste generated and schools which choose to target this aspect of school management may wish to consider auditing waste by weight.

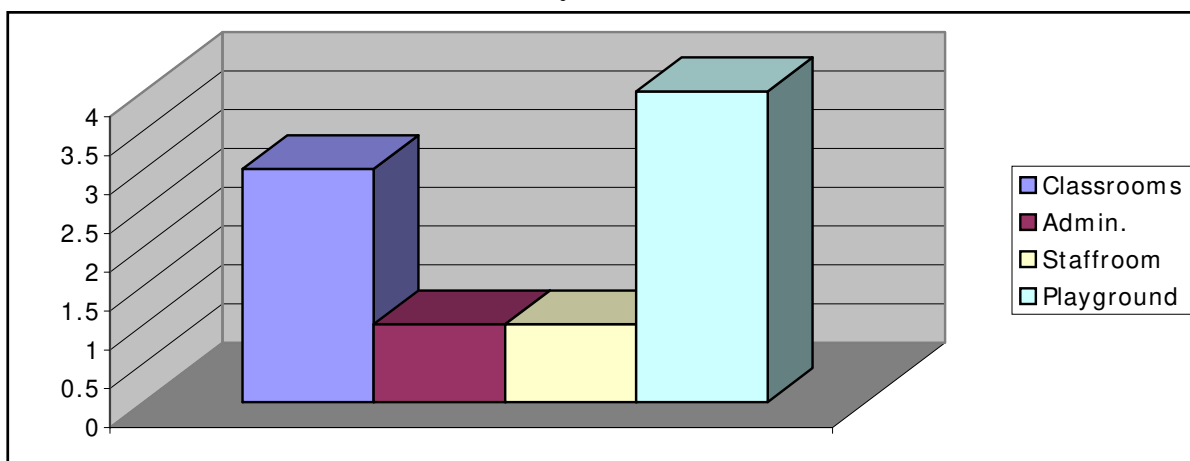
The graph below represents a summary of student results.

Proportion of Waste Sampled



Volumes were sourced overwhelmingly from playground areas:

Waste by School Area



The most interesting aspect of these results is the proportion of recyclable materials found in waste. At almost 50% this is double the usual for schools we have audited and is probably due in part to the absence of any recycling program. While it is understood that the school has considered these programs before and been reluctant to pursue them for security reasons, the benefits of introducing a recycling program are too great to ignore, based on students' findings. While the risk of storing a dumpster of paper in a wooden school is certainly worth considering, establishment of a recycling program has been included in the "Suggestions" section below, in the hope solutions to security issues can be identified.

Apart from minimising non-recyclable food packaging, the school could reduce waste to landfill by approximately 72%, with the implementation of composting strategies and the establishment

of a recycling program. This would mean a saving in monetary terms of up to \$890 from waste removal and a saving in environmental terms several thousand tonnes of landfill per year.

In addition, much of the organic waste was represented by whole, uneaten food items. These items were separated and their retail value estimated at \$15 (or \$75 per week). This amount of uneaten food is equal to the average we have found in the Campbelltown District for a school this size. Nevertheless, it still suggests \$3000 per year of wasted food items.

2. Biodiversity Audit

The Biodiversity Audit involved students surveying the school grounds to determine the level of biodiversity of flora and fauna in evidence. Biodiversity is the web of life. There are a variety of living things that are found within the school co-existing with the activities of students and teachers. This includes the trees, shrubs and smaller plants and grass as well as birds, mammals and small invertebrates such as spiders and insects.

The aim was to quantify the area of the school covered by vegetation and hence the level of habitats which could support a variety of species, as well as providing recommendations for increasing the biodiversity of the grounds.

The students used a base map of the school grounds, and marked in the various vegetated areas, (see attachments). This map was then used to complete a profile of the various areas that were assessed for their support of biodiversity. Students also surveyed the number and species of birds and insects found in different areas of the school and these were used as indicators for the purpose of comparison.

Overview of results

Students surveyed a wide range of species. Results and student suggestions are detailed on the two Biodiversity charts attached. In summary, compared with other local schools, insect sample numbers were low, bird species count high and biodiversity higher in garden beds and wooded areas than concrete. Bird boxes were impressive and it was considered that several areas could be easily incorporated into an holistic school learnscape. An increase in plantings of native shrubs to encourage smaller birds was recommended, though it was also determined that major bee attractors such as Grevilleas might best be moved from central playground areas.

3. Energy Audit

The Energy audit involved students surveying the school buildings to determine the level of energy used within various sectors of the school. This was accompanied by an historical analysis of the schools energy bills to reflect the long-term pattern of energy use within the school.

The aim was to determine the areas of the school that used the most energy and to provide recommendations for the reduction in the school's overall energy use. This would lead to a saving in school funds and also the environment through the reduction of greenhouse gases.

The students used a table to identify the various electrical appliances used in each room as well as communal areas. They converted this information on a computer to calculate the wattage of electricity used in various areas of the school. This provided a profile of the various school blocks which were assessed for their energy use.

Results

Practical analysis of energy use in the school

This analysis details all lights, ovens, heaters, air conditioners, video recorders etc which can possibly be used in each room in the school. The total electricity in kWh was then estimated per year, using the Department of Education and Training Electricity Manual and Greenhouse Cost Calculator. The following graph shows an estimate of the total energy usage for different locations in the school:

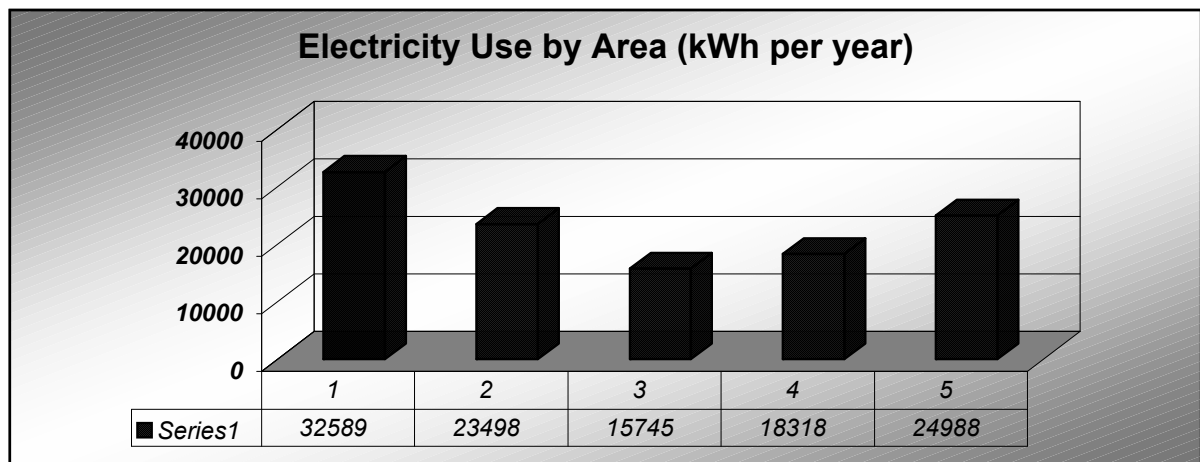
Group A – hall area

Group B – B block classrooms

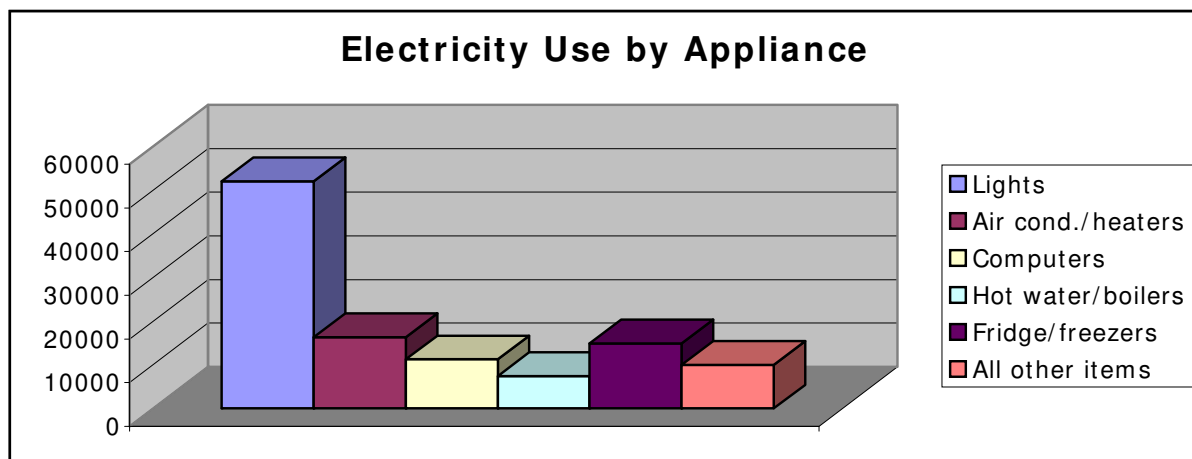
Group C – C block classrooms and portable near hall

Group D – D block classrooms

Group E – Admin block



Lights consumed more energy than any other single item, which is the most usual situation in schools, though not normally to the extent found at PS. Air conditioners and water heaters would usually be expected to account for a higher proportion of electricity usage which may just indicate a well designed school with an unusually high number of outside security lights. A light meter check did find some areas of the school which were excessively lit but not the majority (see section on light monitoring, below).



Light monitoring

The intensity of light in various areas of the school was checked against Australian standards' light intensity recommendations for various uses. It was found that with a couple of notable exceptions, light intensity was very close to recommended standards. Exceptions included the hall, wet areas and toilets, which were overlit with lights on (particularly the hall) and were sufficiently well-lit without any lights on during sunny weather. Students felt the wet areas were used mostly as a corridor and yet lights were left on all day.

4. Water/Storm Water Audit

The water/stormwater audit involved students surveying the school grounds to determine the level of water use within various sectors of the school. Problem areas where water may have been wasted through dripping/ leaking taps and toilets etc were also investigated.

Students also examined the stormwater drains to identify if there was any debris located in the drains which could lead to contamination of the stormwater and hence pollution of the surrounding catchment. Such pollution would be illegal under the Protection of the Environment Operations Act (1997).

The aim was to determine the school's water use and provide recommendations for the reduction in the water consumption, thereby saving money and the environment through the conservation strategies.

Results

Survey of water devices:

Outlet	Number	Water-saving devices	Broken and leaking	Leaking (left on)
Taps	66	-	3	4
Bubblers	14	14	1	0
Zips	3	3		0
Toilets	18	12	0	0
Showers	4	0	0	0
Dishwasher		0	0	0

Tests carried out showed that total water wasted from three dripping outlets was 79 litres in 24 hours. At \$0.93 per kilolitre, this would equate to a cost of \$26 per annum but a more significant factor is the environmental consequence of wasting over 29,000 litres of potable water each year. One problem noticed was that some taps were not turned off properly. Nevertheless, this figure is low compared with schools of similar size and indicates a high level of school maintenance.

This leakage was confirmed by a meter reading that indicated approximately the same amount was lost during the night. This indicates that losses from the system are due almost entirely to above-ground causes (no or very little underground leakage).

Survey of Stormwater drains:

Contents of drains were checked for debris and this debris was sorted into organic debris and litter.

The relatively high proportion of organic matter resulted from lawn clippings and garden mulch run-off and, at a total of seven 30 litre buckets, is about average (certainly much less than the council drain beside the school, indicating a good level of maintenance). Regular cleaning of stormwater drains will prevent most of this debris from entering waterways. The amount of litter retrieved, however, was quite high particularly in playground areas

Recommendations

The following recommendations were devised by the students and audit team to suggest ways to improve the schools environment.

Solid waste audit:

- Consider changing the present lunchtime arrangements so that students eat inside their classrooms. While this will be a significant change in student and staff conditions, we believe it offers the following benefits:
 - greater control over student eating habits, and reduction in whole food items uneaten (schools that have classroom-lunch typically have no whole food items in their solid waste audit)

- marked reduction in playground litter, with an associated improved visual amenity, improved storm water run-off (presently in breach of law) and a beneficial impact on bird and reptile populations
 - opportunity to include food-associated litter in a school recycling program,
 - a better situation to introduce an effective organic recycling program, such as a worm farm or compost system, greatly reducing waste costs and landfill
 - benefits in effective learning associated with recycling and other life skills
- create awareness amongst students about items which are best to avoid to reduce waste, eg lunch boxes and drink bottles instead of glad wrap and poppers.
- Encourage students to discuss items they prefer to eat, and those they will not eat
 - Hold a “Recycling Day” to raise awareness
 - Have a “craft with recycled objects activity
 - Investigate new government recycling contracts (due to be released in October 2003) and set up a whole-school recycling program

Biodiversity audit:

Student suggestions to improve biodiversity:

- Continue to choose native trees in new plantings, particularly dense shrub species
- Consider including bird baths in established gardens
- Introduce more leaf litter to nature areas, as well as rocks and logs into gardens
- maintain nest boxes where practicable to ensure their use by desirable wildlife such as native birds and mammals.
- Increase the variety of layers in the gardens (see comment re. shrubs, above). Introducing some spiky plants near birdbaths will protect small birds such as Honeyeaters.
- reducing playground litter will discourage larger birds such as ravens and noisy minors which, though native, are aggressive species and reduce more diverse populations of smaller birds through predation and territorial behaviour, and small reptiles through predation.
- Other recommendations outlined on attached map

Water / Stormwater audit:

- alert students of the need to turn off taps properly. (Perhaps a design competition for stickers)
- continue to establish mainly native plants in gardens
- continue to clean out drains regularly to ensure 'the drain is just for rain'

- sweep areas around drains rather than hosing
- reduce playground litter

Energy audit:

- put timers on hot water (Zip) units, timed to be on between 7 am and 4 pm
- turn off Zips, hot water systems and refrigerators over the holidays
- use the air conditioners only when necessary and trial using timers on the air conditioners
- conduct investigations to determine the highest, comfortable temperature at which to set air conditioners in summer
- turn fans on low while heaters are in use in the library (circulation important in high-ceilinged rooms)
- raise awareness of the importance of turning lights off (focus on lunch time first)

The audit team including staff from Camden Park EEC enjoyed working with the students, staff and principal at Public School. The school is to be congratulated on their commitment to the integration of environmental education within the curriculum and their efforts in striving to manage their school sustainably.