

Our Carbon Footprint

October 2007

Please do not print unnecessarily



INITIAL ENVIRONMENTAL ASSESSMENT

Introduction

This report covers the period 1 August 2006 to 31 July 2007, and is Somerset College's first assessment of a wide range of environmental indicators.

The College is gaining publicity for its commitment to sustainability through the Genesis Project ^{*}, and the development of education for sustainable development (ESD) in the curriculum. The College is keen to extend this commitment to developing the sustainability of the college campus.

The Climate Change Bill is due to be announced this autumn. It will commit the UK to reduce carbon dioxide (CO₂) emissions, and will require the College to set challenging targets to reduce its own the carbon footprint. Carbon dioxide (CO₂) is used as a sustainability indicator as it is one of the major greenhouse gases.

Aim of the Study

To assess the College's carbon footprint as well as other environmental indicators as a means of identifying the impact that the College has on the environment.

This will then allow Somerset College to:

- use this as a baseline by which future improvements can be measured against
- use the data in communicating the environmental performance of the College both internally and to external audiences
- prioritise action in areas of greatest environmental impact or savings potential

The areas covered in this report are under the following headings:

Part One College carbon footprint

Part Two Further background information on carbon footprint areas

^{*} Further information available at
www.genesisproject.com

Scope of the Study

The study covers the environmental impacts of all sites of the College. Although the energy consumption of the shops and catering facilities are included in the site total, other environmental impacts concerning these businesses are not included in the report. These operations are run separately to the Campus, and will require individual studies.

Profile of Somerset College

Staff and students

Somerset College provides both Higher and Further education, with numbers as follows ¹:

	FULL-TIME	PART-TIME *
Higher Education	559	428
Further Education	1,710	3,316
TOTALS	2,269	3,744

** Part-time includes any student that is not full-time. This includes distance learners, students studying off-site, those that attend College once during the course, as well as those students that attend College weekly.*

There are around 670 permanent staff in the College, plus a number of casual staff.

Sites

Somerset College operates over four sites in Taunton as follows:

- Main site - Wellington Road: This is the main College campus, accommodating the administration and the majority of learning areas.
- Canonsgrove: Student accommodation 3 miles from the main site. It provides accommodation for 176 HE students. There are also 30 student kitchens; a laundry room; a sports hall; a bar; and an internet café on the site.
- Bishops Hull: An old school, housing the performing arts, half a mile from the main site.
- Galmington: This is the motor mechanics workshop, again half a mile from the main site.

Sustainability at Somerset College

A number of staff groups (co-operative inquiry groups) work together in the college, looking at various sustainability issues. The issue of the carbon footprint of the College is of interest to these groups, and a number of groups have based inquiries into trying out ways of reducing the carbon footprint. The ideas from these inquiry groups will soon be fed into a new co-operative inquiry group focussing specifically on campus sustainability.

¹ As at 29 October 2007

PART ONE: COLLEGE CARBON FOOTPRINT

Somerset College's carbon footprint has been calculated using the Greenhouse Gas Protocol Corporate and Reporting Standards ².

Somerset College's operational boundary includes emissions from the following sources:

- use of natural gas at the Main Site, Bishops Hull and Galmington
- use of oil at Canonsgrove
- electricity use at all four sites
- fuel use from College owned vehicles

Due to incomplete data, the study excludes the following, but would recommend including these in any future reports

- business travel via car, bus, train and air (this includes business meetings, inter-site trips and student trips)
- employee commuting
- student commuting

These emissions are reported as follows:

- Scope 1 (direct emissions)
 - emissions from natural gas use at the Main Site, Bishops Hull and Galmington
 - emissions from use of oil at Canonsgrove
 - emissions from College owned vehicles
- Scope 2 (indirect emissions from purchased electricity, steam or heat)
 - emissions from electricity use in all locations
- Scope 3 (other indirect emissions):
 - production of paper
 - use of water
 - and decomposition of landfilled waste

² *Greenhouse Gas Protocol Corporate and Reporting Standards. Published by World Resources Institute and World Business Council for Sustainable Development; available on www.ghgprotocol.org*

Scope 1 (Direct Emissions)

- emissions from natural gas use at the Main Site, Bishops Hull and Galmington
- emissions from use of oil at Canonsgrove
- emissions from College owned vehicles

Natural Gas

Natural gas is used for heating and hot water at the Main Campus (Wellington Road), Bishops Hull and Galmington. Consumption is as follows ³:

Main Campus ⁴	4,417,298 kWh equates to 818.63 tonnes CO ₂
Galmington	85,500 kWh equates to 15.85 tonnes CO ₂
Bishops Hull	199,779 kWh equates to 35.54 tonnes CO ₂
TOTAL	870.02 tonnes CO₂

Gas Oil

Gas oil is used for heating and hot water in the Brendon building at Canonsgrove. Consumption is as follows:

Canonsgrove	7,059 litres equates to 18.99 tonnes CO ₂
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Vehicle Fuel Use

Somerset College owns two vehicles: a van used by Estates, and a minibus based at Canonsgrove halls of residence. Fuel use for these vehicles for the year is as follows ⁵:

Estates van	406.37 litres diesel equates to 1.07 tonnes CO ₂
Minibus	57.67 litres diesel equates to 0.15 tonnes CO ₂
TOTAL	1.22 tonnes CO₂

SUMMARY

Scope 1	870.02 tonnes of CO ₂ (from natural gas)
	18.99 tonnes of CO ₂ (from oil)
	1.22 tonnes of CO ₂ (from College owned vehicles)
SUBTOTAL	890.23 tonnes of CO₂

³ Data taken from end of year report produced by Utility Cost Analysis Ltd, the Energy Bureau used by Somerset College

⁴ Includes the main college, nursery, and the Elms

⁵ Data taken from fuel card use (Wellington Service Station invoices)

Scope 2 (*Indirect emissions from purchased electricity, steam or heat*)

Emissions from electricity use in all locations.

Electricity

Consumption across the four sites is as follows ⁶:

Main Campus ⁷	2,398,451 kWh equates to 1,119.86 tonnes CO ₂
Canonsgrove	504,775 kWh equates to 235.68 tonnes CO ₂
Galmington	67,174 kWh equates to 31.36 tonnes CO ₂
Bishops Hull	26,968 kWh equates to 12.59 tonnes CO ₂
TOTAL	1,399.49 tonnes CO₂

SUMMARY

Scope 2	1,399.49 tonnes of CO ₂ (<i>from purchased electricity</i>)
SUBTOTAL	1,399.49 tonnes of CO₂

⁶ Data taken from end of year report produced by Utility Cost Analysis Ltd, the energy bureau used by Somerset College

⁷ Includes the main college, nursery, and the Elms

Scope 3 (Other Indirect Emissions)

Use of paper, water and decomposition of landfilled waste.

Paper

26.19 tonnes of paper was purchased in 2006/7. This accounts for A4 and A3 white and colour paper (of various weights) used by the Integrated Learning Centres and reprographics. This figure does not include rolls of paper, journals and magazines also purchased by the College.

The embodied energy (ie energy used in the manufacture and transport of the paper) is included in this carbon footprint, as it is considered significant to the College's total footprint. The embodied energy CO₂ calculation includes the CO₂ released in the decomposition of paper. Although it is not ideal to have this included, it is preferable to have this data rather than no paper CO₂ data. This will be improved for 2007/08.

Embodied energy in 26.19 tonnes paper purchased equates to 74.51 tonnes CO₂ ⁸.

Water

In 2006/7, 30,339,000 litres of water was consumed over the four College sites. This produced 12.51 tonnes of embodied CO₂ emissions ⁹ from the electricity used to supply the water, and treat the wastewater. This is broken down as follows:

Main campus ¹⁰	25,930,000 litres equates to 10.69 tonnes CO ₂
Canonsgrove	4,232,000 litres equates to 1.75 tonnes CO ₂
Bishops Hull	177,000 litres equates to 0.07 tonnes CO ₂
Galmington	<i>no data available for Galmington</i>
TOTAL	30,339,000 litres 12.51 tonnes CO₂

Waste

In 2006/7, 253.50 tonnes of waste was landfilled. This was generated from all sites, and includes waste from skips. Carbon dioxide emissions from landfilling this waste equates to 65.15 tonnes.

SUMMARY

Scope 3	74.51 tonnes of CO ₂ (from production of paper)
	12.51 tonnes of CO ₂ (from use of water)
	65.15 tonnes of CO ₂ (from decomposition of landfill)
TOTAL	152.17 tonnes of CO₂

⁸ Using www.papercalculator.org for calculations. Although this also includes CO₂ from landfill of paper in the calculation, it was considered important to report a CO₂ for paper use in this inventory.

⁹ Using data from the Watermark Project, May 2003.

¹⁰ Using data from Estates spreadsheet for the main site, and Wessex Water bills for other sites.

CO₂ emissions for 2006/7

Scope 1	870.02 tonnes of CO ₂ <i>(from natural gas)</i>
	8.99 tonnes of CO ₂ <i>(from oil)</i>
	1.22 tonnes of CO ₂ <i>(from College owned vehicles)</i>
SUBTOTAL	890.23 tonnes of CO₂

Scope 2	1,399.49 tonnes of CO ₂ <i>(from purchased electricity)</i>
SUBTOTAL	1,399.49 tonnes of CO₂

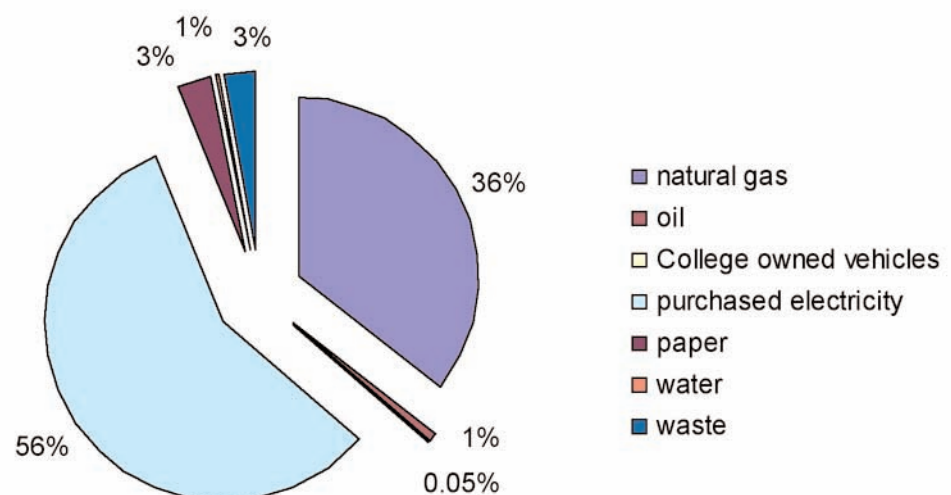
Scope 3	74.51 tonnes of CO ₂ <i>(from paper)</i>
	12.51 tonnes of CO ₂ <i>(from use of water)</i>
	65.15 tonnes of CO ₂ <i>(from decomposition of landfill)</i>
SUBTOTAL	152.17 tonnes of CO₂

Total CO₂ emissions <i>(total of subtotals of Scopes 1, 2 and 3)</i>	2,441.89 tonnes of CO₂
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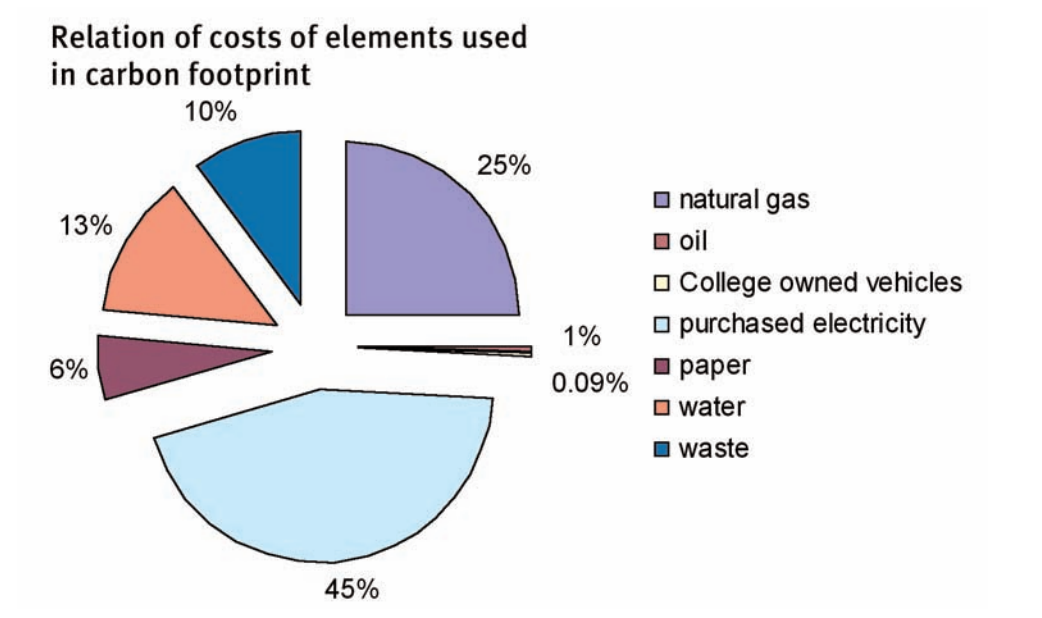
2441.89 tonnes of CO₂ is roughly equivalent to:

- The emissions from driving 12 million kilometres (around the world 302 times)
- CO₂ emissions from 407 households
- 11 times the weight of the rubbish the College throws away each year.

CO₂ emissions are broken down into the different areas as follows:

Carbon Footprint 2006/7 - CO₂

To compare where the CO₂ is produced in relation to the cost of the different elements of the carbon footprint:



Order of elements in terms of CO2 (highest impact first)	Order of elements in terms of cost (highest cost first)
Electricity	Electricity
Gas	Gas
Paper	Water
Waste	Waste
Oil	Paper
Water	Oil
College-owned vehicles	College-owned vehicles

PART TWO: FURTHER DETAIL ON CARBON FOOTPRINT AREAS

In descending order, with the element with the highest CO₂ first:

- Electricity
- Gas
- Paper
- Waste
- Oil
- Water
- College-owned vehicles

Electricity

Data collection

Data has been gathered from the Summary of Electricity and Gas Report produced by the energy bureau Utility Cost Analysis Ltd, the College's energy bureau.

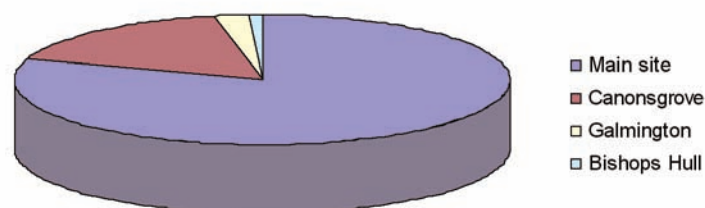
Consumption

ELECTRICITY	KWH	COST (£)	CO ₂ (TONNES)
Main site	2,398,451	£151,230.00	1,119.86
Canonsgrove	504,775	£39,593.44	235.68
Galmington	67,174	£6,274.55	31.36
Bishops Hull	26,968	£2,670.14	12.59
TOTAL	2,997,368	£ 199,768.13	1,399.50

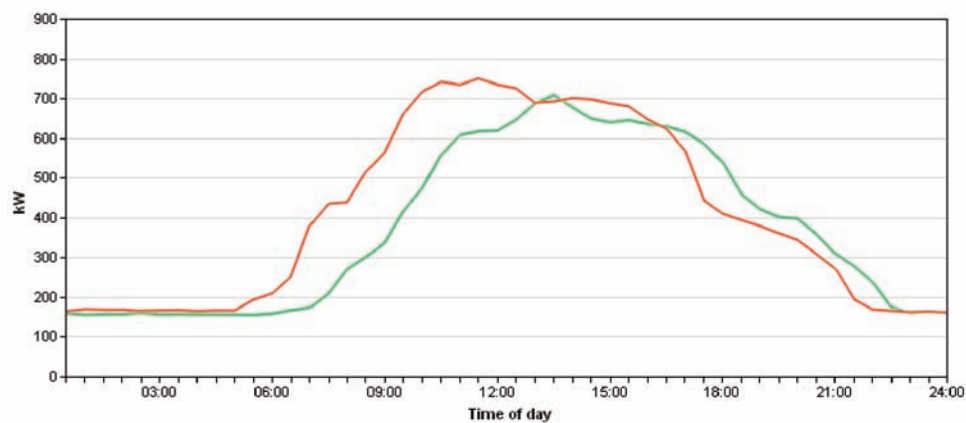
Where is it used?

This electricity use covers all of the College sites, as can be seen on the graph below. The main users of electricity are the main site on Wellington Road, and the Canonsgrove Halls of Residence, as can be seen in the graph below. Wellington Road data includes electricity used at The Elms and the Nursery.

Electricity consumption 2006/7 (kWh)



Profiles of typical 24 hour consumption, summer and winter, at the main site (Wellington Road) can be seen in the graph below.



Red line showing profile for main site Tuesday 16 January 2007

Green line showing profile for main site Tuesday 19 June 2007

Controls and housekeeping

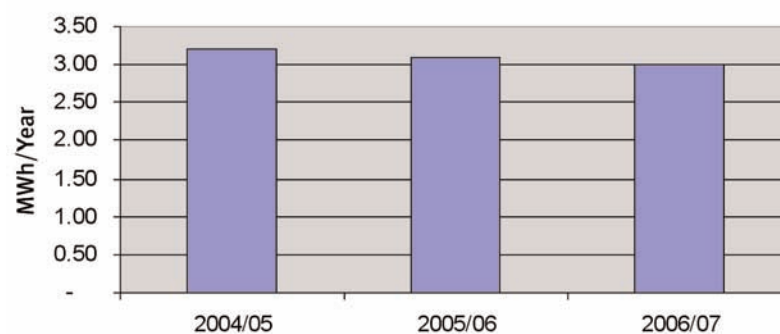
The electricity on the main College site is used for equipment, lighting and air conditioning of which there is no central control. Efficient use of electricity relies on staff and students taking responsibility for turning equipment, lights and air conditioning off when it is not in use.

Air handling units also use electricity, and are controlled by the Building Management System by Estates.

Trends

Electricity consumption in 2006/7 was 3% lower than in 2005/6.

Electricity consumption 2004/5 - 2006/7



Gas

Data collection

Data has been gathered from the Summary of Electricity and Gas Report produced by the energy bureau Utility Cost Analysis Ltd, the College's energy bureau.

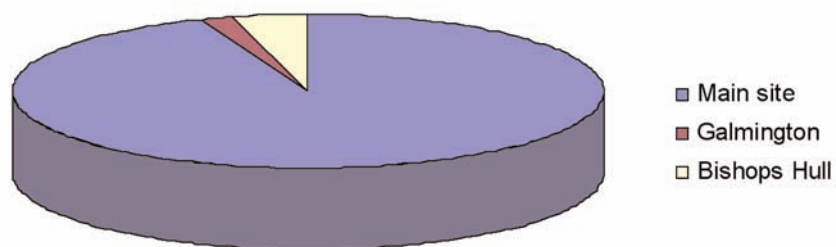
Consumption

GAS	KWH	COST (£)	CO2 (TONNES)
Main site	4,417,298	£101,801.25	818.63
Galmington	85,500	£2,892.47	15.85
Bishops Hull	191,779	£4,419.74	35.54
TOTAL	4,694,577	£109,113.46	870.02

Where is it used?

This gas use covers all of the College sites, as can be seen on the graph below. The users of gas are the main site on Wellington Road (includes the Nursery and The Elms), Bishops Hull, and the motor works at Galmington.

Gas consumption 2006/7 (kWh)



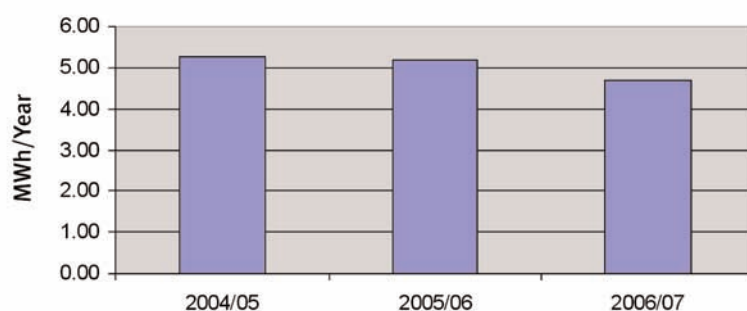
Controls and housekeeping

The gas on the main College site is used for heating the buildings and hot water. Consumption depends on a number of factors including outside temperatures, and occupancy of the buildings.

Trends

Gas consumption in 2006/7 was 10% lower than in 2005/6. This reduction can be seen in the graph below.

Gas consumption 2004/5 - 2006/7



Paper

Data collection

Data has been gathered using records kept by Jan Kingswell, recording paper ordered over the year 2006/7. Estimates have been calculated from this data as to the equivalent weight of A4 white paper used. This data was then put into the Paper Calculator (www.papercalculator.org) to establish the Carbon Dioxide equivalent for the production and disposal of the paper used on site.

Consumption

PAPER	A4 REAMS EQUIVALENT (TONNES)	COST (£)	CO2 (TONNES)
All sites	26.195	£ 29,739.15	74.51

Where is it used?

Paper is used primarily in the ILC printers, staff room printers, photocopiers, and in reprographics. Academic staff and students are given printing allowances for use of the ILC printers, and photocopying is monitored by use of accounts for each department.

Controls and housekeeping

Other than the printing allowances, there is little incentive to reduce paper consumption. For instance, there is no financial incentive to duplex print (print back-to-back), as this costs the same as two single sided copies. A number of printers around the College (outside of the ILCs) do not have a duplex function. A lot of paper sent to printers is never collected.

Trends

No trend data exists at present.

Waste

Consumption

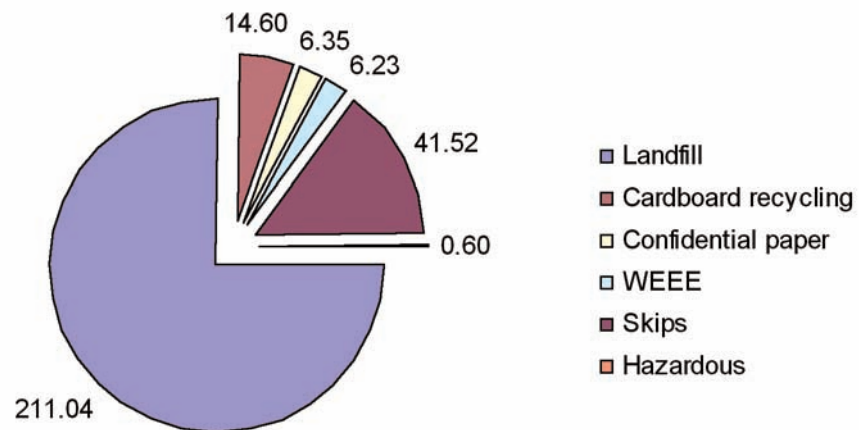
WASTE (ALL SITES)	WEIGHT (TONNES)	COST (£)	CO2 (TONNES)
Landfill	211.04	£26,227.19	54.24
Cardboard recycling	14.60	£687.37	-
Confidential paper	6.35	£1,242.56	-
WEEE *	6.23	£5,223.00	0.24
Skips	41.52	£4,778.56	10.67
Hazardous	0.60	£1,375.25	-
Sanitary	unknown	£12,785.49	-
Other recycling	unknown	£-	-
TOTAL	280.34	£52,319.43	65.15

* Waste Electrical and Electronic Equipment

Total landfill 2006/7 **253.50 tonnes (90% of recorded waste)**

Note: around 15% of IT Waste ends up in landfill

2006/7 All sites waste by weight (tonnes)



Where is it produced?

SITE	BIN	COLLEGE/TDBC MANAGED	CO PROVIDED BY	NUMBER OF BINS ON SITE	NUMBER LIFTS PER WEEK (AVERAGE DURING 2006/7)
Main site	Landfill (daily waste)	College	Biffa	12 x 1100l	35
	Landfill (skips)	College	Viridor	-	As required
	Cardboard	College	Perry's	2 x 1100l	6
	Paper/card	TDBC	Perry's		unknown
	Glass	TDBC	Perry's		unknown
	Plastic	TDBC	Perry's		unknown
	Cans	TDBC	Perry's		unknown
	Confidential waste	College	Bowers	-	As required
	Hazardous waste	College	Safety Kleen	1 x parts cleaner	As required
	IT waste	College	RGC	-	As required
	Sanitary waste	College	phs		
Canonsgrove	Landfill	College	Biffa	12 x 1100l	9
	Paper	TDBC	?	4	unknown
	Glass	TDBC	?	4	unknown
	Plastic	TDBC	?	4	unknown
	Sanitary waste	College	phs		
Bishops Hull	Landfill	College	Biffa	1 x 1100l	2
	Sanitary waste	College	phs		Weekly
Galmington	Landfill	College	Biffa	1 x 1100l	2
	Hazardous waste	College	Safety Kleen	1 x parts cleaner	As required
	Sanitary waste	College	phs		

Controls and housekeeping

Main Site

Paper	Staff are encouraged to segregate paper waste on the main College site, through the provision of office recycling bins. This is taken to Council owned paper recycling bins by the staff themselves. As the College uses the Council paper recycling provision, there is no way of knowing how much paper waste was recycled in 2006/7.
Cardboard	Cardboard is collected separately for recycling at the main site, used primarily by the shop, Scolarest, and reprographics. Two cardboard recycling bins are provided on the main site, emptied three times a week.
Glass and food cans	Some glass bottles and drinks cans are collected in Scolarest on the main site, and recycled in the Council recycling bins. No records are available of this recycling.
Electrical waste	Electrical waste is handled separately in accordance with the Waste of Electronic and Electrical Equipment legislation. Items are taken by a company who aim to reuse items, or where not possible, to recycle components.
Bricks	The Construction department has a unique system in place whereby they reuse bricks, and when no longer usable, the bricks are crushed, and this hardcore is exchanged with a local company for new bricks. For the purposes of this report, this has been considered carbon neutral.
Hazardous waste	Kerosene, used for washing brushes, etc, from the Construction Centre is collected as hazardous waste. Plus additional items as and when required, such as waste paint.
Landfill	Although the data is not available, from observations, it can be assumed that the majority of waste from all sites is disposed of to landfill. The volumes of this can be seen above.

Canonsgrove

Cans/glass/paper/landfill Students have recycling collection boxes in their kitchens, and segregate the waste at the various recycling areas (cans, glass, paper) around the site. Other waste is disposed of by landfill.

Galmington

Hazardous waste Kerosene, used for parts cleaning etc, from Galmington is collected as hazardous waste. Plus additional items as and when required, such as waste oil, and oil filters.

Landfill All other waste is disposed of to landfill.

Bishops Hull

Landfill Presently all waste is disposed of to landfill from Bishops Hull.

Trends

No trend data exists at present.

Oil

Data collection

Data on oil consumption is collected from invoices which details the quantity of oil delivered to site each visit.

Consumption

GAS OIL	LITRES	COST (£)	CO2 (TONNES)
Canonsgrove	7,059	£2,876.33	18.99

Where is it used?

Oil is used at Canonsgrove for heating and hot water in the Brendon Building. This services the housekeeping office; bar; sports hall; computer room; and laundry.

Trends

No trend data exists at present.

Water

Data collection

Data for water consumption has been taken from bills provided by Wessex Water.

Consumption

2006/7	CONSUMPTION (LITRES)	COST (£)	CO2 (TONNES)
Main Site	25,930,000	£55,381.16	10.69
Bishops Hull	177,000	£513.24	0.07
Canonsgrove	4,232,000	£11,857.74	1.75
Galmington	<i>No data available</i>		
TOTALS	30,339,000	£67,752.14	12.51

Where is it used?

Water consumption covers all sites, except Galmington where no bills have been received during 2006/7.

Controls and housekeeping

At present there is little monitoring of water use on site. Unusual consumption which may indicate major leaks are detected by the water company, and reported to the College for identification.

Trends

No trend data exists at present.

College-owned vehicles

Data collection

Data on the fuel consumption of the vehicles is taken from the Wellington Service Station invoices. The service station was closed for a few months in the summer, so estimates have been made for these months, based on averages of the remaining months.

Consumption

VEHICLES	DIESEL (LITRES)	COST (£)	CO ₂ (TONNES)
Estates van	406.37	£385.94	1.07
Minibus	57.67	£53.00	0.15
TOTAL	464.04	£438.94	1.22

Where is it used?

Somerset College owns two vehicles: a van used by Estates, and a minibus based at Canonsgrove halls of residence.

Trends

No trend data exists at present.

THE FUTURE FOR SOMERSET COLLEGE

This report provides a benchmark of Somerset College's carbon footprint, and is the first time the College have reviewed the environmental impact of its operations in this detail.

The study will be repeated in the autumn 2008 to review progress, and monitor the impacts of campaigns and actions during 2007/8.

It is recommended that future studies include the carbon emissions produced from transport (business travel; travel associated with study trips; staff commuting; and student commuting). Procedures will be put in place to ensure that this data is available for the next study.

If you have any queries or comments on any aspects of this study, please contact the Somerset College Campus Sustainability Officer, Kirsti Norris

kirsti.norris@somerset.ac.uk

01823 366 692

Somerset College, Wellington Road, Taunton, TA1 5AX