



# Annual Environmental Report 2015 / 2016

Board for Energy and Environment

15th September 2016



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# Statement



Professor Simon Pollard, Chair  
Board for Energy and Environment

Cranfield University is a global leader for education and transformational research in technology and management. Key to our mission is delivery of a sustainable estate that reflects our aspirations. Here, the Board for Energy and Environment (BEE) reports progress on our environmental objectives. A key intent was to refresh the level of engagement our staff and students have with the sustainability of our Estate. Highlights for 2015/16 are:

- Published our new Biodiversity Action Plan and significantly increased our Biodiversity Action Areas winning an award from the Wildlife Trust.
- Further increased participation of staff and students in environmental volunteering, activities and events.
- Further reduced our carbon footprint very nearly meeting our 30% reduction milestone for this year.
- Significantly reduced single occupancy car commuting to our main campus by increasing bus use, cycling and walking.

We remain indebted to our staff and students that contribute to our on-going improvements and to our Energy and Environment Team and BEE working group members who lead and coordinate our combined efforts. We are grateful to the on-going support of our contractors.

## Key performance indicators

Issue	Description	Progress	Target	By when
Carbon	Scope 1 & 2 emissions <sup>1</sup>	29%	50% reduction	2020 <sup>2</sup>
Waste	Total weight produced	-2%	10% reduction	2020
Recycling	Segregated on-site	52%	75% of total waste	2020
Travel	Single occupancy car use	9%	10% reduction	2017
Water	Consumption volume	26%	30% reduction	2020
Biodiversity	Conservation area	710%	50% increase	2015
Community	'Green' Volunteers	11%	10% of staff & students	2015
Discharges	Ammonia	86%	50% below consent levels	2020
Discharges	Biochemical Oxygen Demand	48%	50% below consent levels	2020
Discharges	Suspended Solids	15%	50% below consent levels	2020

<sup>1</sup>Scope 1 emissions are direct emissions from owned or controlled sources relating to energy and fuel use. Scope 2 emissions are indirect emissions from the generation of purchased energy.

<sup>2</sup>In this report, the year refers to the University's financial year. 2020 is from August 2020 to July 2021.

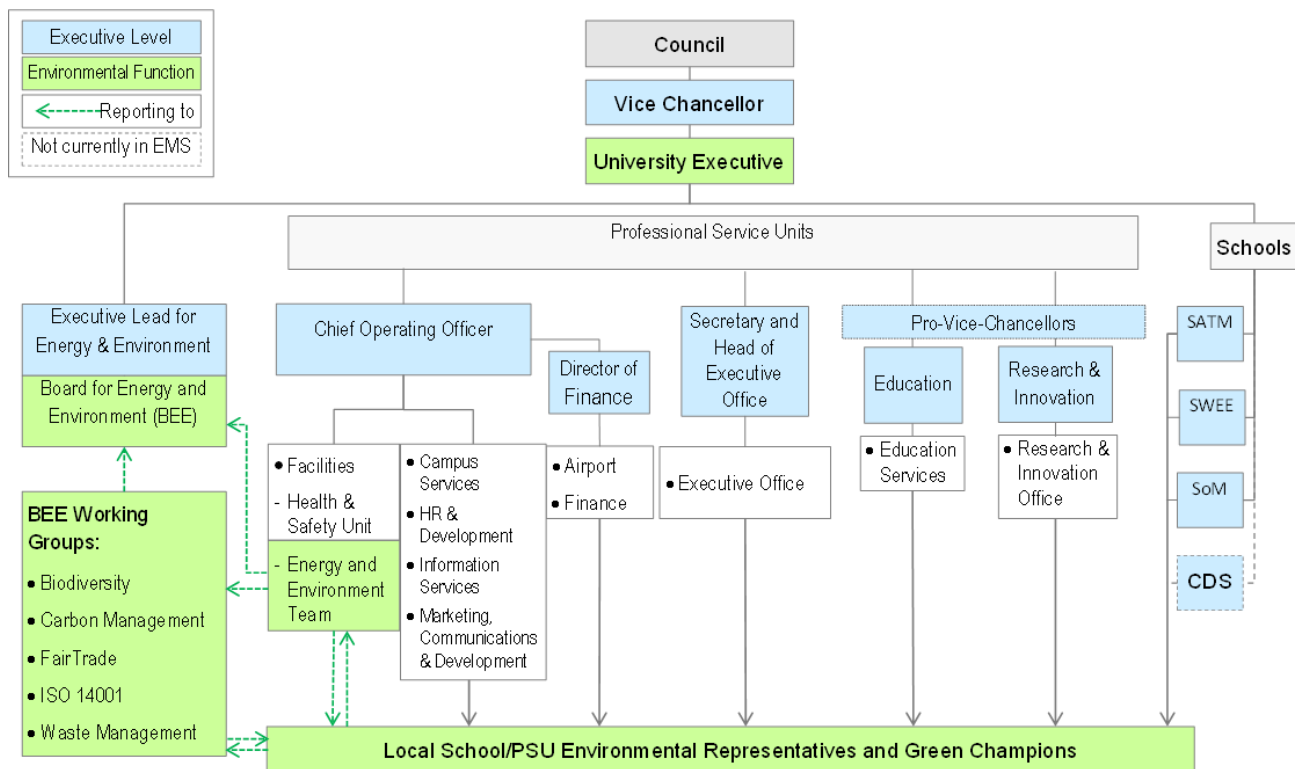
# Environmental objectives

Focus	Objectives	Rationale for action
Carbon & energy	Reduce absolute Scope 1 & 2 carbon emissions by 30% in 2015 and 50% in 2020 from a 2005 baseline.	Contributes to the HEFCE sector carbon reduction target; supports Plan 415i, reducing operating costs.
Waste & recycling	Reduce absolute total waste by 5% in 2017 and 10% in 2020 against a 2010 baseline.	Improves resource efficiency; demonstrates best practice to staff and students; supports Plan 415i, reducing costs.
	Increase segregated waste reused or recycled to 50% of waste produced in 2015 and 75% in 2020.	
ISO 14001	Extend University certification to Cranfield Defence and Security, including at Cranfield Ordnance Test and Evaluation Centre, by December 2015.	Primary means for continuous improvement; supports commercial bidding and Plan 415i, demonstrating best practice to staff and students.
Travel	Reduce staff commuting in a single occupancy car by 10% in 2017 from a 2012 baseline.	Reduces local road congestion; travel emissions and supports Plan 415i.
Water, emissions & discharges	Reduce Cranfield campus water consumption by 30% by 2020 from a 2009 baseline.	Maintains legal compliance and supports Plan 415i, reducing operating costs and demonstrates best practice to staff and students.
	Discharge treated effluent from the sewage works which is, on average, 50% below permitted consent levels for ammonia, biochemical oxygen demand and suspended solids by 2017.	
Fairtrade & sustainable procurement	Incorporate sustainability considerations within scoring criteria for all tenders over £250,000 in value by 2015.	Contributes towards ethical procurement and Plan 415i, reducing operating costs and demonstrating best practice to staff and students.
Sustainable buildings & infrastructure	Achieve BREEAM Excellent for new buildings and all major refurbishments from 2012.	Supports carbon reduction and resource efficiency and Plan 415i, reducing operating costs and demonstrating best practice to staff and students.
Biodiversity	Increase area set aside on University grounds for conservation by 50% by 2015 from 2013 baseline.	Supports Plan 415i, improving the wellbeing of staff and students.
Community involvement	Ensure at least 90% of staff complete the environmental awareness e-learning module by 2014.	Supports Plan 415i, encourages collaborative working and ensures base level of knowledge amongst staff & students.
	To encourage environmental volunteering with 10% of staff and students participating in 2015.	

# Quality assurance

## Governance

The Board for Energy and Environment (BEE) was established in 2011 to report to the Cranfield Executive and Council on energy and environmental issues. The priority of the Board is to ensure Cranfield University demonstrates a leading capability in environmental performance by providing oversight and direction. We seek to practice what we preach by moving our campus to a sustainable estate. The Board consists of senior managers from across the University and is chaired by a member of the Executive. The Board has working groups, with members drawn from operational and academic staff and students, to progress key environmental targets. A dedicated Energy and Environment team facilitates delivery of the objectives and reports progress to the Board on a regular basis. The Board has the ambition of ensuring a close relationship between BEE's environmental activities across the University and the teaching, learning and research taking place within the Themes on environmental best practice. The Governance structure is outlined below:



## Scope of reporting

The environmental objectives on page 4 encompass activities taking place on the Cranfield Campus, including subsidiary companies and tenants on site (see note 1, page 15). The University's operation at the Cranfield Ordnance Test & Evaluation Centre (COTEC) is included. Reporting for the Shrivenham Campus, where we are a tenant, is not included at this stage (see note 1, page 15).



## ISO 14001

Cranfield University operates a university wide environmental management system on the Cranfield campus. The system provides a framework for managing our environmental impacts, risks, and opportunities, for setting environmental objectives and establishing programmes to achieve them. We are proud to have achieved campus-wide certification of this system to the ISO 14001 standard, and are working towards meeting the new requirements stipulated in the new ISO 14001: 2015 version. We are making progress toward certification for Cranfield Defence and Security at the Shrivenham and COTEC sites.

### Incidents

In a climate of continuous improvement, we encourage the reporting of all environmental incidents and near misses to learn and advance.

Twenty-eight environmental incidents were reported this year. An improvement on the forty-five encountered last year.

These included:

- 2 incidents related to inappropriate waste storage or disposal.
- 9 spills/leaks – (one reportable) associated with equipment and vehicle failure, and inappropriate handling of redundant equipment.
- 2 discharges to drains associated with construction and maintenance activity.
- 15 internal reports of nuisance odours, predominantly associated with aviation activities.

## Other reporting

In line with the Higher Education Statistics Association (HESA) requirements, the University submits environmental data as part of the annual estate management reporting statistics. This data attempts to exclude tenant data and differs slightly from the data that appears in this report. As part of the Carbon Reduction Commitment (CRC) Energy Efficiency scheme requirements, the University provides energy data to the Environment Agency on an annual basis. The scope of CRC reporting is slightly different to that of this report and the HESA return. Data submitted to HESA is also used by the 'Green League' (a student-led, people and planet voluntary league table of University environmental performance). This makes comparisons between Universities, which are not always a true like for like comparison. Cranfield is a wholly Postgraduate University undertaking industrial scale research. This means our environmental impacts per student or per m<sup>2</sup> can appear high. This is one reason why we produce this annual report and publish information on our web site, which evidences how we are improving over time. We are also participating with an alternative metric for the environmental performance of Universities, devised by the Association of University Directors of Estates (AUDE) called the Green Scorecard.

## Base year recalculation policy

Our base year figures for reporting are reviewed from time to time to ensure like for like reporting. In 2013, the University sold Sudbury House Hotel prompting a recalculation of the base-year carbon emissions data and subsequent years to remove reference to this asset (see *notes 2 and 3, page 15*).

# Carbon and energy



Reduce absolute Scope 1 & 2 carbon emissions by 30% in 2015 and 50% in 2020 from a 2005 baseline

- Biomass boiler fully operational
- 10% Carbon campaign with significant electricity savings in key buildings
- On line portal showing building electricity consumption
- Repair of steam boiler and improved operation of district heating
- Agreement to progress ISO 50001



*Daylighting with LED Lighting*

This milestone this year was to achieve an interim target of a 30% reduction. We made good progress with a 10% year on year saving. However, we narrowly missed the target with an overall saving of 29% so far. Variations in weather influence the result as well as minor errors or inconsistencies in the data when comparing with a ten year old baseline. Meter accuracy is unlikely to be better than 2% for example. However, it does point to the need to maintain, and where possible, increase our efforts.

Carbon	2005*	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
'000 tCO <sub>2</sub> e	18.5	18.1	20.8	19.7	17.8	16.3	14.6	15.7	14.9	14.4	13.2

(\*HEFCE require a carbon reduction target against a 2005 baseline year. (see note 4, page 15)

Most of the savings over the last six years since the development of the Carbon Management Plan have come from large-scale improvements in the infrastructure, including the CHP unit, extension of the district heating and a new biomass boiler. There have also been investments in smaller energy efficiency projects in particular more efficient LED lighting and better insulation. Overall, the investment has run to several millions of pounds but the return has been quick, typically less than 5 years. The net benefit of reduced energy costs is already several million pounds and will continue to increase. There are still plenty of opportunities to invest in large and small projects with quick returns, which will enable us to reach our 50% reduction target.

Energy Gauge



## Plans for 2016

- Roll out of ISO 50001
- Continued investment in energy efficiency via Salix loans
- More campaigns to improve energy efficient behaviour
- Progress large energy projects (Solar Photovoltaic and District Heating)

# Water, emissions and discharges



Reduce Cranfield campus water consumption by 30% by end of 2020/21 from a 2009 baseline

Discharge treated effluent from the sewage works which is, on average, 50% below permitted consent levels for ammonia, biochemical oxygen demand and suspended solids by end of 2017/18.

- Further investment in the sewage works to prevent effluent discharge above permit levels.
- On-going review of water management with Anglian Water.



There are no figures for consumption this year due to a failure of the Anglian Water billing meter. This year's consumption is estimated using last year's data. This emphasises the need to have our own robust metering system to more closely monitor usage across the campus and for the site as a whole.

Water use	2009	2010	2011	2012	2013	2014	2015
Water use '000 m <sup>3</sup>	185	168	156	161	135	136	136

Discharges (average % below permit level)	2013	2014	2015
Ammoniacal nitrogen	87%	88%	86%
Biochemical oxygen demand (BOD)	57%	46%	48%
Suspended solids	22%	2%	15%

(see note 5, page 15)

The University's sewage treatment works encompasses a leading edge pilot hall facility used by staff and students on campus. Improvements continue to be made to the sewage works to ensure discharges are kept below consent level. This includes dosing trials to reduce suspended solids, and a new trial system of alkalinity regulation, which reduces the amount of chemical additions to the treatment process, whilst reducing H&S hazards to plant operators. Further work for 2016-17 includes looking at other alternative solutions for solids controls such as re-installation of the reed bed area.

## Plans for 2016

- Install automatic water metering
- Review monitoring of water quality in the brook
- Further work to reduce suspended solids





# Waste and recycling



Reduce absolute total waste by 5% in 2017 and 10% in 2020 against a 2010 baseline

Increase segregated waste for reuse or recycling to 50% of waste in 2015 and 75% in 2020

## Achievements this year

- Improved layout and segregation in University recycling facility.
- A new weighing facility means we can learn more about amount and type of waste created across the campus, and focus on individual areas for action and awareness raising.
- Continued introduction of standard recycling bins and signage throughout the university.
- Preparations for increased food waste collections.
- Successful 'Big Cranfield Clearout' at the end of the student year (September 2015) with 1.25 tonnes of clothes and household items sent to charity for re-use.

The University is leading thinking in the circular economy through our research and teaching. We must apply these principles in the way we manage resources on campus. Over the last few years we have made considerable efforts to minimise waste and improve recycling facilities across the Cranfield campus. Thanks to the support of staff and students we recycled nearly 630 tonnes or 52% of our total waste in the academic year (2015-16), exceeding our target of 50%. Reduction of overall waste remains a challenge, although we are doing better this year than last.

Waste Indicators	2010	2011	2012	2013	2014	2015
Total waste (tonnes)	1181	1130	1134	1206	1233	1199
Segregated on site to recycle (tonnes)	323	397	423	509	613	628
Total recycled overall (tonnes)	498	796	803	865	772	776
% segregated on site for recycling	27%	35%	37%	42%	50%	52%

(see note 6, page 15)

## Plans for 2016

- Communicating more widely on recycling performance in focussed areas.
- Continuing to replace old style recycling bins with our standard options and extend to litter bins.
- Extending food waste collection facilities.
- Developing ideas for student projects involving campus waste management.
- Looking at ways of reducing our total waste.



# Travel



Reduce staff commuting in a single occupancy car by 10% in 2017 from 2012 baseline

- Car share workshops held.
- New cycle shelter at Sports Centre.
- Introduced cycle lockers.
- Liftshare website upgraded.
- Uno bus introduced an extra rush hour service.
- Cycle repair and resale sessions.
- Two rapid charging points added to campus.



The priority target in the Travel Plan is to reduce single occupancy car use by staff from 76% to 68% by 2017. A survey in April 2016 revealed a significant reduction in single occupancy car commuting to 69%. There has been an increase in cycling, walking and bus use.

Objective	2006	2012	2013	2015
Single occupancy car use	86%	76%	73%	69%

The new cycle path from Cranfield village to the University is clearly having a beneficial impact on both walking and cycling. The bus timetable was further improved earlier in the year with an extra morning rush hour bus from Bedford.

To increase use of 'green' travel options, further work is required. This coming year, the focus will be on improving the experience of using the UNO bus service, upgrading and increasing cycling facilities and promoting car sharing further, especially for those unable to use other means of transport. Electric charging will also be further developed.

## Plans for 2016

- Introduce smart phone app for buses for easy payment.
- Improve monitoring of progress.
- More electric charging points.
- Focus on cycling safety and introduce a bike registration scheme.
- Investigate cycle loan / hire scheme.



# Fairtrade and sustainable procurement



Incorporate sustainability considerations within scoring criteria for all tenders over £250,000 in value by 2015

- Fairtrade Fortnight event included successful Fairtrade breakfasts, Fairtrade quizzes, and involvement from SAFAD.
- Increased awareness raising of Fairtrade on campus including with posters and leaflets.



Fairtrade products are now provided in all internal catering outlets on campus and should be available for all meetings and events.

Fairtrade status is due to be renewed in December 2016.

Environmental considerations are now more widely used in procurement decisions.



*Members of the University Executive supporting Fairtrade Fortnight*

## Plans for 2016

- Widen Fairtrade product offering.
- Investigate how sustainable procurement can be further developed.
- Continue awareness raising.



# Biodiversity



Increase area set aside on University grounds for conservation by 50% by 2015 from 2013 baseline

- Conservation areas extended.
- Bee hives on campus.
- Staff engaged in a spring/summer watch campaign.
- Biodiversity Action Plan published.
- Popular biodiversity walks, including a night-time bat walk.



The Biodiversity Action Plan has now been published. This outlines our commitment to increasing biodiversity on campus and our conservation efforts. There are designated Biodiversity Action Areas (BAAs) on campus, which have been numbered and mapped. These have significantly increased our overall area under conservation. Examples include the new orchard area by The Drive, native plant meadows and wildflower plots, Chicheley Brook and the development of a wildlife corridor along the hedgerow running through campus.

We are planning to review the success of these areas and introduce more managed wildflower plots to enrich the meadow areas. Our grounds contractor 'Nuture' has installed bee hives, which are located by Chicheley Brook.

The Wildlife Trust awarded us the Gardening at Work award for 'Best Newcomer - Wildlife Garden' in July 2016. This was for developing our wildflower areas as well as engaging our staff and students to value biodiversity on campus. Next year we intend to develop a database on biodiversity using GIS software, expand our living lab opportunities and continually improve our Biodiversity Action Plan.

Biodiversity indicators	2012	2013	2014	2015
Campus conservation areas m <sup>2</sup>	1,320	1,470	2,060	10,450

## Plans for 2016

- Develop 'Living Lab' opportunities on campus.
- Review and further develop BAAs.
- Develop GIS mapping of biodiversity on campus.



# Community involvement



Ensure at least 90% of staff complete the environmental awareness e-learning module by 2014

Encourage environmental volunteering, including through the Green Teams network, with 10% of staff and students participating by 2015

- Staff engaged in 10% Carbon Saving campaign.
- Successful volunteering event including litter picking, scrub clearance and tree planting.
- Active University Green Team, which meets quarterly.
- A Green Team handbook has been published.



The number of staff and students engaged has increased this year due to establishment of a joined up University Green team and increased interest in biodiversity and Fairtrade on campus. Our University Green Team now has 61 members. We ran an energy saving campaign in December and again from February until July. This was branded the '10% Carbon Challenge'. We hosted several workshops to support this where champions shared their energy saving ideas.

Community indicators	2012	2013	2014	2015
Number of participants	275	238	291	458
Percentage of staff and students	6%	5%	7%	11%

During Green Week a number of presentations were held to raise awareness of environmental issues, showcase environmental research projects and encourage 'Green' behaviour. In November 2015, a Wildlife Trust volunteering event was organised as well as a popular tree planting event in February 2016 and a campus litter picking event in April 2016. The CSA Green Team have successfully produced an awareness raising video for sustainability on campus.



## Plans for 2016

- Closer working with the University Green Team on behaviour change.
- Increased focus on waste management awareness raising.
- Green Week 2016.
- Improve communication through social media.



# Sustainable buildings and infrastructure



Achieve BREEAM Excellent for new buildings and all major refurbishments from 2013

Develop 'zero carbon' standard for University buildings by 2014

- The AIRC<sup>3</sup> is nearing completion and is on target to meet BREEAM excellent as is the new IMEC building.
- The building hosting CAIET and NERC's FAAM is now complete and has met design criteria to meet BREEAM excellent.
- Two of these new buildings are incorporating photovoltaics.



Aerospace Integration Research Centre  
(under construction)

Investigations are ongoing to see how we can incorporate more renewables into new buildings or as part of a campus infrastructure to achieve a zero carbon approach. An extension to building 52 will be a major new development next year, which will be built to BREEAM excellent.

The new MUEAVI (Multi-User Environment for Autonomous Vehicle Innovation) road will be constructed next year and will incorporate a vital link with the south of the campus. This is an opportunity to extend the infrastructure on site linking more buildings on site with the district heating and campus electricity network. A new SUDS (Sustainable Urban Drainage System) strategy is also being developed as part of the overall Masterplan as is a Landscape strategy. These will also influence the development of the rest of campus.

## Plans for 2016

- Investigate additional renewable energy options for new build.
- Further development of the district heating scheme.
- Extension of campus electricity grid.
- New Landscape and SUDS strategy.



Aerospace Square

<sup>3</sup> AIRC – Aerospace Integration Research Centre; IMEC – Intelligent Mobility Engineering Centre; CAIET – Centre for Atmospheric Informatics and Emissions Technology; FAAM - Facility for Airborne Atmospheric Measurements; BREEAM – Building Research Establishment Environmental Assessment Method

# Notes

1. **Objectives:** Baseline and target years refers to the financial/academic year August to July (for example, for the Carbon target, the baseline year 2005 is financial year 2005/2006 and the 50% target is to be achieved in year 2020, which is academic year 2020/2021).
2. **Scope:** Tenants are included because it is often not possible to distinguish between what is and is not a direct impact to the University as opposed to an impact of others operating on site. Examples include waste, car travel, some aspects of energy and water consumption and sewage discharges. As measurements and monitoring on site improve, this may become easier to distinguish. Additionally, the University is providing utility and other services to tenants and in a position as landlord and service provider to influence their behaviour and assist in the reduction of their environmental impacts, whilst at the same time having an interest in minimising the risks to the University. The converse applies to the University's Campus at Shrivenham. Here the University is a tenant on a Ministry of Defence (MOD) site. It is not possible at this stage to include this Campus within the targets. However, when information becomes available this will be reviewed.
3. **Base Year Recalculation Policy:** Cranfield University will ensure that its greenhouse gas reporting is up to date, accurate and consistent with current Government guidance. In particular, when there are structural changes that have a significant effect on the baseline and the reported progress towards targets, the baseline and, if necessary, data for years in between will be recalculated.  
**Base year recalculation:** It is important that progress is measured on a like for like basis. This means that any changes in calculation methodologies are applied to the previous figures as well as current figures.  
**Structural changes may include:** mergers, acquisitions, and divestments; outsourcing and insourcing of relevant activities; changes in calculation methods or improvements in the accuracy of factors, such as emission, factors, or activity data that result in a significant impact on the base year figures; discovery of significant errors, or a number of cumulative errors that is collectively significant. The recalculation will be triggered and reported if the structural changes would result in a change of greater than 2% in the total baseline figure. At the same time any errors in the current year reporting greater than 2% will be amended and relevant reports updated or notes attached explaining amendments.
4. **Changes to carbon data:** Our carbon footprint is recalculated each year for all years in order to account for errors, changes to the scope and material changes to the conversion factors provided by the Department for Environment, Food and Rural Affairs (Defra) for company reporting purposes. They may not therefore compare directly with previous figures reported in the University Financial Statement. See also our baseline recalculation policy above. Note the figures include emissions for tenants on Cranfield Campus, Silsoe Campus, COTEC and subsidiary companies. Sudbury House Hotel was included historically but has since been removed from the baseline and all years. The figures also include Martell House, which was acquired in 2011, and the baseline has been recalculated accordingly. They exclude the Shrivenham Campus.
5. **Water consumption and discharges figures:** These are for Cranfield Campus, including tenants. COTEC and Shrivenham data is not included. Discharges are taken as the average of the three consent targets.
6. **Waste figures:** These are for Cranfield Campus and include some, if not all, tenant waste. Note the key performance indicator for recycling is waste segregated on site. However, the waste contractor further segregates waste at their depot. This elevates our overall recycling performance and it is this figure, which is reported in the HESA Estates Management Reporting. We are working closely with local charities and organisations, collecting reusable goods from students as they leave the University and passing these on to a local homeless charity, Emmaus, to re-sell.
7. **Academic expertise:** Wherever possible, the University is making use of its academic expertise and facilities to enhance its response to environmental improvement. At the same time the estate is offering opportunities for research and teaching. Examples of this include energy audits carried out by students and the University laboratories to analyse local discharges. The new Combined Heat and Power (CHP) unit is regularly use as a real life demonstration for teaching.

# Key contacts

## Board for Energy and Environment:

- Chair, Professor Simon Pollard, PVC Energy, Environment and Agrifood
- Director of Finance, Mr Ian Sibbald
- Director of Facilities, Mr John Street
- Energy and Environment Manager, Mr Gareth Ellis
- Environment Advisor, Mrs Ginny Ford
- Board Member, Mr Gio Lusignani, Director of Information Services
- Board Member, Professor Frédéric Coulon, Water Theme
- Board Member, Miss Becky Shepherd, Environment Officer
- Board Member, Kelechi Anyaoha, Green and Residential Officer, Cranfield Students' Association (elected to President of the CSA in 2016)
- Board Member, Miss Savina Velotta, Executive Officer (Board Secretary)

## Working groups:

- Biodiversity Chair, Professor Jim Harris
- Carbon Management Chair, Dr Nazmiye Ozkan
- Fairtrade Chair, Mr Ian Sibbald
- ISO 14001 Chair, Mrs Ginny Ford
- Waste Management Chair, Dr Philip Longhurst

# Further information

For further information, please visit our environmental pages on the University Website:

<https://www.cranfield.ac.uk/about/environmental-credentials>

or the University Intranet: <https://intranet.cranfield.ac.uk/EnergyEnvironment/Pages/default.aspx>

If you have any questions on any other topics outlined within this report or would like to provide us with any feedback, please contact the Energy and Environment Team at [green@cranfield.ac.uk](mailto:green@cranfield.ac.uk).