

## EAST WING, SOMERSET HOUSE, LONDON

When King's College London moved its Dickson Poon School of Law into the East Wing of Somerset House, the grade 1 listed building needed a sustainable refurbishment. A mixed mode ventilation strategy was key to its ambition to reach a rating of BREEAM Excellent.



Take one Grade I listed building in central London, by the River Thames and on six floors, and make it as energy efficient as possible, future-proofing it into the 21st century but within the constraints of a listed building. This was the challenge for BDP, architects and designers behind the upgrade of the East Wing at Somerset House on behalf of client King's College London. The building is now the home of the College's Dickson Poon School of Law, King's Cultural Institute (Inigo Rooms) and a number of high specification seminar rooms.

"When you work with a building like this," says Tim Leach, Director and Head of Heritage and Culture, BDP, "you don't pinpoint one area of sustainability. There is no one area to highlight. BDP's work is about what is possible and what is not, making energy saving and building conservation a priority."

Completed in February 2012, the sustainability principles behind the project are that it is a "mixed mode building" ie. the building is naturally ventilated in Spring and Autumn and heated and cooled via a mechanical ventilation fan-coil system in Summer and Winter.

The users of the building trigger the heating system when required. When someone opens a window, this sets off a micro switch. As soon as a window is open, all the mechanical plant serving that room shuts down. In this way, the building is heated and cooled in as efficient a manner as possible, using natural ventilation when possible.

"People who know the building will also realise we have changed the cross-ventilation using the thermal stack through the central corridor with an extractor at roof level," says Leach. Again, this is to influence the natural ventilation for the building and keep unnecessary energy costs down.

"In about 60 rooms, the low-velocity displacement ventilation is delivered via the chimney flues and fireplaces," says Leach. It is a principle designed by BDP and delivered by mechanical and electrical engineers Hoare Lea.

“It has been done before but not on anything like this scale,” says Leach. There are the three components to the system: mechanical ventilation, cooling and heating and the micro switch. Each room functions as its own bespoke ‘pod’, thereby keeping the space at the comfortable level that the users of the room would like.

The chillers for the heating and ventilation system were provided by European market leaders, Italian company Climaveneta and, for this project, two chillers (FOCS-CA/LN 2712 and FOCS-CA/LN 3902) were specified and installed at roof level.

“For the heating and ventilation at the East Wing for Somerset House, we worked closely with the client of course,” says Steven Shepherd, Managing Director, Climaveneta UK Group. “As with all projects, the aim is to identify the heating, ventilation and air conditioning solution that is going to ensure quality, efficiency and also accelerated return on investment in terms of bringing down the energy costs of large buildings.”

Another energy-saving addition is a transparent solar film on the windows. This controls solar gain and gives thermal insulation and, again, brings down the overall energy costs to heat/cool the building.

Most windows are draught-proofed and a ‘thermal store’ has been introduced within the roof spaces using PCM (phase change materials) gypsum-based boards from Germany. These store and re-radiate heat. They are used as internal lining to the historic roof timber structure, in conjunction with new wood fibre thermal insulation. Again, they improve the thermal mass of the building without affecting the existing structure, or the significant character of the spaces.

The next phase of the building will be implementing a full combined heat and power plant campus-wide and it is at this point that the Somerset House project will be re-assessed to establish if the Design stage BRE AAM rating of ‘Excellent’ is certified.

Recycling rates are now up to 86 per cent and the courtyard is lit by high intensity, low-energy LED floodlights that use 80 per cent less energy than the previous floodlighting. King’s College London’s environment policy also targets travel policy and procurement practices to minimise the impact of all forms of transportation.

The project has been awarded the Gold medal for the Built Environment and Architectural Heritage by the Green Apple Awards in June 2013. BDP has previously worked on a building for King’s College London, the King’s Building, that won the ‘Sustainable Construction’ Award at the Higher Education Funding Council for England (HEFCE) Green Gown Awards (2007), and the design for the East Wing at Somerset House forms part of a lineage of projects for BDP, where sustainable thinking is at the centre of the design process and informs the development from feasibility to completion.

“The BDP approach is about how you work on lots of different aspects of sustainability and marry those with the particular constraints of an individual listed building or any existing building. It is always going to be more difficult bringing in sustainability measures into existing buildings than new buildings but that is part of the challenge,” says Leach.

A final word goes to one of the building’s users who has worked at the School of Law for 17 years, Professor Alexander Türk, Director of Postgraduate Taught Programmes: “The renovation opened up the building, stripped the interiors back to reveal the original features and created a feeling that is historic yet unstuffy. It is a very pleasant place to work, with expansive windows that let in plenty of light, large rooms and high ceilings that further emphasise the feeling of space. The interiors are effective in the way they retain the building’s character yet provide clean, unfussy spaces that seem particularly suited to their function as a law school.”

Building performance figures will be available in due course.