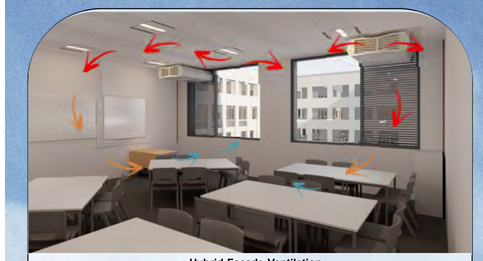


Hybrid Façade Ventilation

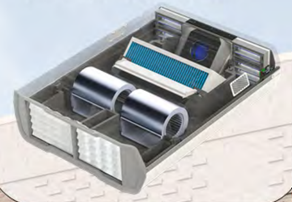
The teaching areas within the building will be ventilated via hybrid façade ventilation units integrated into the window module, and encased within a ceiling bulkhead.

- The units are designed to provide an **enhanced level of ventilation** and achieve **superior levels of thermal comfort**, both in summer and winter.
- Each unit will contain an LTHW heater battery to provide space heating to the classroom, and as units are located at high level, floor **flexibility is maximised.**
- The diffusers promote **good mixing** with air velocities to give **high levels of occupant comfort** removing the perception of draughty environments.
- Boost mode for warmer summer periods the unit will increase the fresh air rate based on the internal CO2 and temperature
- Night cooling mode to **securely pre-cool areas overnight**
- **Acoustically treated** to meet the requirements of BB93

Heat Recovery

Heat recovery will be provided on all ventilation systems where possible providing;

- **High efficiency** heat recovery from exhaust air to pre-heat fresh air for occupants
- Thermal wheels or counterflow heat exchangers **provide up to 80% efficiency** to **minimise heating requirements** from the main heating plant.
- Ventilation plant will include bypass systems to take benefit from ***'free cooling' when available***



Water Efficiency

We have designed the water systems to operate as efficiently as possible

- Dual flush WCs **reduce water consumption**
- Water saving devices will be installed on showers and taps
- Water storage has been sized to balance storage volumes with a good level of water turn over to eliminate the risk of stagnation

Heating Systems

We have selected heating systems to suit the needs of each space. A number of different systems will be installed as follows;

- Warm air heating to give a **high level of thermal comfort** in the classrooms. This gives a **dependable, flexible** and **easy to use** solution for teachers.
- Radiant heating to Sports hall gives **good levels of thermal comfort**
- Warm air heating to halls and changing to **maximise flexibility**

Lighting

Artificial lighting to supplement the available daylight has been designed to be **energy efficient and simple to operate**.

- Daylight linking will be included in all teaching spaces to **automatically dim artificial lighting in response to availability of natural light**
- Manual dimming and switch is provided to give **flexibility in teaching spaces**
- **High efficiency LED fittings** are proposed to **minimise energy consumption** from artificial lighting, when required.
- LED lights have long life expectancy so significantly **reduce maintenance and replacement costs**

Daylighting

We have carried out detailed assessments on both natural and artificial lighting for the project. A detailed **climate based daylight model** has been produced to determine the availability of natural light to the teaching and learning spaces.

- Climate based modelling gives a more **robust indication of quality daylight** availability vs older, more traditional methodologies such as daylight factors
- Daylight linking will be included in all teaching spaces to **automatically dim artificial lighting in response to availability of natural light**
- Integrated window design to incorporate opening elements to supplement and enhance hybrid ventilation, **maximise penetration of natural light**, and to give **great views out** of the building.

Sustainable Urban Drainage

Our strategy for drainage is to provide a sustainable solution that maximises the use of SUDs features to regulate water run-off from the site whilst enhancing the biodiversity and ecology of the external spaces. SUDs features may include;

- **Permeable** paving/**Porous** surfacing to **provide water attenuation**
- **Underground attenuation tanks** used to **regulate water discharge** from site

Controls

We have included a central Building Management System (BMS) to control and operate all the HVAC plant. The BMS will provide the following;

- **Optimisation of all systems** to **maximise efficient operation** and running
- **Night time cooling** of occupied areas to **reduce risk of overheating** in summer
- Variable speed controls to **reduce energy consumption** during low occupancy or out of hours
- Classroom controls are s**imple and** intuitive. User controls are provided to ensure the **systems are easy to operate**, and generally run autonomously.

Biophilic Design

We have considered the concept of Biophilic Design within the site planning. It is a term, meaning love of nature, used to describe our deeply rooted, emotional connection to nature, natural systems and living things. The theory, based on years of evidence based research of living and working situations, suggests that because humans evolved in natural environments, access to quality nature is essential to our happiness, sense of belonging and overall well-being. With increasing urban living this connection is becoming weakened.

The benefits of adopting this approach has been assessed to;

- **Increased productivity**
- **Faster healing** times
- Reduced staff turnover
- **Enhanced creativity** and **reduced stress**
- **Improving social interaction** and reducing hostility

And specifically within an educational environment

- **Increased rates of learning** at schools by 20-25%
- **Improved test results** and **concentration levels** at schools

Low Carbon Technology

An appraisal of low and zero carbon technologies has been undertaken with the following options considered;

- high efficiency **air source heat pumps**
- **LED lighting**
- Heat pumps to heat hot water
- **Photovoltaic panels**
- **Low energy fans** providing great indoor air quality

The proposals are currently based upon using heat pumps to provide all the heating and hot water requirements to the site. Energy modelling has been undertaken, based on benchmarks to determine indicative load profiles for heating and electrical energy.

Low energy and maintenance LED lighting will be used throughout to drive down energy use and reduce on-going maintenance costs

Extensive use of photovoltaic panels offset the building's carbon emissions.

Energy Performance

We have carried out detailed thermal modelling using IES Virtual Environment to determine the performance of the building with respect to **compliance with Part L** of the Building Regulations. The following design considerations have been made;

- We have followed the well established **Lean, Clean, Green** approach to design, first considering good passive design, followed by energy efficient technology**, then considering renewable/green energy**
- **High performing thermal constructions** will be targeted, exceeding the minimum requirements of Part L.
- **Solar control glazing** will be used on the south, east and west facades to limit solar gains and maintain occupant comfort.
- High air tightness of 3m³/h/m² @ 50Pa will be targeted to **minimise heat losses in winter.**

An **A+ EPC rating is achievable** due to the inclusion of heat pump technology, low energy consumption and photovoltaic panels on the roof.

With high efficiency heat pumps, hybrid ventilation, and high efficiency LED lighting **a net zero carbon building** is achieved


Energy Performance Certificate
Non-Domestic Building
HM Government
Certificate Reference Number:
2593-1012-7148-2031-3205
Energy Performance Asset Rating
More energy efficient
A+
A 0-25
B 26-50
C 51-75
D 76-100
E 101-125
F 126-150
G Over 150
Less energy efficient
Technical information
Benchmarks
Buildings similar to this one could have ratings as follows:
If newly built
If typical of the existing stock

bam design

SUSTAINABLE DESIGN

BOND BRYAN
e info@bondbryan.co.uk
w www.bondbryan.co.uk

BAM

bam

King Edward VI
Handsworth Wood Girls Academy

Originator project ref: **22074**
Purpose of Issue:
Scale(s): **1:0.40**
Paper size: **A1**
Revision description: **P01**

Sustainable Design

North | Scale bar

project originator volume level type role number: **SPR1037-BBA-ZZ-00-DR-A-0113**
Native model: 22074-Building
revision