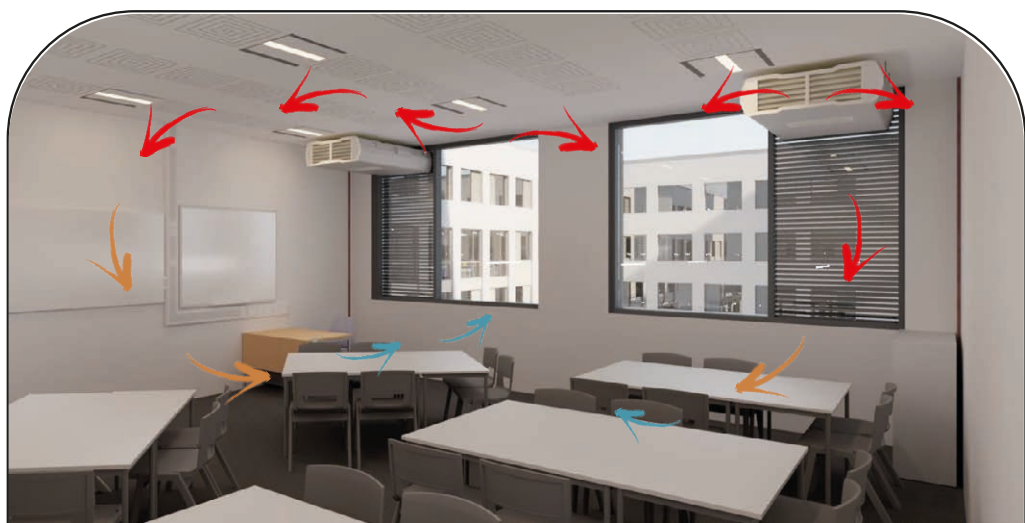


THE PROPOSAL: SUSTAINABLE DESIGN



Hybrid Façade Ventilation

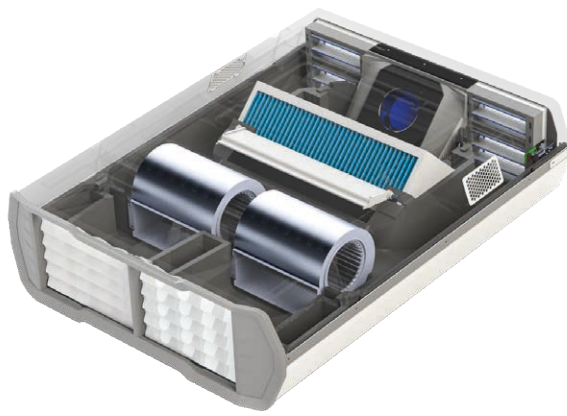
The teaching areas within the building will be ventilated via hybrid façade ventilation units integrated into the window module, and cross ventilation encased within a ceiling bulkhead.

- 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 a heater to provide space heating to the space, 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

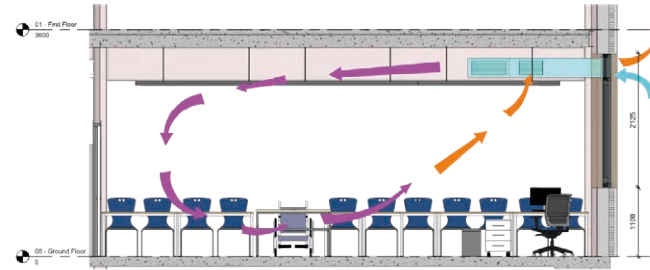
- Dual flush WCs **reduce water consumption**
- Water saving devices will be installed on showers and taps
- Water storage has been sized to balance storage volumes with a good level of water turn over to eliminate the risk of stagnation



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**.

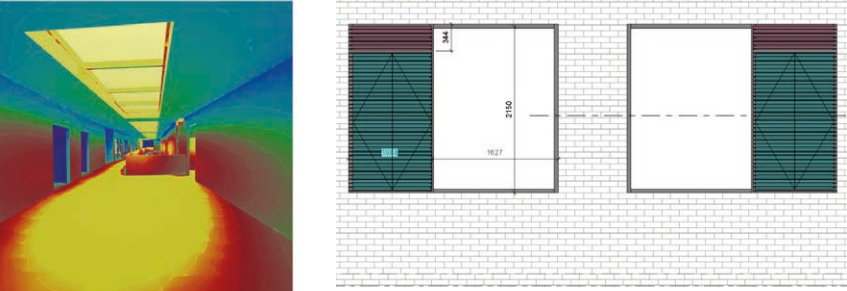
- Daylight linking will be included in all teaching spaces to **automatically dim artificial lighting in response to availability of natural light**
- Manual dimming and switch is provided to give **flexibility in teaching spaces**
- **High efficiency LED fittings** are proposed to **minimise energy 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 include;

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



Biophillic Design

We have considered the concept of Biophillic 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 education facilities



Low Carbon Technology

The new College Buildings will have;

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

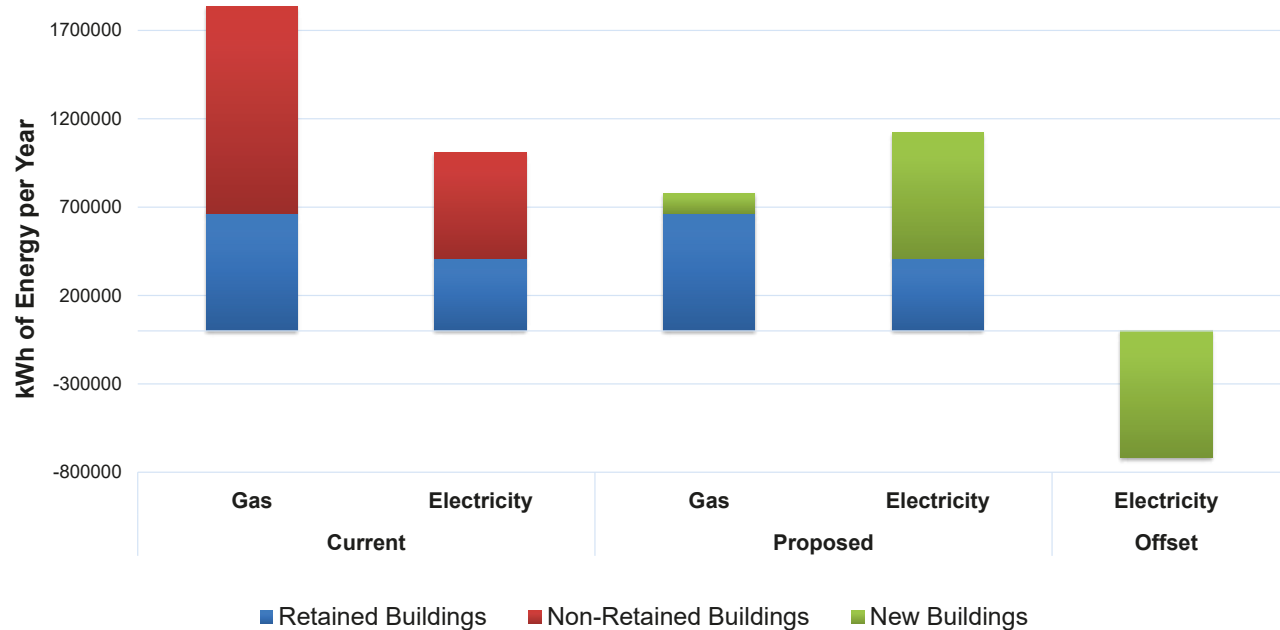
The proposals will provide the College with new buildings that are net zero carbon in operation.

Passive design and low energy systems are proposed to reduce energy use.

Extensive use of photovoltaic panels will then offset the new building carbon emissions.

The graph opposite shows the energy use for the College both currently, and with the proposed new buildings.

Current Gas and Electric Consumption Compared to Proposed Consumptions at Delivery



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

