CASE STUDY

A new school and community hub

Committed to a target of net-zero carbon by 2030, the City of Edinburgh Council has embarked on an ambitious strategy to develop several combined schools and community hubs.

The Maybury Primary School and Health Centre will initially accommodate up to 420 primary and 120 nursery pupils. The Health Centre and GP surgery will serve up to 10,000 patients and a second phase will increase the primary school's capacity to 630 pupils.

Using 'Passivhaus' techniques – established in Germany to construct comfortable homes while using very little energy for heating and cooling – it has been designed to be extremely low carbon.

Similar schools are planned for Newcraighall, Queensferry and the replacement Currie High School.

Layout

The north facade is a welcoming entry point for community facilities, GP surgery and nursery, with weathering steel cladding and a green metal entrance canopy.

The south facade is a playful and engaging entrance for school children; the colourful cladding relates to the natural colours of the landscape: rusty reds, hay yellows, blues, purples and greens of the heathered Pentland Hills. Using colour for navigation, red for the early years through to green for the upper years, so learners can familiarise and know where to go.

The space inside will be illuminated by double height atrium voids, with three-dimensional artwork providing colour and vibrancy. Light and natural materials; like clerestory glazing, will create bright and ethereal spaces, while low volatile organic compound (VOC) materials in warm neutral colour palettes will contribute to a feeling of wellness and calm.

Flexible and interactive learning

Conventional classrooms have been reimagined as open plan agile learning spaces that embrace technology and adaptable learning styles. Classrooms on the ground floor open directly to the outdoors and connect visually through plenty of windows.

The first floor teaching terrace draws students outdoors, taking advantage of natural external classrooms and offering vistas to the grassy areas, sandpit and wildflower meadow just beyond. Space under this balcony offers sheltered indoor-outdoor learning spaces.

Within the classrooms, flexible zones are created allowing different activities and varied levels of interaction. Movable bookcases and storage units delineate space and absorb sound, but also become teaching tools with high-tech screens and interactive devices. Furnishings will absorb sounds and soften spaces providing tactile experiences, colour and comfort.

Technical delivery and challenges

To achieve extremely low carbon emissions and ensure that it is comfortable, the school has been designed to the ultra high-performing Passivhaus standard:

- Orientation towards the warmth of the sun;
- Careful control over the amount of glazing;
- Extremely high levels of continuous insulation;
- Draught-free construction to avoid heat losses;
- Air source heat pumps instead of boilers;
- Mechanical ventilation with heat recovery from the return air;
- On-site renewable energy, using photovoltaics.

The Scottish Futures Trust target for energy efficiency is 67 kWh/m2/year but these features mean that the school's projected energy consumption will be around 40kWh/m2/year, far less than conventional schools built only a few years ago.

Maybury School will also be made from timber frame construction, which means its embodied carbon will be approximately 600kg/CO2/m2. However, with demand for low-carbon timber buildings increasing and supply chains in Europe disrupted by Brexit, an opportunity exists to support the growth of the timber industry in Scotland, taking away our island dependence on importing materials and allowing for better engagement with our local communities, critical in a circular sustainable future.

Challenges

- Achieving high levels of airtight construction.
- Upscaling the Scottish timber-frame industry for larger-scale non-domestic buildings.
- Bringing Passivhaus to a new market and upskilling the supply chains to build higher quality buildings.

Client: City of Edinburgh Council

Architect and Passivhaus Designers: Architype

Structural & Civil Engineers: Etive

Services Engineers: Rybka / E3 –

Landscape Architect: Wardell Armstrong

Acoustic Engineer: New Acoustics

Fire Engineer: Jensen Hughes

Project Manager, Principal Designer and Quantity Surveyor: Faithful & Gould

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1 External image from landscaped area.

2 Main entrance image.

3 Interior from a similar school.

4 Cross section through Maybury School atrium.

5 Interior from a similar school.

6 Interior from a similar school.