

Cardiff LibraryThe Finer Details

BDP.

September 2009



Health & Wellbeing Impacts

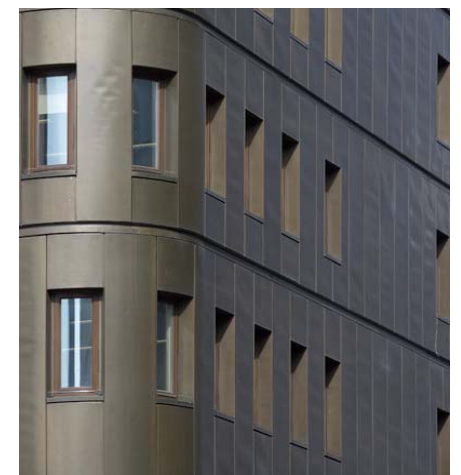
BDP's interior designers followed the brief using vibrant colour and varied settings to appeal to a wide cross-section of users, thus creating a library with a buzz and sense of life. Each floor is identified by an individual colour which sits against the base colours of the interior, the black carpet and concrete soffit. Shelving and floor components are laid out to allow intuitive way finding and circulation, with bright orange used as points of information. Selected pieces of iconic furniture were chosen to bring a sense of fun to the place. The glazed façade with screen printed panels and solar fins maximises natural daylight penetration. Finishes were specified to have low VOC emissions.



Energy Use and CO₂ Impacts

The carbon emissions calculated under Part L are a very low 19.2 kgCO₂/ m². The library also achieves an Energy Performance Certificate (EPC) 'B' rating, with a score of 45. Under current (2006) Building Regulations the library would be required to achieve a score of 50. However, the library was designed under the previous (2002) version of the Building Regulations, and hence the library not only performs exceptionally well against the design standards which were applicable in 2005, but it also exceeds the current standards.

The structure employs exposed concrete soffits to help achieve a comfortable open plan space, which uses night time cooling to avoid the need for air conditioning. The underside of the roof is lined with sustainable timber panelling and 'glulam' beams. The facades incorporate high performance 'spectrally selective' coatings, screen printed panels and solar fins, allowing good daylighting with reduced solar heat gains/glare.



Transport Impacts

The building is located near Cardiff Central train station and multiple bus routes. No parking has been provided at the library, ensuring that all staff and visitors arrive by public transport.

Water Use

The extensive green roof attenuates over 50% of rainwater run off. Low water consumption sanitary fittings are provided in all toilet areas.

Resource Use and Waste Management

Materials with low environmental impact were specified where possible – for example all internal walls and floor finishes are 'A' rated according to the 'Green Guide to Specification'. Waste management was a key consideration during construction, with waste materials sorted for reuse and recycling.

Biodiversity

The installation of an extensive green roof offers many benefits to the library – additional thermal insulation of the building, reduced heat gain in summer / heat loss in winter, attenuation of stormwater runoff and hence reduced risk of local flooding, local native species for ecological habitat and reduction of the urban heat island effect which is endemic in cities.

Monitoring

The library is extensively sub-metered, enabling energy monitoring via the BMS.



Internal management procedures

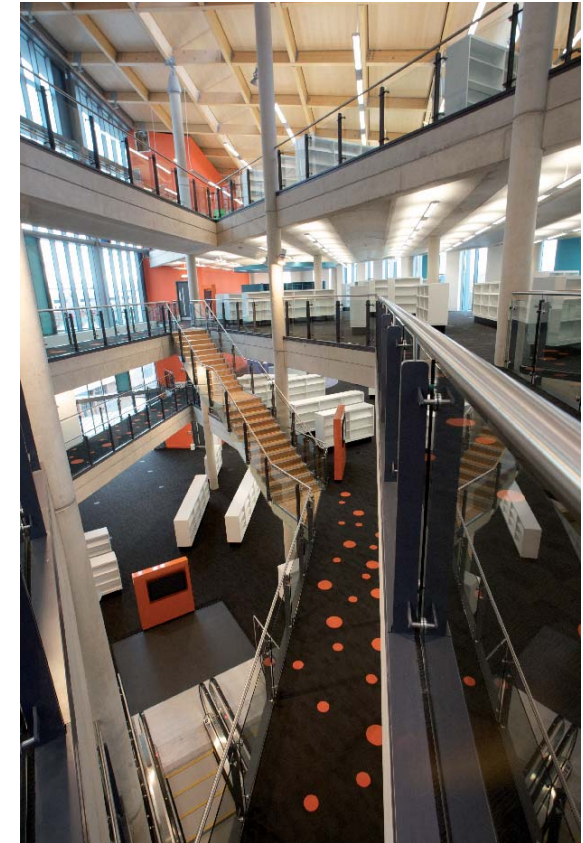
The services design is simple and robust. Ventilation, heating and night time cooling is achieved by variable speed AHUs containing high efficiency thermal wheels, feeding air into floor voids, where it contacts the concrete structure. Heat rises to the top of the atrium and is either recirculated or exhausted via rooflights during peak temperatures. Originally intended to have a ground source closed loop cooling system – the TAS dynamic thermal analyses predicted the building performed so well without it that the system was not required.

Fixtures and Fittings

The services design is simple and robust. Ventilation, heating and night time cooling is achieved by variable speed air handling units containing high efficiency thermal wheels, feeding air into floor voids, where it contacts the concrete structure. Heat rises to the top of the atrium and is either recirculated or exhausted via rooflights during peak temperatures.

Site

The new Cardiff Central Library sits at the southern end of the Hayes. The site was originally a car park, and hence the new library reuses a previously developed site.



Regeneration

Cardiff library is part of the St David's development in central Cardiff, which is due to open in October 2009 and builds on present assets including the existing St David's Shopping Centre and much of the Hayes. The scheme is set to transform the Southern end of the City and give a currently underused area a new lease of life by creating attractive and safe public spaces for people to enjoy.

The St David's development will bring new stores, cafes, restaurants and luxury residential apartments to the heart of Cardiff, as well as enhanced public areas and facilities and a modernisation of the existing St David's Shopping Centre. The original Cardiff Library was demolished as part of the St David's development, therefore a temporary library was provided by St David's Partnership and the new library was funded and constructed by St David's Partnership under a s106 agreement to replace the original library.

The new library is now owned and operated by Cardiff City Council. The library, which opened to the public in March 2009, provides quality educational materials, information and entertainment to users of all ages. It is a "living room for the city", providing a learning hub for visitors and locals but also a vibrant landmark building to be enjoyed and used.



Plan depth

The library is quite deep, however the central atrium and glazed façade maximise natural daylight penetration, while heat recovery on the mechanical ventilation system maximises energy efficiency.

Renewable Energy

Whole life costing (WLC) was a tool used by the team to compare design options and identify sustainable design solutions which would deliver the most economic and environmental benefits over the life of the building, rather than choosing solutions based on the lowest capital cost which would benefit the developer but not the occupier of the building. WLC was used in conjunction with a renewable energy feasibility study to identify the most suitable renewable energy technologies for the library.

The overall study determined that boreholes for pre-heating and pre-cooling air distributed through the building via the air handling units were the most appropriate solution. At a cost of £300,000 this was a very expensive option for library, but the team decided to proceed as it would provide the greatest benefits to operation of the library. This study was undertaken in the early stages of design, however following further design of the building and incorporation of additional passive design solutions such as solar shading, the need for active cooling in the central library area was designed out. A thermal review determined that temperatures within the library would be comfortable without the need for cooling. As such, the borehole system was deemed unnecessary.



Cardiff Library

BDP Professions

architect, interior design, sustainability consultant

Other Consultant

Arup: structural engineer

Forman Roberts: mechanical & electrical engineer

Gardiner and Theobald: quantity surveyor

Procurement Route

Design & Build

Size 5,167m² library, 1,741m² retail

Start on Site 2007

Completion 2009

Contact

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