The DESIGN MUSEUM Publication of Information

Project Description

A centre of design for London

The goal of the project was the creation of a world-class museum of design in the heart of London, with galleries for permanent and temporary exhibitions, education spaces and a design reference library. The architectural vision developed to realise this goal was profoundly shaped by the fact that the new Design Museum's permanent home is within the skin of an existing building - the Grade 2* listed former Commonwealth Institute, designed by Robert Matthews, Johnson-Marshall & Partners, which opened in 1962. Driving the process of reclaiming this iconic example of post-war British Modernism as a contemporary cultural space was the wish to preserve and enhance its inherent architectural qualities for future generations of Londoners and visitors to the city. The intended outcome was a building that would feel as though it had retuned itself.

A new public space in Holland Park

This process of natural evolution and readjustment began with the character of the relationship of the new Design Museum with its setting in Holland Park. Freedom of access allows the public to move comfortably from the green spaces of the park to the interior spaces of the building in a relaxed, open and instinctive manner.
The main public approach to the building continues to be from Kensington High Street. Visitors pass under the Kensington High Street apartment block and cross a landscape plaza to reach the Museum. Located in a ground floor unit of the apartment block, the Design Museum shop marks the Museum's presence on the street. A flexible layout allows the shop's interior to be changed to reflect current exhibitions or to accommodate seasonal display.

Structure

One of the key elements of the project is the structural design developed by Arup to retain and preserve the original roof structure. These complex proposals allowed the internal floors of the existing building to be demolished, a new basement to be built across the site and the new structure of the museum building to be constructed under the roof.

The existing fabric of the building shaped how the new structural design developed. The rhythm of the edge support mullions sets up a typical structural grid of approximately 9m x 9m. Shear walls, built in as part of the service cores distributed through the building, brace the structural grid.

A series of piles, temporary beams and trusses were built around and through the existing structure to support the internal roof support columns and the roof edge support mullions. The external walls and internal structure were then demolished and the new structure built up around the temporary works until it could support the roof. The temporary supports were then removed and the new structure completed, allowing the fit-out work to commence.

Dynamic spatial experiences

Once inside the new interior, visitors will be naturally drawn up through the atrium space towards the hyperbolic paraboloid roof structure – the defining architectural gesture of the original design. The central staircase leads to the mezzanine level - an echo of the original dais, at the centre of the exhibition building. As in the original building, this level offers a chance to view the whole building, as well as providing space for exhibiting a key piece from a visiting exhibition or the permanent collection. As one moves upwards through the central void, so the framed view of the roof will widen and transform, assisted by the enlarged openings in the top floor slab, creating a dynamic experience that will change according to the time of day and the light conditions. Providing sightlines to all of the building's principal spaces, the central void acts as a key medium for orientation and navigation. From the entrance foyer, a visitor will see the entire route through the building, winding up from the central platform around the opening at first floor level to the permanent exhibition space on the top floor and the sweeping curve of the roof.

Layout

The programme is split between five floors, providing a total area of around 10,340m2. The museum's main exhibition space is located on the ground floor, together with the café, bookshop and design store. The first floor contains the administration and learning departments, design reference library and an area of open storage where the museum's collection can be accessed for research purposes. An exhibition of the permanent collection, designed by Studio Myerscough, is located on the top floor, where the roof soars up to 16m above one's head, alongside the restaurant, event space and the members' room, all of which

enjoy views over Holland Park. The second exhibition space and the auditorium are located at basement level, which also accommodates curatorial spaces, workshops, kitchen and back of house areas.

Materials and quality

The internal fit-out of the building is designed to complement the existing envelope and act as a backdrop for the permanent exhibition and exhibits throughout the Museum. As such the material palette is purposefully restricted and hard-wearing, with concrete terrazzo floors at basement and ground levels and white oiled oak used for the public route up through the building and for wall panelling throughout the building.

The key to the success of the fit-out was the care and attention to detail with which these materials were put together, to achieve a high level of finish. The intent was to create a cohesive architectural interior that will provide a lasting backdrop for the Museum's ongoing programme of exhibitions.

BREEAM Rating and Score

Very Good

Key innovative and low–impact design features of the building

The project was planned to minimise - where possible - embodied carbon, as well as carbon emissions. The following steps have been taken to reduce overall energy consumption:

- Re-use and comprehensive upgrading of an existing landmark building, significantly reducing the embodied carbon impact of the creation of a new home for the Museum. Wherever possible, thermal elements have been specified to reduce in-use carbon.
- In the design of the Shell & Core structure, efforts were made to use the works as part of the final proposals. The existing perimeter mullions were originally hollow 'C' sections. These were filled with concrete earlier than required and used during the temporary works condition to support the roof. The first and second concrete floors were also overstressed to - in effect - lift the perimeter column loads off the temp works and thus minimise sequencing. Consequently, counting the whole of the first and second floors, 25% of the temporary works were utilised in the final Shell & Core construction.

- The external facade system incorporates fritted glazing and is complemented internally by solar shades. This helps to reduce the amount of light entering the building and therefore controls solar heat gain. This in turn helps to minimise the cooling load within the building.
- The original brick plinth of the building has been rebuilt with improved thermal performance.
- Translucent panels have been introduced into the south and west facades to allow natural daylight into the building's education and office spaces. These will help to reduce the amount of artificial lighting required in these spaces during the day.
- Connection of the Museum building to a new high-efficiency and low-pollution estate-wide CHP network provides power and heat with minimal transmission losses.
- Galleries are serviced via displacement ventilation, providing air at low level with warm air rising to a stratified zone. This achieves optimised heat recovery in winter and provides significant free cooling opportunities in summer, compared with a conventional high-level air supply cooling system. The overall result is a significant reduction in energy consumption.
- Installation of high-efficiency plant, featuring ventilation with low specific fan power and high-efficiency chillers for when cooling is required.
- Lighting throughout the new building is principally by high-quality, high-efficiency LED fittings.
- Energy-efficient lifts were specified.
- Grey water supply is provided by the landlord to flush toilets.
- We used timber throughout the building, for elements of the mezzanine level and the second floor structures and for floor finishes and wall panels. Timber has low embodied energy, is easy to recycle and bio-degradable
- Where appropriate we specified materials from the green guide. Additionally we specified materials that are robust so they will require less maintenance.
- The base build team applied BREEAM to ensure sustainable practices were followed in materials use, management and construction.

Energy consumption across the completed building is measured by the following means:

- Meters monitor all energy sources in real-time. This determines high out-of-hours usage and enables the creation of base-line carbon emission levels and reduction targets against these. As part of the mechanical and electrical installations, these meters meet the requirements of current Part L Building Regulations and base build BREEAM requirements.
- Sub-meters monitor each major energy-consuming department within the building – kitchens, lounge, bar, café, individual galleries and lifts.
- Separate meters are provided for lighting and small power throughout the building.

The data output from the various smart meters and sub-meters is analysed so as to identify peaks and instances of unacceptably high energy consumption. This informs a continuous process of management and adjustment of plant and equipment for optimum energy efficiency. It also feeds into the development of energy-efficient work plans for museum and staff buy-in and adoption.

Cost Information

Total overall Shell & Core cost of Design Museum	£2,019/m2
Total cost of DM related landscaping works	£ 987/m2
Internal fitout Constrcution cost	£1,319/m2
Internal fitout Services cost	£ 880/m2

Building Area Analysis

Gross floor area – 1.0386 hectares (10,386m2)

Function Areas:

Education – 1067m2

Exhibition Spaces – 2183.5m2

Retail and Catering – 724.4m2

Auditorium – 208.8m2

WCs – 239.3m2

BOH – 1324m2

Total Function Areas – 5747m2

Area of circulation – 2052 m^2

Area of storage – 413 m^2

% area of grounds to be used by the community

Within the overall site, 35% of the grounds can be used by the community, in the approach to and to the north of the Museum building.

% of building to be used by the community

Within the Museum, 79% of the building can be used by the community.

Predicted electricity consumption from fossil fuel

82.55 kWh/m^2

Predicted water use

0.547 m^3 / person / year

% predicted water use to be provided by rainwater or greywater

75% predicted water use to be provided by rainwater or greywater

The steps taken during the construction process to reduce environmental impacts

Site deliveries were all pre-booked, to reduce gate waiting and idling times.

Environmental performance was monitored through the lens of a UKAS-certified ISO 14001:2004 Environmental Management System. The project team achieved all its targets for energy, waste and water reduction throughout the construction programme, which is testament to level of care, planning and management taken by our construction partners. Other sustainability highlights included:

- Procuring 100% of all timber from sustainable sources
- More than 45% of applicable materials were procured with responsible sourcing certification (BES6001)
- 100% of non-hazardous construction waste was diverted from landfill during the fit-out process

A list of any social or economically sustainable measures achieved/ piloted

During the shell and core construction period, Mace, the main contractor, actively encouraged local labour and suppliers. Workers were incentivised to maximise stay on site, with rewards for early starters and late stayers. Willmott Dixon Interiors, the contractor for the Museum's internal fit-out, invested considerable time and resources supporting local community initiatives throughout the construction programme, which included: repairs and maintenance to the public spaces and footpaths in the adjacent Holland Park, including the supply of essential maintenance equipment, which can be used to support the hours of maintenance required to keep the park operational. They also funded the erection of bat boxes and wildlife habitats.

The local Ecology Centre also took receipt of a giant 3D Plant Puzzle, which will be used to educate the hundreds of school children that use the centre every year on the importance of ecology and wildlife management. A series of school and educational visits took place for young people in and around the London Borough of Chelsea & Kensington – educating them on the construction industry and the processes involved in designing and building a scheme like the Design Museum.

During the construction project, the Design Museum achieved an impressive 'exceptional' rating against the Considerate Constructors Scheme Code of Considerate Practice, which monitors the project against the following five competence areas: Caring about Appearance, Respecting the Community, Protecting the Environment, Securing Everyone's Safety and Valuing the Construction Workforce.