Houldsworth Building_University of Leeds

The Brief

ADP was commissioned by University of Leeds to develop design proposals for the comprehensive refurbishment and improvements to the building envelope of the Houldsworth Building.

The project involved the comprehensive refurbishment of the seven-storey sixties-built School of Engineering building, creating new faculty, teaching and research facilities on the upper floors and the refurbishment of key facilities on the lower floors including lecture theatres, a IT 24 hour drop-in cluster, additional teaching spaces and a new research laboratory. The budget for the project addressed backlog maintenance for the whole building, including a full mechanical and electrical systems strip-out and replacement, and improvements to the building envelope including a new replacement roof covering, roof insulation, statutory compliance upgrades, and a full window replacement.

KEY FEATURES

» Complex and highly technical refurbishment across six floors, providing teacging and research environments for engineering and architecture schools
» BIM exemplar project for detailing and consultation
» Utilised existing materals and structure to improve energy efficiency
» Involved both recladding and refurbishment

The upper floors provide a suite of modern laboratory facilities, new computer suites, a new teaching space for the School of Architecture, part of the School of Civil Engineering, and a new home of the relocated Faculty Services suite.

Although the project prioritised urgently needed backlog maintenance and statutory compliance issues for the School of Engineering, the project also afforded the end users the opportunity to consider strategically the location, optimum size, and function of present and future administration, teaching, and research spaces. ADP was originally commissioned to carry-out a review of the existing facilities assessing both current and future accommodation needs, function and resource needs of the entire Faculty of Engineering and the benefit of its proximity to the Faculty of Mathematics and Physical Sciences. The study identified the historic issue of piecemeal and uncoordinated refurbishment over many years resulting in the fragmentation of research groups and space inefficiencies.

The project gave us the opportunity to re-allocate research groups, offices and teaching spaces to suit the programme of the building, creating open-plan, flat floor flexible teaching and research facilities and space efficient offices. New thinking included the creation of large, contiguous research laboratories based on a 'superlab' concept creating zones for equipment and activities whilst maintaining generic

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'wet chemistry' type preparation space. Modular laboratory furniture provides flexibility and enables potential transitions of use between teaching and research. The administration hub was moved to upper floors, freeing up spaces up for undergraduate facilities closer to entrance thresholds.

Key Challenges
Due to the complex phasing needs reflecting the 'live' working research environment of the building a number of phasing strategies were developed and presented to the end users, potential external contractors, and consultants for feedback and comment on which strategy would be the most feasible, cost effective, straightforward to build, and cause the least disruption to the daily operation of the School and Faculty. During the stakeholder consultations five phasing strategies were interrogated reflecting the complex nature of the works.

As the Houldsworth Building will remain fully occupied during the proposed two year phased works programme it was vitally important to maintain facilities for teaching and research. Temporary accommodation needed to be identified throughout the construction period.
Additional challenges were the complexity of refurbishment working around existing laboratories and specialist equipment. This was achieved through the point cloud survey converted to BIM object data recording the outline dimensions of every piece of retain equipment and data added regarding service and environmental requirements. This resulted in the delivery of complex room data sheets and 3D room loading drawings, each discussed and verified with the end users over an extended consultation and design period. The data gave us a 'to the millimetre' walk-through view of complex rooms such as laboratories and workshops.

This allowed the client, end users, fellow consultants to observe the rooms remotely via our CDE and to plan for the logistics of refurbishment such as existing specialist equipment protection during the building works, planning for new servicing (gases, power and data) and for the planned removal of equipment during the building works. The point cloud model was then converted into basic 'block' data of objects in the Revit model providing an appropriate LOD for the contractor to work with.

Design Solution
The top floor (level 5) of the building has been opened-up to provide a large, flexible flat-floor teaching spaces for the architecture students. Movable screens have been added, and a central bulkhead created to provide a service zone, acoustic baffles added to create openness and natural light. Levels 5 and 6 have also been opened up for flexible IT clusters, group offices and larger laboratory spaces.
By removing walls, including storage walls and glazed screens, we improved the transparency and natural light to the centre of the building. The team designed bespoke wayfinding graphics and branding for the spaces reflecting the curriculum.

Where possible existing features have been retained such as the parquet flooring (receiving a light colour wash), and terrazzo floors.

We engaged collaboratively with stakeholders analysing work patterns to develop optimum layout and to reduce distances. We identified the provision of shared equipment areas in centrally accessible locations to avoid duplication and separated noisy/dirty equipment to improve quality, ensuring separation of high hazard gases. We explored layouts to facilitate the teaching of teach group sizes, large and small, enabling access to a greater range of equipment and resources. We modelled layouts and included a 'Shop Window' for teaching and equipment and incorporated the latest IT/AV to enhance the teaching experience.

The key design feature is transparency and flexibility, improving utilisation and the quality of facilities offered for teaching, administrative support, and research.

Sustainability
This project was not subject to a BREEAM assessment due to the complex nature of the refurbishment however the project was expected to comply with the University's Sustainability Guidance for refurbishments including achieving an air-tightness rating of 8m3/hr/m2. This involved a full window replacement (over the seven storeys), a new roof covering with additional roof insulation, and the lining of the internal face of external walls.

Other energy saving features included; task lighting, low energy light fittings, improved daylighting throughout, PIR lighting, BMS controls, new energy efficient mechanical systems and plant, retained natural ventilation to office areas, new thermally efficient windows, new insulation layers to the roof and external walls.

Client:	University of Leeds
Services:	Architectural
Contract Value:	£23m
Completion Date:	September 2017