

KINGSTON UNIVERSITY TOWNHOUSE

RIBA Stirling
Prize 2021
Winner

PROJECT VALUE - £41M

CLIENT - Kingston University

PROJECT MANAGER - Turner & Townsend

ARCHITECT - Grafton Architects

STRUCTURAL ENGINEER - AKT11

M&E ENGINEER - Chapman BDSP,
DES & CMB

MAIN CONTRACTOR – Willmott
Dixon

PCE’S SCOPE OF WORKS -

- Precast concrete columns
- Precast Beams
- Solid walls
- Precast concrete wall units for stair and lift core boxes
- Hollowcore flooring
- Double Tees

PCE CONTRACT VALUE - £8M



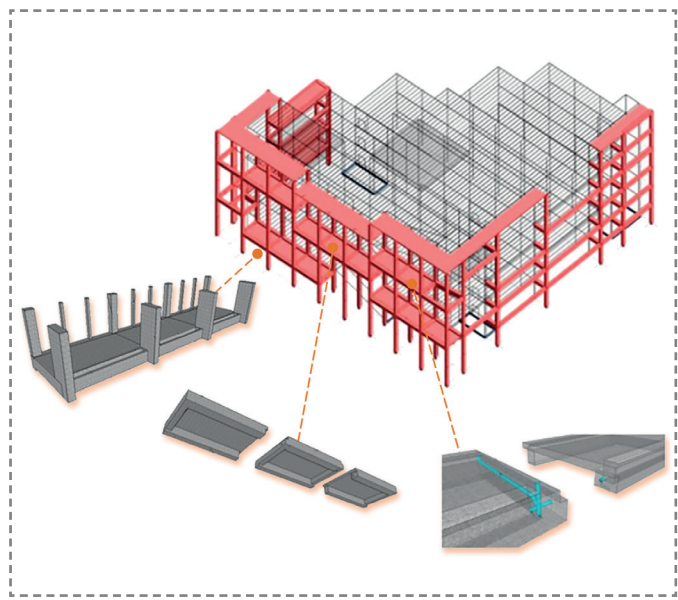
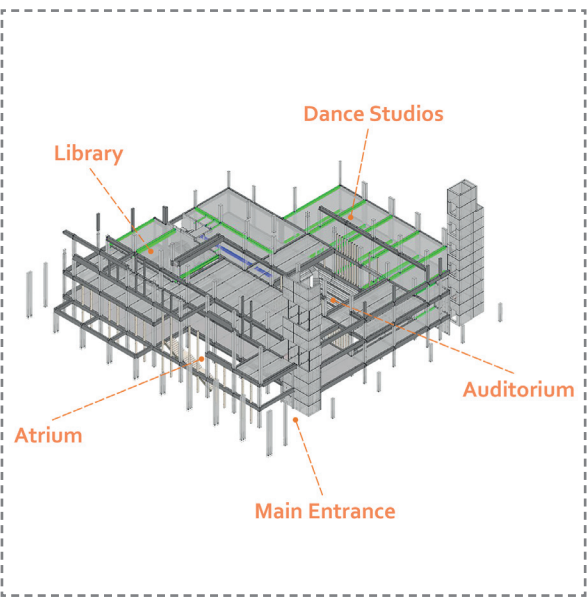
Introduction

The new Townhouse Building at Kingston University represented a key milestone in the universities broader masterplan development and its drive towards flexible, interdisciplinary learning spaces which link the university to the wider community. The conceptual design of the building is one which seeks to anchor the Penrhyn Road campus as a place of excellence for technology and performing arts whilst creating a sense of community and arrival and belonging for those who study at and visit the campus. The architect’s vision was to create a building with little or no boundaries in terms of vertical and horizontal spaces, and internal and external spaces. A building whose architectural integrity relies on the structure and its materiality to accentuate the beauty of the building and to create dramatic and inspiring spaces for those who use the building. A robust, high quality and sustainable building which utilises the thermal mass within the concrete frame to regulates the internal environment whilst minimising energy usage. Externally the highly imaginative façade is made up of an open undercroft colonnade at ground floor to invite public use and activity, above which three cascading terraces form hanging gardens giving a sense of landscape connecting from ground level to the top of the building.



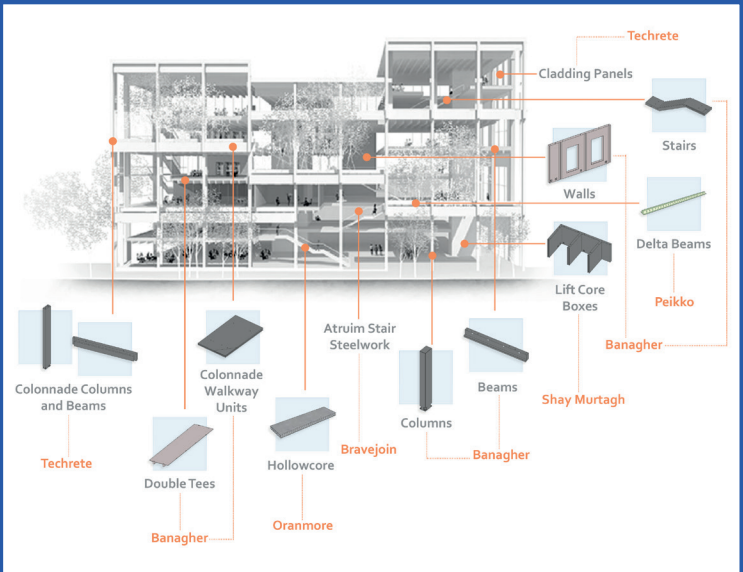
Hybrid Bespoke Structure

The buildings external expression seeks to incorporate a visually rich façade in terms of articulation and detailing, with an emphasis on assembly of materials in a manner which is finely detailed and robust, ensuring the longevity of the quality of the appearance of the building. The interior of the building is predominantly defined by a column and beam structural system supporting exposed concrete ribbed slabs, that defines the quality and character of the spaces within and are influenced by the type and quality of finish of the concrete.



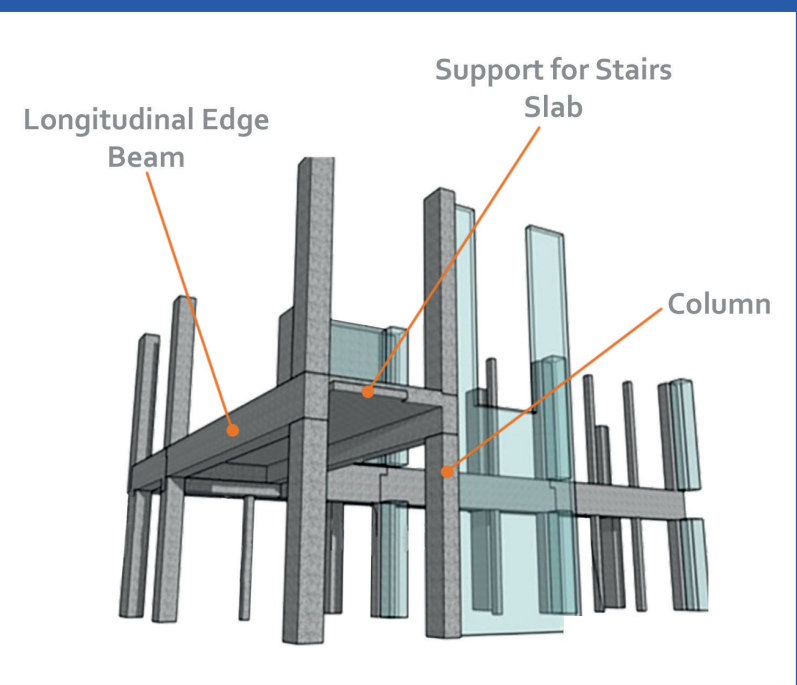
Project Features

Vertical circulation through the structure is primarily via a full height atrium at the front elevation of the building which has three large feature stairs spanning the length of the atrium between floor levels. A composite solution was developed for the feature stairs as spans were up to 15.0m long by 4.4m high. The solution combined a fabricated structural steel frame with integrated stair trays. The soffit of the frame was clad in precast concrete panels to give the appearance of concrete and the stair trays were cast on site to keep the weight of the frame to a minimum. Colonnade structure is independent from the Superstructure for movement but retains lateral stability from the main stability structure. Construction of the colonnade was a significant challenge due to the complexity of the embedded services strategy, difficulties in accessibility and the temporary stability requirements. The colonnade is manufactured from a high-quality architectural finish concrete with all surfaces exposed except for those concealed by adjoining elements and structure. The temporary restraint of elements had to be discreet in terms of how struts and props connected to the elements and in most instances, stabilisation had to come from the previously constructed colonnade structure. Careful sequencing combined with a design solution heavily influenced by the assembly methodology and PCE’s ‘in-house’ construction expertise made the delivery of the colonnade possible.



Key Metrics

- A 10,000m² Concrete Frame completely exposed in terms of concrete finishes and connections
- Innovative TABS system integrated within Double Tee slabs to allow maximum optimisation of the buildings Thermal Mass
- Integrated services design within the structural elements
- Key architectural design aspects such as Feature Atria, Auditorium and Roof Gardens
- Structural Architectural Concrete Colonnade creating external terraced spaces along with linkage to the adjacent pedestrian areas
- The CO² footprint was less than 180Kg of CO₂/m² for the total building floor area



The Kingston University Estates Team required a heating and cooling solution for its new town house development, which could fulfil the following requirements: reduce energy loads, maintenance and carbon emissions. It was imperative that a long-term financial benefit could be achieved. TABS assisted Kingston University with achieving its aim of a BREEAM ‘Excellent’ accreditation by reducing overall energy

consumption. It is highly versatile and can be adapted according to conventional and renewable energy sources, whilst also taking into consideration site dynamics. TABS only require a minimum adjustment in the water temperature of 4 or 5°C and works silently in the background (perfect for academic and work environments) as a “fit and forget” solution.

Project Delivery

Site logistics was a key challenge due to the tight site constraints along with the adjacency of the busy Penrhyn Road and the bus stops and pedestrian crossing directly outside the site. From concept through to delivery and life cycle, a sustainable solution was fundamentally at the heart of the Universities vision. The Townhouse is an exemplar demonstration of how the fabric of the building can be used throughout the life cycle of the building to minimise carbon emissions. In addition, the carbon footprint of the Construction process was significantly reduced through the use of a DfMA strategy combined with extensive use of cement replacements. Sustainability calculations following project completion show that for offsite manufactured precast concrete units, which accounted for over 85% of structural components delivered, the CO² footprint was less than 230kg/m² for the total building floor area.

