

# ASSEMBLY BUILDING C, BRISTOL

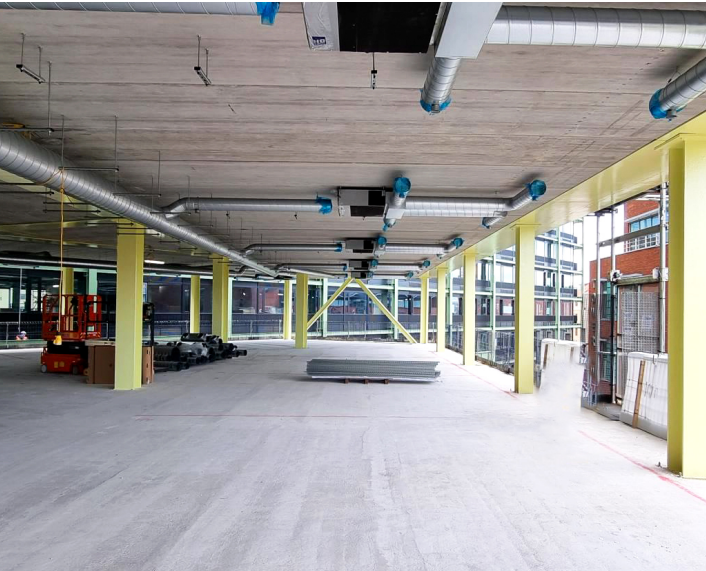


CLIENT - BELL HAMMER  
MAIN CONTRACTOR - GALLIFORD TRY CONSTRUCTION  
ARCHITECT - AHMM  
STRUCTURAL ENGINEER - ARUP  
M&E ENGINEER - DODD GROUP  
PCE SCOPE OF WORKS -  
• PCE HYBRID FRAME  
• ARCHITECTURAL RECON SANDWICH PANELS  
• 75MM STRUCTURAL TOPPING  
PCE CONTRACT VALUE - £5.3M  
DESIGN - PCE INTERNAL



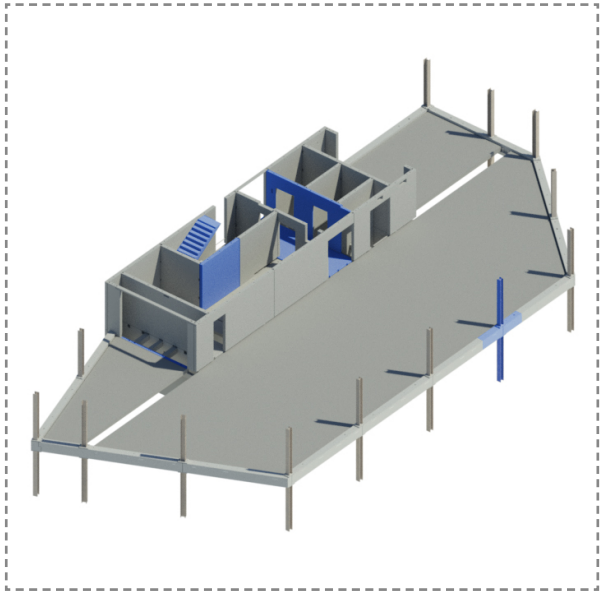
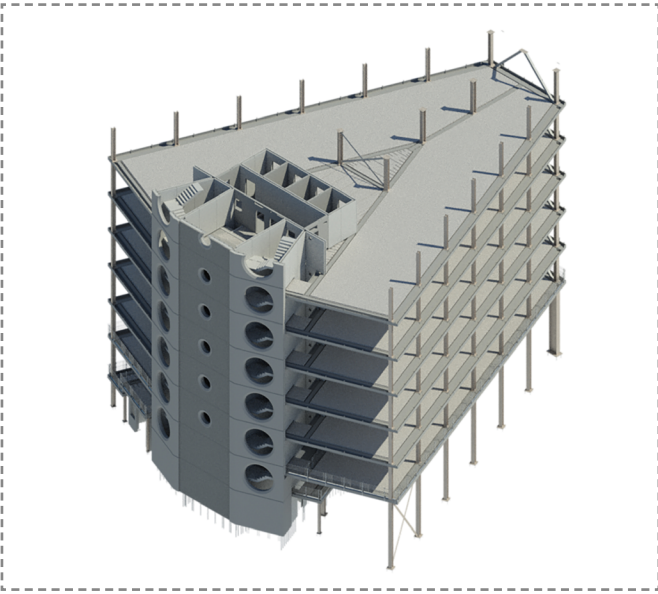
## Introduction

PCE Ltd was appointed by Galliford Try to use it’s innovative HybriDfMA Frame system to design, manufacture, and construct Building C, the third and final installation of Bristol’s Assembly development. Overlooking the iconic River Avon, Assembly C offers 14 storeys of modern and attractive office space. The Bristol centre development offers spectacular new public space and office buildings adjacent to the world-famous Bristol Floating Harbour which opened over 200 years ago in 1809. The development creates a revitalised destination for Bristol, offering a contemporary people-friendly workspace with a new floating pontoon. The plans drew from the character and context of the site, ensuring seamless integration it into the city. In what is a true hybrid structure, precast and insitu concrete merge with offsite manufactured structural steel to deliver an impressive structure, innovatively showcasing precast concrete in its exposed, ‘raw’ beauty.



## Hybrid Frame Structure

The HybriDfMA framed building provides 92,000 sq.ft of office space utilising PCE’s experience of Modern Methods of Construction (MMC), offsite engineering and providing as much offsite construction as possible in the busy city centre of location. Initial engineering design work for the 14-storey tower commenced months before starting on-site, with the team utilising their experience in HybriDfMA Frames to provide structural expertise and know-how, enabling PCE’s CAD technicians to initiate and deliver first class digital Building Information Models. Throughout the design engineering phase for the building, calculations for the principally steel framed structure with its complexity of steel columns and composite concrete/steel beams integrated with other precast concrete elements were diligently carried out to generate robustness, stability, and temporary works analysis models. These models, by giving attention to detail in the design process, fully considered the structures ability to withstand the design dead, imposed and wind loads to ensure valued engineering buildability and to reduce the amount of temporary works, bracing, etc, and resultant foundation loads.



## Project Features

Assembly C prominently displays exposed concrete as a defining feature. Meticulous attention to detail in design, manufacturing, and construction was pivotal, given about 75% of the structure is exposed with no cosmetic finishes. Precision was essential, from precast twin and solid walls to steel columns. This ensured the highest quality finishes, creating a visually stunning structure harmonizing with Bristol’s skyline. Symmetry was carefully considered, with exposed soffits and precast concrete hollowcore floor units revealing an impressive herringbone effect, precisely aligned through the core and walls.



The hybrid nature of the structure is clear to see. Composite concrete/steel Deltabeams seamlessly connect circa 200 tonnes of structural steelwork columns, supported by the stability provided by the North precast concrete core. This amalgamation aligns with the HybriDfMA structural ‘kit of parts’ approach, integrating 17-tonne architectural panels embellishing the building’s front with precast concrete elements shaping cores, stairwells, and steel columns. Building C showcases a fusion of traditional double-height steel columns, precise composite steel/concrete Deltabeams, and prestressed concrete flooring components, diligently crafted through Building Information Management (BIM) processes, meeting exacting tolerances. Exposed architectural panels feature a Rekli pattern acid-etched finish, enhancing the building’s aesthetic appeal. These 17-tonne precast concrete sandwich panels, featuring large diameter windows, were expertly assembled at the manufacturing facility, offering clear internal views of the exposed precast concrete stairs and core.



## Key Metrics

- 14 storey Hybrid Frame tower structure
- 32 week construction programme
- 330 product deliveries to site
- 2,460 off-site manufactured components
- No requirement for any external scaffolding
- Significant reduction in waste
- Addition of off-site quality control
- Assembled by PCE’s 12 multi-skilled site operatives
- Deliveries to a busy constricted city centre



In all, some 44 architectural and sandwich panels, 200 tonnes of steel columns, 440 twin and solid walls, over 1,000 hollowcore floor units, 249 steel Deltabeams with 9,000m<sup>2</sup> of reinforced structural topping came together to showcase a first class PCE HybriDfMA framed office building for the centre of Bristol. Great importance had been placed by PCE’s Engineers

and Technicians on attention to detail in the design of the architectural panels and all the visually exposed finishes to ensure a stunning, visual building, complementary to the Bristol skyline, which was a key demand of the city planners for this prestigious Bristol Development. Exposed architectural panels with their Rekli pattern acid etched finish showcase a spectacular front to the building along Narrow Plain, Bristol.

## Project Delivery

Modern Methods of Construction (MMC) were deeply integrated into the design stage, maximising opportunities for offsite manufacturing. This included the design of prefabricated joint reinforcement cages and the fixing of reinforcement bars to Deltabeams for floor structural topping before on-site installation. Extensive temporary works considerations minimised the number of locations used for propping purposes as part of the buildability and safe access provision design.

Detailed planning for construction commenced months prior to the first offsite component’s arrival, aligning with design and manufacturing phases for a speedy, safe, and efficient build. Assembly Building C faced logistic challenges due to its tight city centre footprint and access limitations. PCE’s collaborated closely with Galliford Try, ensuring structural components were swiftly unloaded and installed directly in their final position with minimal disruption. Each floor level was structurally completed in less than 13 working days, showing the speed of PCE’s systemised approach. Each floor consists of 84 precast concrete hollowcore floor units, 18 steel columns, 18 composite construction Deltabeams, 35 twin and solid walls, two sets of stairs and landings, 3 façade architectural wall units and 140 m<sup>3</sup> of insitu concrete. Identical levels enabled efficient planning, minimizing crane lifts, enhancing ease of onsite work. PCE’s versatile workforce delivered a comprehensive turnkey mixed structural material frame project, reducing the need for additional contractors, thus adding significant value for clients.

