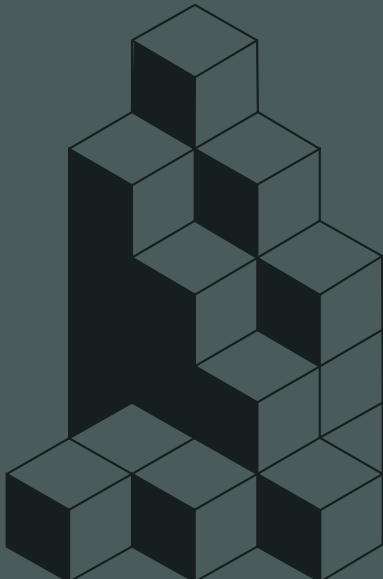


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MODULAR MANUFACTURED HOUSING

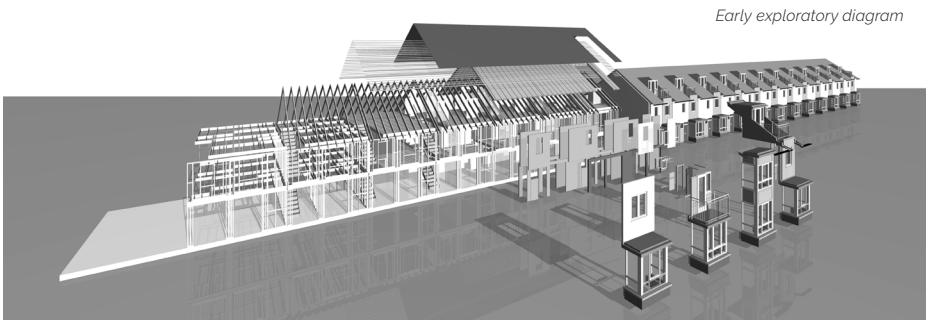
HTA Design LLP

Spring 2019



The making of a modern modular vernacular.

1



Early exploratory diagram

The past few years has seen an explosion of interest in factory-made housing. As our chronic housing crisis has deepened and become accepted by all political parties as a key challenge to overcome if we are to continue to prosper as a nation, the policy makers and commentators have turned towards off-site production as the only possible way to increase housing delivery.

This was the central notion of the influential 2016 Farmer Review of the construction industry. Modernise or die, which reported on an industry falling well behind in productivity due to low levels of investment and innovation. This stubborn resistance to move with the times has been blamed for increasing concerns over quality in housing construction, as the traditional approach to building struggles to comply with more onerous standards in an increasingly complex regulatory environment. It is also responsible for the drop in new workers entering the sector as construction is no

longer considered to offer a rewarding career in a technologically advanced world. Of course the housing crisis has emerged through rather many more complex factors around planning, development economics, affordable housing policies, and a market led approach almost entirely dependent on the private housebuilding industry. The Government fully acknowledged that the current system has failed to meet the needs of the nation in its 2017 report, Fixing our broken housing market, subsequently moving to enable Local Authorities to start building homes again.

Although there are a few signs that existing major developers are beginning to make the shift towards more modern methods of construction, there has meanwhile been a notable increase in the number of new players entering the market seeking to find better ways to do things. This is as much about delivering better housing that is not only more efficient to build, but also of higher design quality. These include pension funds proposing a long term investment in managed housing for rent, intermediate housing providers seeking more certainty around quality, programme and cost, and smaller developers who see innovation as a way back into a market overwhelmingly dominated by a limited number of major housebuilders.

Whilst there are plenty of challenges confronting those seeking to enter the



market in this way the benefits of enhanced quality, greater cost certainty, much quicker delivery with less disruption, reduced waste and carbon usage, as well as a safer working environment for employees, all make a compelling case for increased adoption of modern construction methods. Moreover, by embracing the possibilities of technology in construction, we can facilitate greater design focus, not only to the benefit of developers and architects, but above all to future residents of the homes and existing communities local to new developments.

As housing design specialists, HTA have long championed off-site construction as a means of driving innovation and improvements in both the design and construction of the UK's housing. These explorations began some 20 years ago on significant urban projects such as Greenwich Millennium Village and were developed through a series of more suburban projects in Upton and Allerton Bywater (pg 72), through the 2007 Government's Design for Manufacture initiative. This approach, that considers the architect as a designer in industry, with the full range of skills required to balance any competing interests, has helped drive forward the industry that can shape the future of the housing market not only in the UK, but increasingly internationally as projects such as Apex House in Wembley (pg 8), and 101 George Street in Croydon (pg 32), show the world what is possible.

About HTA Design.

HTA are an award winning housing practice focused on designing better homes and creating great places. In 2019 we celebrate our 50th year in practice.

We bring together planners, architects, landscape architects, interior designers sustainability specialists, and others to create a collaborative way of working that aims to deliver the very best in housing design.

HTA's long term commitment to improving the quality of housing has naturally led to us working more closely with contractors and manufacturers to develop the role of architects as designers in industry. Over the past decade we have completed the wide range of projects included within this booklet, all delivered using various factory manufactured systems. In particular the use of fully volumetric modular construction has helped highlight to the housing sector the wide range of benefits inherent in more innovative forms of delivery, as well as driving significant growth of our own practice during this period.

The past 12 months has seen the completion of modular student housing schemes at Savoy Circus (pg 14) and Holloway Road (pg 18), and perhaps most significantly the



rapid convergence of modular construction with the booming build to rent sector as large projects at Greenford Green (pg 30) and George Street, both for Greystar and delivered by Vision Modular systems will see the rapid completion of new professionally managed and institutionally funded rental housing to the highest construction standards.

With offsite construction...

On completion George Street, in Croydon, will at 44 storeys be the tallest modular structure in the world. Meanwhile we have seen increased investment in harnessing the benefits of modular construction for more suburban family housing, spurred on by our winning entry to the 2018 Sunday Times Terrace of the Future competition (pg 60).

Our experience is that modular construction drives a more collaborative approach between client, design team and constructor, enabling each to focus their expertise in the most focused way, resulting in greater efficiency for all involved, whilst delivering vastly improved outcomes in higher quality of design and construction, much reduced construction programmes and greater certainty of delivery.

As a result we have restructured our business to move from a traditional architecture practice to a more inter-disciplinary

structure that facilitates traditionally linear design stages to be explored through concurrent design loops to better enable the development and manufacturing process. Through ongoing collaboration with our manufacturing clients we are able to drive improvements in the design in every new project we take on together, resulting in reduced costs but improved profitability through greater efficiency. Over the past 5 years we have delivered some 7,000 modular homes, the experience of which we seek to further across the industry.

Within this document we set out some of the key projects recently completed or currently in progress, with an invitation to get in touch to hear more about the benefits, visit some of the projects, and discuss how off site construction can help you deliver better homes, faster.

The number of trips by vehicles to site is typically reduced by:

80%

Making Modular London

Case Studies



Modular projects
completed in London
since 2013

Not to scale

Olympic Way

632 modules

24 months on site

21 storeys



Grand Felda

896 modules

18 months on site

18 storeys



Felda House

529 modules

21 months on site

21 storeys



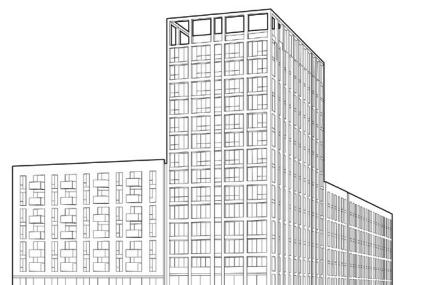
Greenford Quay

Block 5

1,100 modules

19 months on site

15 storeys



Savoy Circus

338 modules

18 months on site

9 storeys

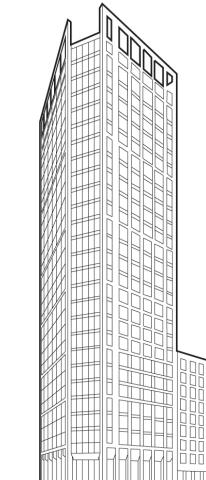


Highbury II

310 modules

9 months on site

13 storeys

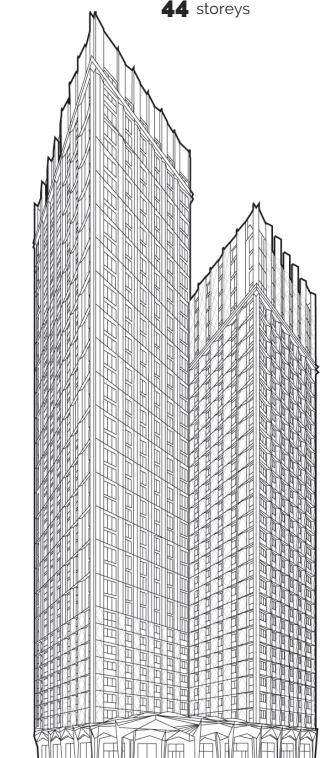


Apex House

679 modules

12 months on site

29 storeys



101 George St

1,400 modules

25 months on site

44 storeys

Apex House

Wembley

Location:

LB Brent

Accommodation:

558 Student units

Client:

Tide Construction

Manufacturer:

Vision Modular Systems

Operator:

Scape

Modules:

679

Completed:

2017

Delivery:

12 months

Apex House in Wembley sets the standard in the design of high rise student housing. Completing the redevelopment of an entire urban block by Tide Construction, at 29 storeys it is the crowning achievement and the tallest modular building in Europe.

In common with all of our modular design work, the architecture elects not to express the mode of construction any more than we might with a reinforced concrete frame. The elegant white GRC cladding emphasises the verticality of the tower, with corners that emphasise its

symmetrical form when viewed from surrounding streets, whilst masking the highly regular and repetitive accommodation within.

The building contains 558 student rooms with shared living spaces, generous internal amenity space, and a sheltered courtyard garden, along with management and maintenance facilities. Designed to optimise the benefits of the Vision Modular system the project was delivered from concept to completion in just 30 months, with work on site completed in just 12 months.





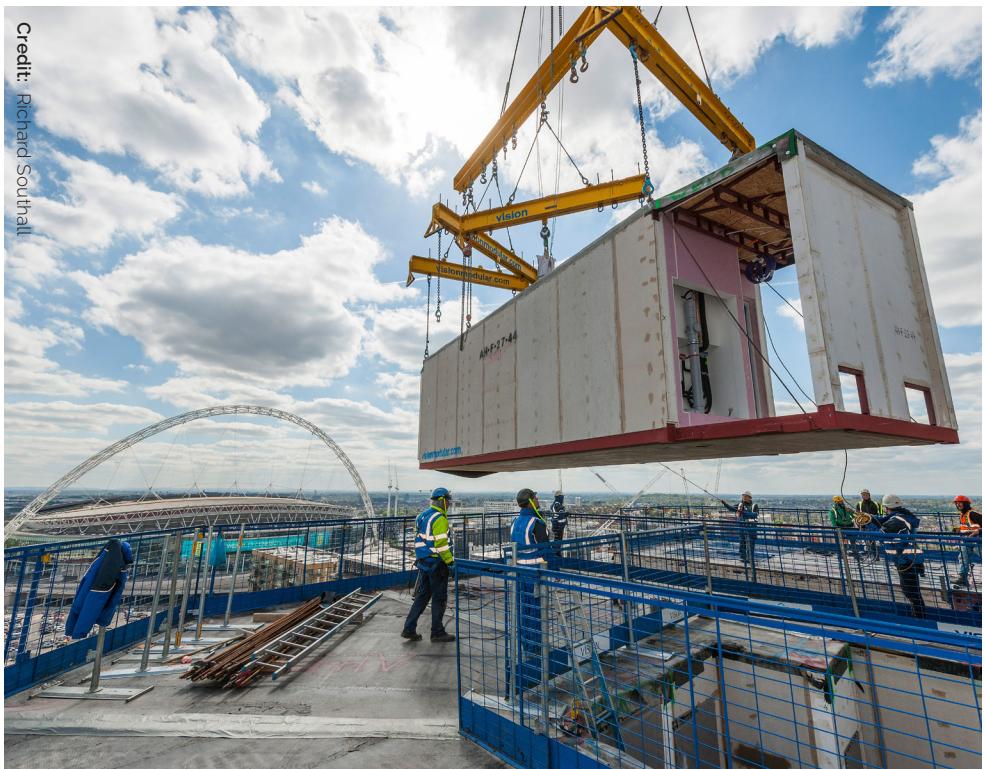
Apex House



Facade module, street level & interior



Credit: Richard Southall



Apex House



Modules craned in position

Savoy Circus

Hammersmith

Location:

LB Hammersmith & Fulham

Accommodation:

306 Student units

Client:

Tide Construction

Manufacturer:

Vision Modular Systems

Operator:

Chapter

Modules:

338

Completed:

2018

Delivery:

18 months

The construction of Savoy Circus, known as Chapter White City, completes a series of student housing schemes designed by HTA and delivered by Visions Modular Systems. It sees the redevelopment of a site vacant for over 20 years with a contemporary building that sits sympathetically within a conservation area, with references to the famous cinema that once sat on the site.

The building provides 306 student studios, with social space, cafe, administration and gym at ground floor, whilst the basement contains laundry, bike storage and servicing along with a large common room opening

onto a sheltered landscaped courtyard.

The building is formed of two 6 storey flanks fronting Westway and Old Oak Road with a taller 7 storey corner element announcing the building with the main entrance. The lower flanks have dormer windows within top floor modules.

Architectural details include corbelled brick corners, reconstituted stone window surrounds and glazed brickwork. The material palette has been influenced by the conservation area with glazed bricks a reference to the site's heritage.





Savoy Circus



Brickwork details



Highbury II

Holloway Road

Location:

LB Islington

Accommodation:

257 Student units

Client:

Tide Construction

Manufacturer:

Vision Modular Systems

Operator:

Chapter

Modules:

310

Completed:

2018

Delivery:

9 months

295 Holloway Road is a remarkable project for the quality of finish and speed of delivery on a site riven with complexity. The site is directly adjacent to Holloway Road Underground station, and the Piccadilly line, along with access to a major substation, whilst Holloway Road and Hornsey Road required round the clock access. The building houses 257 student units over 13 storeys and was completed quite remarkably in just 9 months on site. Originally designed by CZWG architects

to detailed planning approval, HTA completed several workstages concurrently to change external materials to take account of changing regulations, as well as internal floor plans to achieve 4 additional rooms on each floor and a 12% increase in the size of ever room. All this whilst retaining the composition of the building's volume and window positions. HTA was appointed in June 2017 and the first students moved in September 2018, a project programme of just 15 months.





Highbury II



Street level & module delivery on site

101 George St.

Croydon

Location:

LB Croydon

Accommodation:

546 Homes

Client:

Tide Construction

Manufacturer:

Vision Modular Systems

Operator:

Greystar

Modules:

1,400

Completed:

2020

Delivery:

25 months

Our scheme for 101 George Street, is on a prominent site directly opposite East Croydon station, vacant for many years despite a series of planning consents. A pair of connected towers rising to 44 and 38 storeys, will provide 546 new homes formed from some 1,400 modules, with a range of shared amenities including gyms, lounges and private dining/event rooms. The ground floor is largely public with an incubator hub for businesses, café and art gallery with a winter garden forming a civic space to signal the buildings entrance, create a moment of relief on

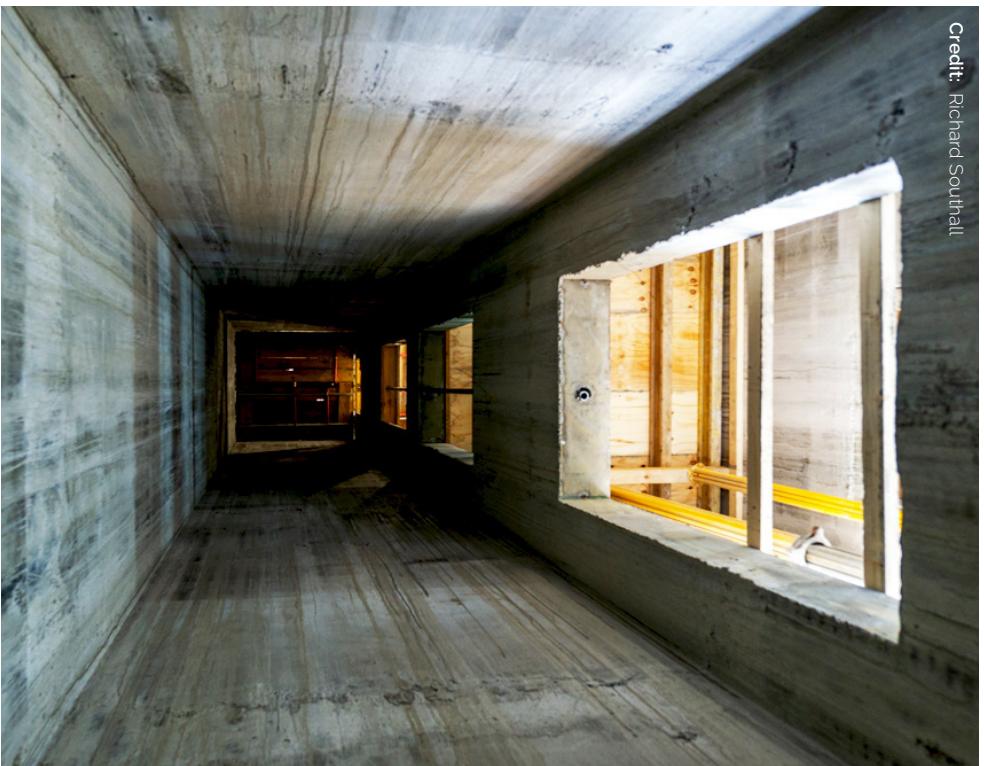
busy George Street, and create a gateway to the emerging cultural quarter. Double height bays clad in glazed terracotta feature a vertical emphasis for the taller tower whilst the connecting tower uses diamond shaped panels that echoes mid-century modern examples and give a distinctive appearance enhanced by the play of light and shadow. The significantly reduced construction time, being delivered in just 25 months, will minimise disruption to the busy local area and will be the tallest modular building in the world.



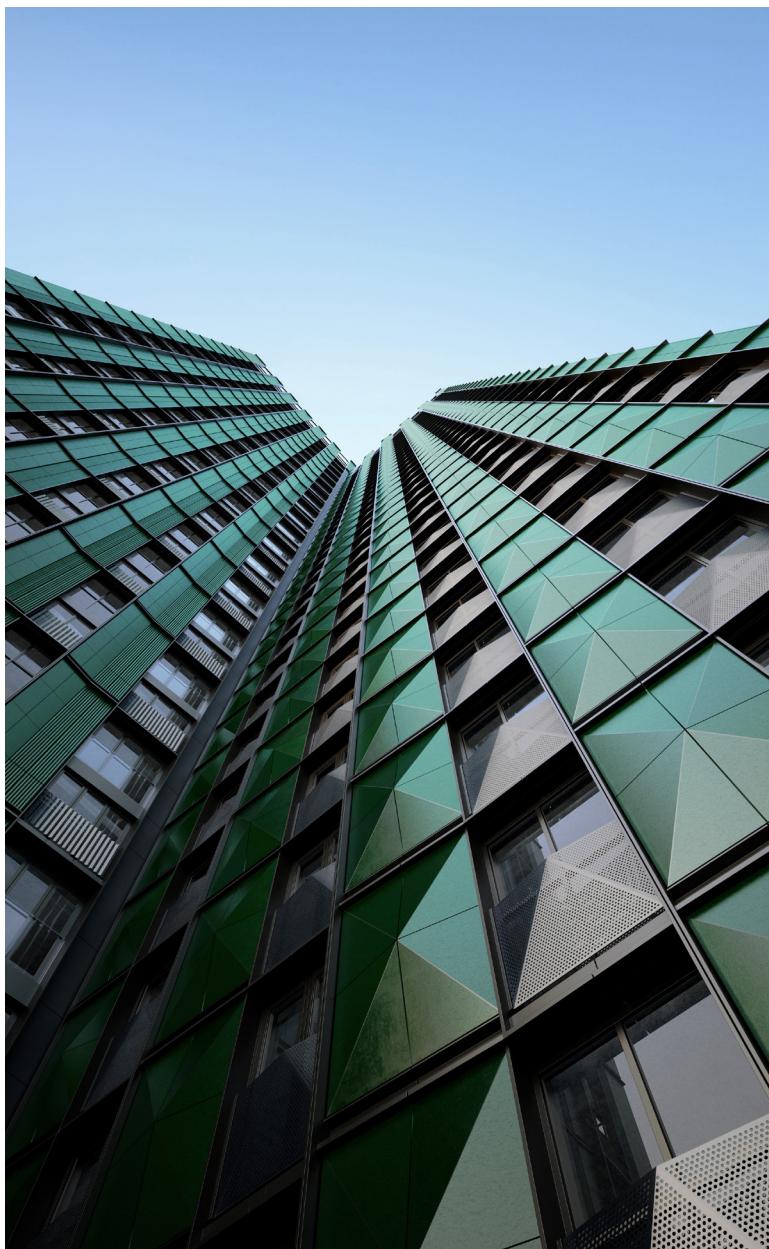
Credit: Forbes Massey



Credit: Richard Southall



Credit: Richard Southall



101 George Street

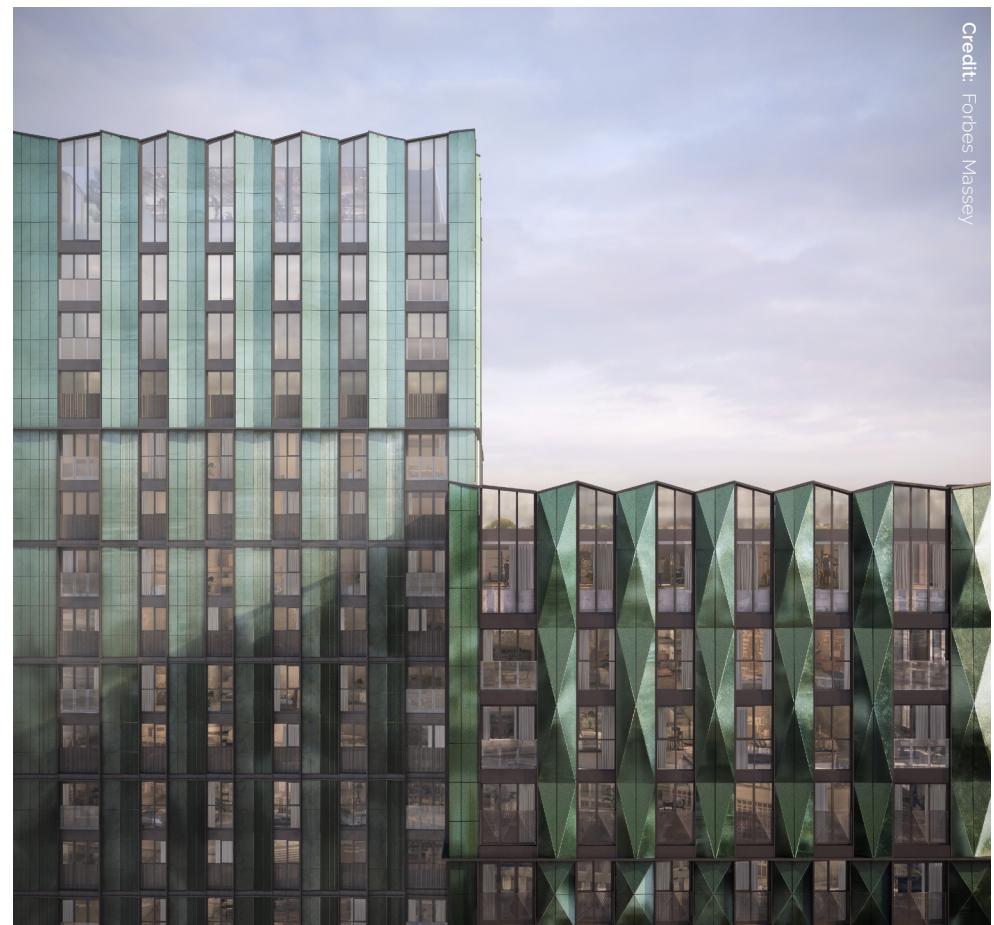


Facade CGI & core construction

Credit: Tide Construction



101 George Street



CGIs & model photograph

Credit: Forbes Massey

Greenford Quay

Greenford

Location:

LB Ealing

Accommodation:

1,965 Homes

Client:

Greystar

Manufacturer:

Vision Modular Systems

Operator:

Greystar

Modules:

1,100

Completed:

2020

Delivery:

26 months

The growth in purpose designed and built, professionally managed housing for rent is highly suited to modular construction as improved quality, reduced defects and certainty of programme and cost enables projects to be completed in half the time of traditional construction reducing the costs of funding the build. HTA were masterplanners and lead architects for the 2000 home scheme for US multi-family operator Greystar, creating an entirely new neighbourhood around the Grand Union Canal in Ealing, one of the first bespoke build-to-rent

development of scale in the UK. HTA led the design development to facilitate the modular delivery of the first building to be delivered, block 5, including 379 apartments and extensive resident amenities including lounge and dining room, gym, bar and games room along with outdoor courtyards and roof terraces. A generous double-height entrance sits in prime position on the edge of the main square to welcome all residents, with the remainder of the ground floor given over to commercial use, activating the façade and surrounding area.





Greenford Quay



Block 5 on site & public realm



Greenford Quay



Communal interior spaces

Olympic Way

Wembley

Location: _____

LB Brent

Accommodation: _____

158 Homes & Hotel

Client: _____

Donban Contracting

Manufacturer: _____

Vision Modular Systems

Operator: _____

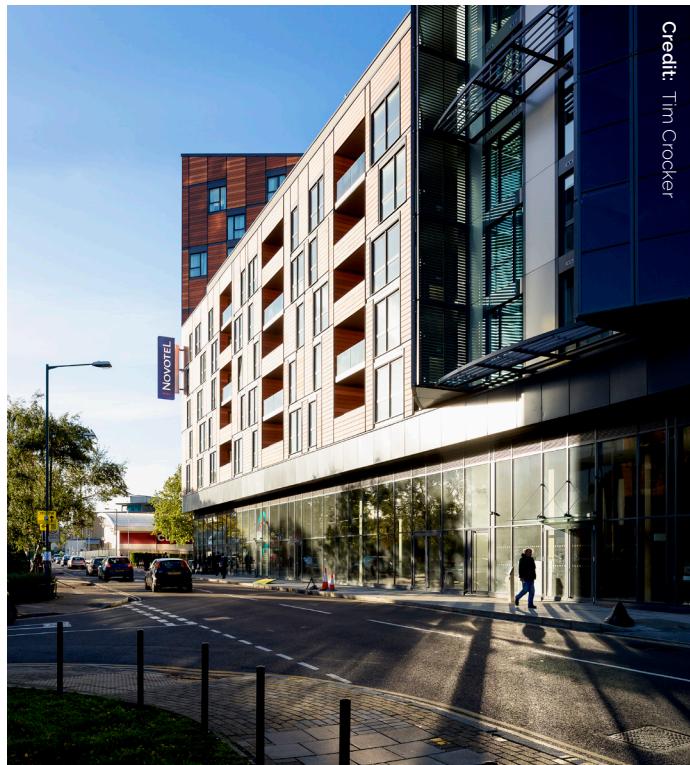
Novotel, Pinnacle, Network Homes

This landmark development designed for Tide Construction became a test bed for establishing Vision Modular Systems as the leading manufacturer delivering modular housing in the Capital. A mixed use development with private, intermediate and affordable housing, along with a 220 room hotel above ground floor retail and an underground car park, the scheme's complex programme required a wide range of module shapes and sizes, demonstrating that

off-site construction need not be a limiting factor in housing delivery and indeed can help facilitate delivery on constrained sites in urban areas.

Located on the main connection between Wembley Park station and the stadium, the buildings respond to the context with a carefully considered design rich in variation and, completed 6 years ago the enduring quality of the development demonstrates the robustness of the modular system.





Credit: Tim Crocker

Olympic Way



Facade details & tower



Felda House

Wembley

Location:

LB Brent

Accommodation:

450 Student Units

Client:

Tide Construction

Manufacturer:

Vision Modular Systems

Operator:

CRM

Modules:

529

Completed:

2015

Delivery:

21 months

A cluster of three slim, stepping towers, the buildings respond to the heights of neighbouring developments. The design includes communal amenity spaces, meeting and IT rooms, a concierge service, bike storage and a shared communal garden. The scheme was developed from the outset to be delivered by Vision Modular Systems and demonstrates the potential of the system to deliver a huge

variety of modules, including the prominent triangular common rooms, recessed floors at upper levels and projecting oriel windows that work to break up the façade. The cladding uses subtle changes in tone to break down the mass of the building and its reflective finish also minimise the presence of the building for nearby residential buildings.





Felda House



Facade detail & communal student space

Union Wharf

Greenwich

Location:

RB Greenwich

Modules:

653

Accommodation:

249 Homes

Completed:

2019

Client:

Essential Living

Delivery:

31 months

Manufacturer:

Elements Europe

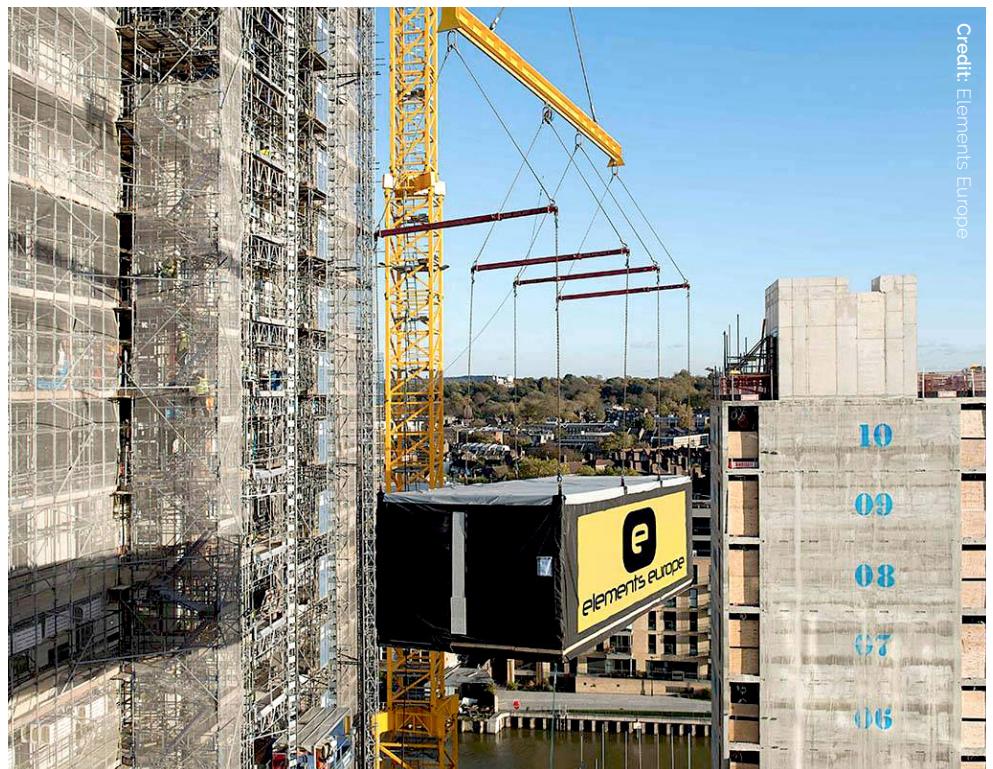
Operator:

Essential Living

This build to rent project for Essential Living, will deliver 249 homes in two buildings, the tallest rising to 23 storeys with extensive shared amenity facilities. Designed by Assael Architecture to detailed planning approval stage, HTA joined the project to facilitate

delivery using modular construction, manufactured by Elements Europe in their Telford factory. The project was pioneering for Elements in delivering modular construction to new heights as well as the adoption of BIM right across the design team.





Credit: Elements Europe

Union Wharf



Modules on site

Queens Parade

Willesden

Location:

LB Brent

Accommodation:

117 Student Units

Client:

Tide Construction

Manufacturer:

Vision Modular Systems

Modules:

160

Completed:

2020

Delivery:

16 months

The site sits at a key junction between Walm Lane, Willesden Lane and the High Road within the Willesden Green Conservation Area.

The starting point for our design was a comprehensive study of the context and the scale of the current design evolved through numerous studies addressing the different contexts.

The architecture is a direct but modern response to the Conservation area. Using a brick based architecture with cast

stone window surrounds and string courses that structure the overall hierarchy of the design. Bay windows, dormers and large shop front windows all contribute to the human scale of the proposals.

The faceted nature of the taller corner block design allows the building to address the approach from multiple angles and the 'folds' in the form reduce its apparent scale and create a balance of horizontal and vertical expression.



Grand Felda

Wembley

Location:

LB Brent

Modules:

896

Accommodation:

802 Student Units

Completed:

2016

Client:

Tide Construction

Delivery:

18 months

Manufacturer:

Vision Modular Systems

Operator:

CRM

The project came to us with a detailed planning consent by John McAslan Architects for student housing to be delivered above a public leisure centre. The design was reconfigured within the consented envelope to facilitate modular delivery, the highly engineered module structures enabled an increase

in accommodation by making the addition of two extra floors easily possible. Delivering 804 student rooms through a mix of studios and shared flats, the building was completed within 18 months including the forming of a large basement area for a 25m swimming pool.





Grand Felda swimming pool

With offsite construction...

Typically the embodied energy in a modular building versus that of a traditional building is lower by:

50%

Reinventing the suburbs

Case Studies



Hanham Hall

Bristol

Location:

South Gloucestershire

Accommodation:

185 Housing units

Client:

Barratt Homes

Manufacturer:

Kingspan (SIPs)

Launched within the Carbon Challenge programme Hanham Hall is one of the largest zero carbon communities in the UK delivering 187 new homes for private sale and social housing. The nine-hectare site adjoins the green belt, bordered by suburban housing with a grade 2* listed hall which has been refurbished and successfully adapted to create a busy hub for the community with office space, a crèche, and cafe.

The layout and style of the design respond to the site's unique characteristics and constraints with green belt restrictions and the need to retain views of the Hanham Hills meant more than a third of the site could not be built on.

The housing was subject to advanced modelling and prototyping to ensure it could deliver the complex ranging of standards, through optimising daylight whilst avoiding overheating. The internal layout of the homes explored ideas around flexibility in use to meet the changing requirements of multi-generational living. The Kingspan Tek system was adopted to ensure high levels of air tightness using a precision manufactured envelope enabling all homes to achieve the new 'Zero' standard and outperform the building regulations and other widely used industry standards.





Hanham Hall



House types & occupation

Terrace of the Future

Location:

UK

Accommodation:

N/A

Client:

Ilke Homes

Manufacturer:

Ilke Homes

'The Hundred House' is HTA's winning entry to the Sunday Times British Homes Awards Terrace of the Future competition. Designed in close collaboration with Ilke Homes – one of the UK's leading modular home manufacturers – proposing homes of well-proportioned rooms and flexible layouts, designed for ease of factory manufacture and rapid delivery on site. Our approach, although technologically cutting edge, is designed to sit comfortably alongside existing developments by appearing both contemporary and familiar. To promote the use of modular and pre-fabricated construction, efforts were made

to produce a house that appeared robust and heavyweight, with familiar proportions and charming features – helping it secure the Readers' Choice award. Spatially, the house features a split level living space with a kitchen dining space that addresses the garden and a first floor living room that allows for a dramatic vaulted ceiling. This arrangement allows for a variety of modern living arrangements such as grandparents or older children returning home. Further development is underway with the aim of delivering the first homes in 2019.





Terrace of the Future



Section, interior & street view

VELUX Model Home

Kettering

Location:

Northamptonshire

Accommodation:

2 Homes

Client:

Velux Group

Manufacturer:

Unilin (SIPs)

The Carbonlight concept homes have been developed as part of VELUX UK's Model Home 2020 project - a Europe-wide initiative demonstrating commitment to developing sustainable climate-neutral buildings with a high level of liveability. The two homes are designed to be spacious and airy, with a very high daylight factor (7%). The sloping roof and section are designed to maximise light and natural ventilation and the super insulated buildings have high levels of air tightness to reduce the amount of heating they need. The homes were monitored with residents' involvement to test if sustainable and well-lit homes promote well-being, the results demonstrated that the residents enjoyed

better mental and physical health from living in well daylit sustainable homes.

The homes were designed in accordance with the principles espoused by ActiveHouse a pan-European housing specification prepared by a consortium of manufacturers, designers and developers.

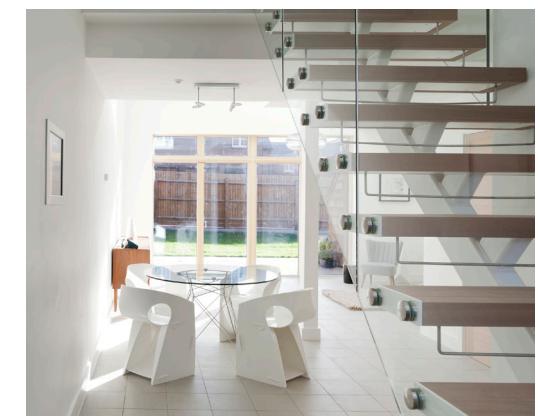
The homes were built using a hot-rolled steel frame with light-gauge steel infill panels and the roof was constructed using prefabricated Structural Insulate Panels (SiPs). The windows and roof-windows were supplied by VELUX and VELFAC and the energy management system was supplied by WindowMaster.



Credit: Adam Mørk



VELUX Model Home



Interior & rear exterior

Kingspan Potton

Cambridge

Location:

Cambridgeshire

Accommodation:

1 House

Client:

Kingspan Potton

Manufacturer:

Kingspan (SIPs)

The Kingspan Potton PassivHaus was designed in partnership with Kingspan Potton to demonstrate that a PassivHaus can be beautiful architecture and sustainable. Their clients for a custom-built home often ask for a more sustainable home and they wanted to demonstrate that this is possible and still achieve award-winning architecture. The house is constructed on their show home site in St Neots.

The house was constructed from Kingspan products including the TEK Structural Insulate Panels (SiPs) which were used for

all the walls and roof structure. It meets the PassivHaus requirements for airtightness and thermal performance demonstrating that prefabrication and sustainability go hand-in-hand.

The house is designed to be customisable by their clients and the version constructed is the smallest type in the range of potential homes. It features an internal daylit 'courtyard' space that the house revolves around and an open plan living dining area.





Kingspan Potton



Interior living space

Allerton Bywater

Leeds

Location:

West Yorkshire

Accommodation:

151 Homes

Client:

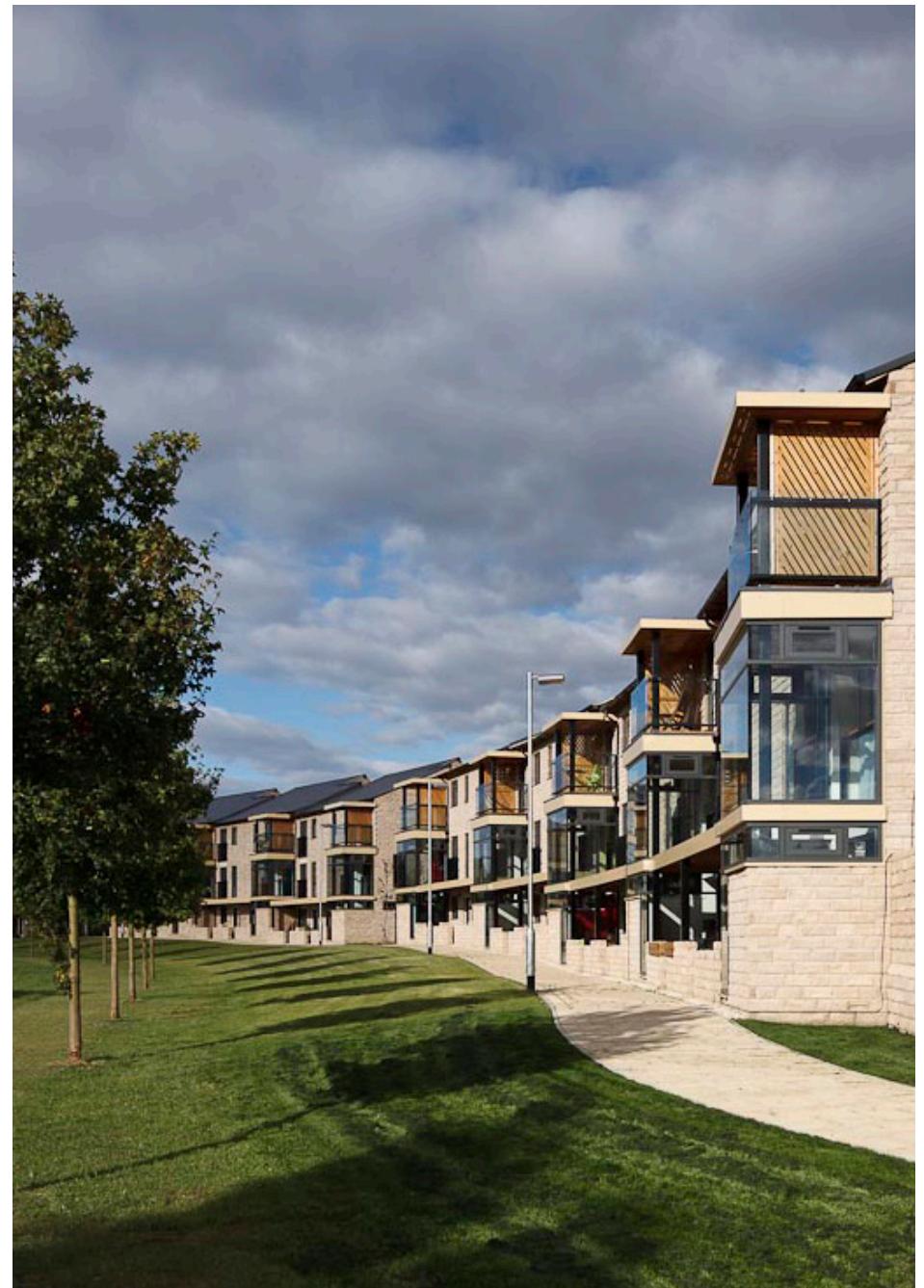
Barratt Homes

Manufacturer:

Kingspan

Won in competition in 2006 as part of the Design for Manufacture programme promoted by English Partnerships, Allerton Bywater was a millennium village with a phase designed by HTA for Barratt, for delivery using modern methods of construction. A mixed tenure development of 151 family houses and apartments that also had to meet complex Design Codes requiring high levels of variety and bespoke housetype design, the design is highly contemporary whilst respecting materials and detailing common to the local vernacular. Although this requirement added further complexity to the

manufacture of homes for an industry in its early stages of innovation and development, we were still able to achieve high levels of standardisation of factory produced elements within the highly varied designs. The homes were extremely popular, and this site was considered one of the most successful of those completed. Although the programme failed to drive significant change across the housing industry, it was important to HTA in helping develop its ambitions for improved construction through more innovative methods of construction.



Mill Way

Needingworth

Location:

Cambridgeshire

Accommodation:

40 Homes

Client:

Innerspace

Manufacturer:

Modularize

This sensitive site is located at the edge of Needingworth, a village between Huntingdon and Cambridge. Our design is for 40 Innerspace homes arranged along a principle street in the village with a new street providing access to several shared courtyard spaces. A generous landscape edge is provided to the south and west of the development to provide

a buffer of native hedgerow plants and trees for views across the neighbouring fields. We have looked at the history of the village and are reinstating an ancient avenue of trees that marked an old road that runs along the western edge of the site. The site is the first proposed use of our Innerspace homes.



With offsite construction...



Mill Way living space

Typically there are 10-20 staff working on site, while there are hundreds working in the factory.

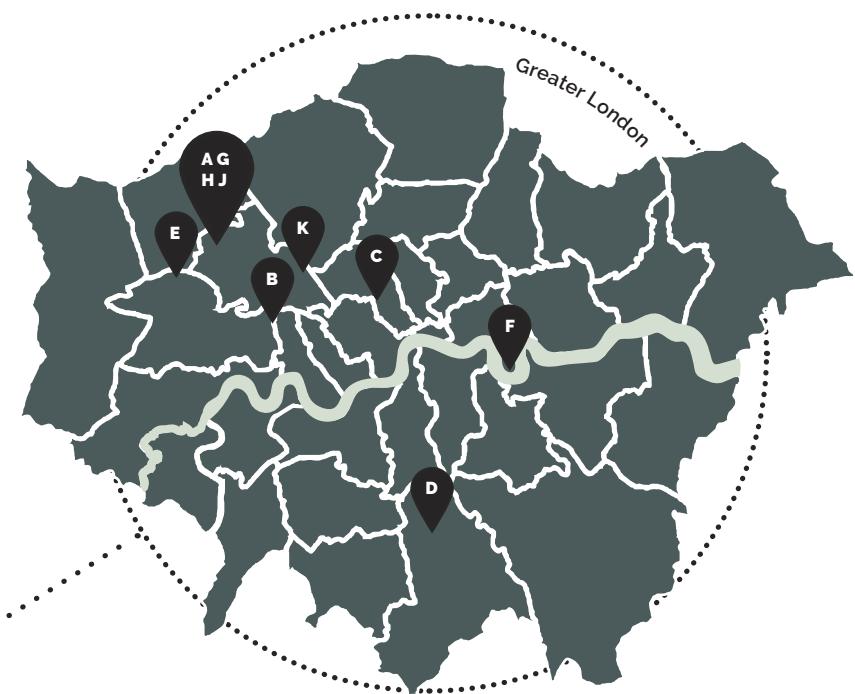


Project Directory

Case Studies Map



Suburban Urban



A:	E:	I:	M:
Apex House	Greenford Quay	Kingspan	Allerton Bywater
B:	F:	J:	N:
Savoy Circus	Union Wharf	Olympic Way	Mill Way
C:	G:	K:	O:
Highbury II	Dexion House	Queens Parade	VELUX Model Home
D:	H:	L:	
101 George St.	Karma House	Hanham Hall	

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