

Project Case Studies

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Hope Rise, Bristol

A 100% social rent, 2 storey building above a steel podium on an existing car park

Client: Bristol City Council

Type of Construction: Volumetric Modern Methods of Construction

Location: Chalks Rd, St George, Bristol BS5 9EN

Description: Full turnkey for building 11 NDSS compliant one-bed apartments using ZED PODS designs and BOPAS accredited build system.

Status: Completed (December 2020)



Hope Rise is a net zero-carbon development of 11 residential dwellings, it was delivered through a unique collaboration and partnership between Bristol City Council, Bristol Housing Festival and YMCA. It is an example of innovative sustainable development above an existing public car park (including improvements to the car park layout and other associated works such as EV charging stations) with retention of **100%** of original public car parking spaces for local community.



Before: Car Park

The project achieved zero operational carbon while providing high-quality homes for vulnerable households, giving them safe, healthy and beautiful places to live and wrap-around tenant support. Modular building means homes are quick to build, helping swiftly address the current shortfall in housing demand. Energy efficient homes means bills are lower, so everyone can enjoy a better standard of living. Residents enjoy a new sense of community and security, as substantiated in the “Post-occupancy” study conducted for the Bristol project, “Hope Rise”.

Site area (m ²)	2,694
No. of dwellings	11
1Bed 2Person	9
2Bed 2Person	2
Total GIFA (m ²)	491
No. of PV	105
No. of heatpump	11



CARBON SAVINGS
19.6
Tonnes/yr

WATER SAVINGS
206,406
Litres/yr



MEASURABLE OUTCOMES:

- **Reduction in whole life costs** including circa **50%** savings in production time.
- **Reduction in delivery time** using time and motion studies. Only **2** days of modules installation time— minimised road closure & disruption to local community
- **Reduction in productivity gap:** improve repeatable processes and DFM. Interfaces between MMC production and parallel site preparation
- **Exceeds Building & Fire Safety standards:** Each unit have its own independent structure with no structural bridging elements, ensuring party wall performance to achieve 60-minutes fire ratings.
- **Exceeds all planning standards:** All homes exceed NDSS with additional **5** sqm private amenity space
- **Future-proofing:** Exceeds new Part F, L, O building regulation standards.
- **Performances:** Super-insulated, airtightness construction with less than **1.3** air changes per hour @50 PA. Low energy ASHP with high performance averaging COP of **3.5**
- **Energy Positive Homes:** Total **30.4** kWp of Solar PV on-site with **14,946** kWh annual PV energy.



“

We are really pleased to see this development finished, particularly as it demonstrates that new housing is about creating great places that promote resilient communities. Bristol is a city of innovation, and we have taken a lead on exploring new solutions to the housing crisis that is evident across the country. We all need to work together to tackle these big issues, and there has been some fantastic partnership working to bring these ZED POD homes to the city”



Marvin Rees
Mayor of Bristol



“

There is a crisis in the availability of affordable housing across the UK. The pressing need to build high-quality, energy-efficient homes, combined with rapidly rising construction costs, is making the delivery of new homes for council tenants increasingly difficult. Hope Rise has shown us that innovation is essential as we seek to deliver homes fit for the future to meet Bristol’s housing need. We hope the learning from this pilot project will lead to the design and delivery of hundreds if not thousands of homes.”



Councillor Tom Renhard
Cabinet Member for Bristol City Council

HOPE RISE – THE 2021 UNITED NATIONS CLIMATE CHANGE CONFERENCE

The **only** modular social housing development in the UK showcased at COP26 Built Environment Virtual Pavilion



RESIDENT'S TESTIMONIAL

“ I was nervous about moving in so close to Christmas because of winter & most people I know when they first move in it's always cold. However, the homes are really warm & don't take long to heat up.



I fell in love with ZED PODS at first read. I loved that they are energy-efficient and environmentally friendly. The house designs had come up on my home choice and my heart just leapt. To see such a wonderful house show up on home choice was a shock to me and to be living here now I don't suppose any words can describe how I feel about my home.

ZED PODS are not only a very practical way of trying to help tackle the housing crisis and giving more to communities. They give pride to the people that live in them. I feel proud that the house I live in not only looks both breath taking on the outside but beautiful on the inside.”

Sam Lindo, Resident of Hope Rise
(Also a “Community Builder” for the scheme)



AS BUILT ENERGY PERFORMANCE

Energy Consumption

Based on the mix of model and actual data, the site is a net exporter of energy based on total consumption (regulated plus unregulated energy)

22nd December 2020 – 21st June 2021

One-bed Apartments

11,862 kWh

Two-bed Apartments

3,084 kWh

Total Energy (kWh per year)	Total site wide Energy Generation modelled (kWh per year)	Net Energy Consumption (kWh per year)
14,946	16,112	-1,166

PV Energy Production

The 105 panel roof mounted photovoltaic panels generate enough energy to cover the yearly demands of residents and also provide surplus power to the national grid.

22nd December 2020 – 21st June 2021

One-bed Apartments

12,429 kWh

Two-bed Apartments

3,683 kWh

Total Annual PV Energy Production

105 panels

16,112 kWh



Above: one-bed monthly energy generation



Above: two-bed monthly energy generation

Average Operational Carbon Footprint per unit

Combining the different zero carbon strategies each unit at hope rise achieves a negative dwelling emissions rate with a greater than SAP energy and carbon ratings.

-0.91 tones CO₂ eq

Dwelling Emission Rate **-10.54** kgCO₂/m²

SAP—AS DESIGN

Predicted Energy Performance

Very energy efficient - lower running costs (92 plus) A	109
(81-91) B	
(69-80) C	
(55-68) D	
(39-54) E	
(21-38) F	
(1-20) G	
Not energy efficient - higher running costs	
England	EU Directive 2002/91/EC

SAP—AS BUILT

Measured Energy Performance

Score	Energy rating	Current	Potential
92+	A	109 A	112 A
81-91	B		
69-80	C		
55-68	D		
39-54	E		
21-38	F		
1-20	G		

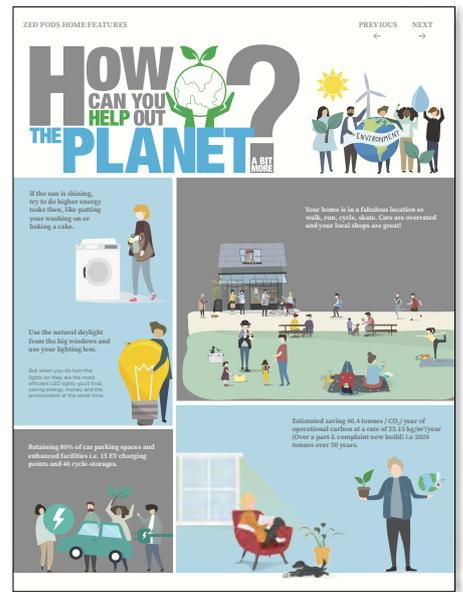
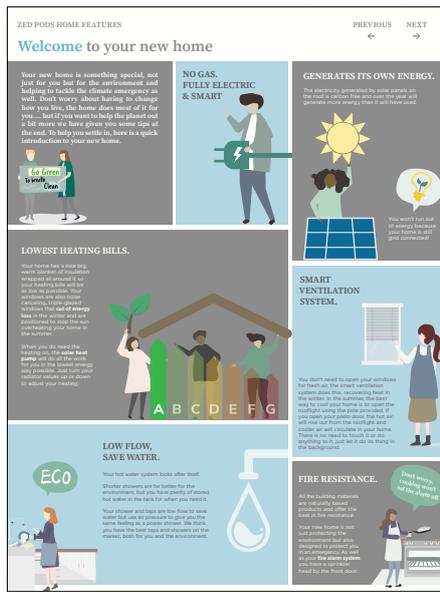
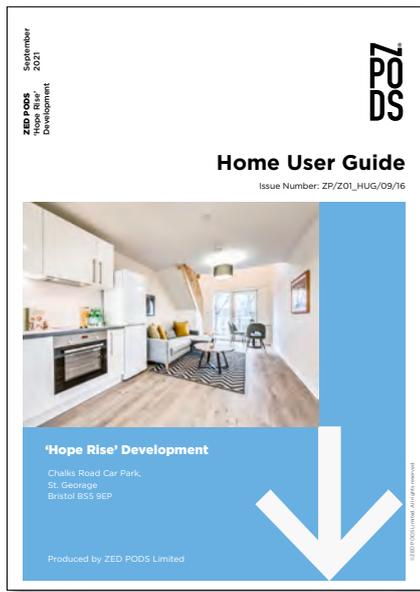
HANDOVER AND TENANTS SUPPORT – LOW CARBON LIVING

Home User Guide

Part of tenants training and care

Home Welcome Leaflet

Part of tenants training, promote low carbon living



POST OCCUPANCY & LESSONS LEARNT

ZED PODS have been fully involved in the post occupancy handover and developed the O&M and handover documents. ZED PODS have also conducted post occupancy evaluation, energy monitoring and follow-up customer satisfaction surveys. Including fortnightly hand-over meetings with the client for 3 months post-handover. Hand over included video home user guides, M&E training, F&M training and BIM model training.

Jamal (name changed to protect anonymity) came to the UK as an unaccompanied minor from Syria and was under the care of Social Services until he was 21. He had most recently lived in a shared house with support which was coming to an end, meaning he needed to move on. His support worker referred to him as a model tenant and thought he would be ideal for Hope Rise.

Jamal himself was keen as he was used to living as part of a community when growing up and wants to be part of something where he can make friends. Jamal worked with a Community Builder and the YMCA to access paid work experience as a labourer on a site alongside the Community Builder. This enabled him to gain invaluable skills which he has transferred across to his carpentry apprenticeship. Jamal feels very much at home at Hope Rise; he is extremely grateful and happy for the help he has received from the Community Builders and other residents and looks forward to integrating more within the community over the next few months. He recently passed his driving test and can now drive further afield for work. He is also keen to obtain his Construction Skills Certification Scheme (CSCS) card.



Marshall Walk, Bristol

A SOCIAL HOUSING DEVELOPMENT OF 12 ZERO-OPERATIONAL-CARBON HOMES

Client: Bristol City Council

Location: Marshall Walk, Inns Court, Bristol BS4 1TR

Delivery Partner: ZED PODS Ltd

Status: Completed (Mid July 2025)

Homes Delivered: 12 x 1B1P zero-operational-carbon modular homes

Delivery Model: Volumetric Modern Methods of Construction (Category 1)



INTRODUCTION

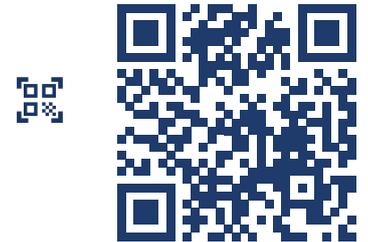
Marshall Walk is a pioneering social housing development in the heart of Inns Court, Bristol, delivered by ZED PODS in partnership with Bristol City Council (BCC). The project provides 12 1B1P (37 m²) high-quality, zero-operational-carbon homes for single-person households, including half for single homeless people. Contributing directly to BCC's Affordable Housing Delivery Plan and its One City Plan. The homes are funded through the council's Housing Revenue Account and Homes England and designed to support temporary, move-on and long-term housing needs for single person households.



Before: brownfield plot

The development is located on a long-underutilised brownfield plot adjacent to the Inns Court Community and Family Centre. The scheme was granted planning consent in 2022.

In early 2024, ZED PODS was appointed under the SWPA framework to take the project through to completion using a full turnkey MMC approach.



Site area (m ²)	1,200
No. of dwellings	12
Unit type	1B1P
Unit GIA (m ²)	37
Total GIFA (m ²)	567.6
No. of PV	84
No. of heatpump	12



OVERCOMING SITE BARRIERS

The project site presented several physical, logistical, and contextual challenges. Three-quarters of the plot consisted of hardstanding concrete, with the remaining portion containing two mature trees and uneven grassland. The site sits at a junction between residential back gardens, a community centre, and local shops with flats above—creating sensitivity around privacy, overshadowing, and massing.

Topographically, the land slopes from north to south, resulting in a step change in level from the street to the build area. To address this, the ZED PODS in-house design team developed a stepped modular layout, adjusting building heights in 225mm increments to match the natural gradient. This approach reduced the perceived height of the blocks and resolved access challenges.

Another major constraint was the risk of overlooking and overshadowing. ZED PODS inhouse architects adapted the window placement and roof pitch to reduce the impact on adjacent properties while enhancing natural daylight within homes. The overall building height was lowered by 330mm through an adjusted roof pitch (reduced from 22° to 15°), which also enabled the offsite modules to be transported safely on local roads, in compliance with height restrictions.

Given the constrained nature of the plot and its location within a car-free community, the scheme includes a single designated disabled parking space. It also promotes active travel by providing two large secure cycle stores, walkable access to local shops and bus routes, and well-lit pedestrian pathways—addressing mobility needs with minimal environmental impact.



DESIGN ADAPTATION AND OFFSITE DELIVERY

ZED PODS inhouse team inherited a planning-approved scheme which required some reworking to suit ZED PODS specific modulous system. The inhouse architectural team undertook a full technical review, revising the scheme to meet the demands of offsite delivery while maintaining the approved site footprint and key planning principles. This included enhancements to meet the latest thermal performance standards and full NDSS compliance.

Several refinements were made through a Non-Material Amendment (NMA) application, which was validated in March 2024. These changes were critical to unlocking the scheme and a redesign of the mono-pitched roof to allow complete volumetric modules to be transported to the site. Despite these changes, generous internal ceiling heights of 2.5–2.6m were retained across all homes, preserving spatial quality.

The window placements were also revised to optimise internal daylighting, provide better symmetry on gable elevations, and reduce the risk of overlooking neighbouring gardens. Obscure-glazed windows were introduced at the rear of each unit to brighten internal corridors. Material specifications were updated, replacing timber-effect doors with anthracite grey, triple-glazed high-performance units to align with ZED PODS' sustainability objectives and manufacturing capabilities.

A key sustainability intervention was the expansion of the solar PV array. Originally designed with 3 panels per roof, the new configuration allows 14 panels per building, with each home now benefiting from 7 panels generating up to 3,000 kWh of clean electricity annually – a major step towards net zero operational carbon.



PLACEMAKING AND URBAN INTEGRATION

The site is situated at a junction between residential gardens, local shops with dwellings above, and a vibrant community centre. It is characterised by a steep north-south slope and a history of underutilisation. The revised design respects these site contextual constraints while contributing to the revitalisation of the wider area.

The stepped form of the modular blocks follows the existing site gradient in 225mm increments, softening the development's mass and reducing visual impact. The homes are oriented north-east to south-west to maximise solar gain and mitigate overlooking issues. Externally, the use of red brick and metal cladding creates a contemporary aesthetic that complements both the surrounding residential stock and the adjacent community building.

To enhance the sense of place and foster neighbourly interaction, ground-floor homes feature defensible space with low walls and railings, while first-floor units are accessed via private external staircases. Landscaped areas to the west provide semi-private spaces for residents, while the northern and southern boundaries include soft landscaping open to the wider public realm.

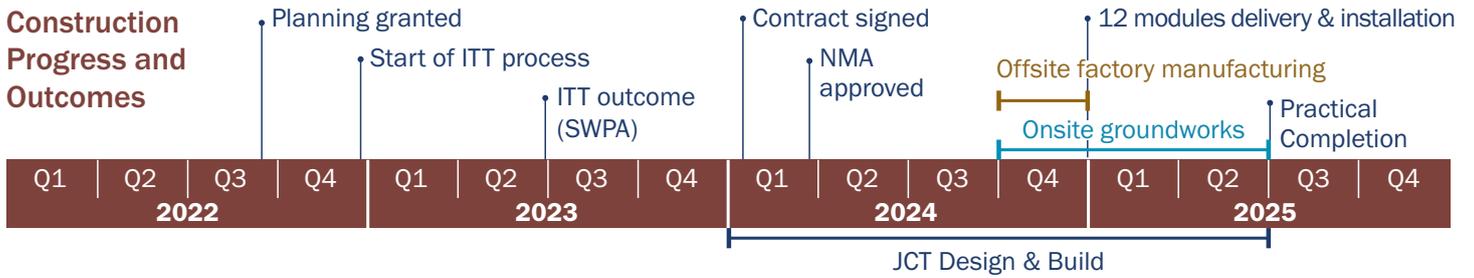
No car parking was provided on-site, as the homes are intended for non-car-owning residents. The site's strong pedestrian connectivity and access to local amenities support this car-free approach and align with BCC's sustainability and transport priorities.

CONSTRUCTION PROGRESS AND OUTCOMES

Following design finalisation and contract signing in early 2024, ZED PODS began groundworks in November 2024. As with many constrained brownfield sites, coordinating utility diversions has been a key challenge.

Simultaneously, the fully finished modules were being manufactured offsite in BOPAS-certified facility in Peterborough. The modules were craned into place in January 2025, with project completion in July 2025 - demonstrating the time efficiency of volumetric construction.

ZED PODS' integrated delivery model has not only accelerated programme timelines but also enabled greater quality control, reduced onsite disruption, and lowered embodied carbon.



AS BUILT PERFORMANCE

Energy Performance Certificate

Calculation Type: New Build (As Built)

23 Marshall Walk
BRISTOL
BS4 1TR

Energy Rating

A

Valid until
18 June 2035

Certificate number
9615-3009-9306-3675-7204

Above: 'As Built' EPC A rating of 23 Marshall Walk. All 12 units received rating A

Air Test Result

Air test results varied between 1.21–2m³/h/m² achieving near Passivhaus standard, all below ZED PODS design target. The achieved values are 80%+ better than the national compliance level of 5 m³/h/m²

Test Results Pass

Target:	<= 1.50	m ³ ·h ⁻¹ ·m ⁻² @50Pa	Air Permeability:
Air Flow Coefficient (C _{wa}):	7.171	m ³ ·h ⁻¹ ·Pa ⁻¹	<div style="font-size: 2em; font-weight: bold;">1.21</div> <p>m³·h⁻¹·m⁻²@50Pa</p>
Air Leakage at 50 Pa (Q ₅₀):	204.444	m ³ ·h ⁻¹	
Air Flow Exponent (n):	0.86		
Coefficient of Determination (r ²):	0.995		

This is to certify that the above name building has been tested by a registered provider in accordance with ATTMA TSL1, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate. Enquiries about this certificate should be made to: Scheme Manager, ATTMA, Unit 3, Tannery Road, Loudwater, Buckinghamshire, HP13 7EQ or visit www.bcta.group/attma/ or email admin@bcta.group.

YAMQ-HJBG-206D

Sound Test Result

Test Type	Certificate Number	Source Room	Source Room Volume	Target (D _{nT_w} +C _{tr})	Result (D _{nT_w} +C _{tr})	Outcome
Wall Test	210942	Bedroom	25.3m ²	>=45 dB	68 dB	PASS
	210946	Living Room	39.5m ²	>=45 dB	58 dB	

SOCIAL IMPACT

The company exceeded its contracted social value obligations by delivering **115%** of its target, including reduced carbon emissions, maximise recycling of construction waste, use of local supply chain, well-being & training initiatives, local skills and employment support.

In addition, we are an approved supplier of the Prisoners Building Homes Programme (PBH), national scheme to up skill prisoners, help them access employment after release, enable them to turn their lives around and reduce the cycle of re-offending. The day-release prisoners earn Living Wage & pay tax, NI and victim support contribution. Their remaining wage allows them to support their families / post release resettlement cost (e.g. rent/deposit to access PRS). Under this program, 12 day release prisoners commute daily to our manufacturing facility to work & train on this project along with our workforce. The cohort achieved less than 3% re-offending rate (as compared to national average of 25%+), saving UK taxpayers **£1.4** million on reduced recidivism. To date, **35** day-release prisoners have been supported in our factory, making us the largest employer under the PBH program.

CONCLUSION

Marshall Walk showcases the potential of MMC to unlock difficult urban sites and deliver future-proof, social-rented homes at pace. By re-imagining a dormant plot through high-performance modular design, ZED PODS and Bristol City Council have created a low-carbon, high-quality housing scheme that reflects local context, supports community integration, and exemplifies the next generation of sustainable social housing.

This project is a testament to collaborative working, precision offsite manufacturing, and architectural adaptation and sets a replicable model for similar urban infill schemes across the UK.



Fortis House, Henwood

Delivering Ashford's first net zero-operational carbon, move-on accommodation

Client: Ashford Borough Council (ABC)

Location: Henwood, Ashford, Kent

Scope of works: Full turnkey solution—all RIBA stages (0-7)

Status: Complete (December 2024)

Description: 23 bespoke new ultra-low energy homes built to be 'stepping stones' to more permanent accommodation on a former car park in a site situated in Flood Zone 3A area.

Carbon Savings*: 41 tonnes/year, **Water Savings**:** 554,040 litre/year



With funding from the Department of Levelling Up, Housing and Communities

Fortis House (FH), designed and built by ZED PODS, in partnership with Ashford Borough Council, redefines sustainable social housing with 23 zero-operational-carbon homes on a Flood Zone 3A site. Built above a steel podium (2.4 high) on an underused public car park, the project overcomes significant environmental, operational, design and regulatory challenges to deliver 23 zero-operational-carbon, social rented homes which can withstand even 100-year climate change flooding event, setting a new national standard for sustainable housing development.



Before: Flood Zone 3A

This project tackles social housing needs embedding innovative design, ISO 19650 level digital construction and exceptional sustainability goals. FH has achieved superior energy-efficient design, flood-resilient features, and superior living standards setting a new benchmark for affordable & inclusive social housing. Lauded as a "Beacon of Hope," FH aims to "change lives" of 25 tenants and 14 day-release prisoners (who have built the modules) ensuring long-term financial, social and environmental benefits.



CARBON SAVINGS
41
Tonnes/yr

WATER SAVINGS
554,040
Litres/yr

Energy Rating
A

EA
Approved

Made in Peterborough

Benefit/Cost Ratio
4.95

CONSTRUCTING EXCELLENCE
SECBE AWARDS 2024
WINNER
Modern Methods of Construction

CONSTRUCTING EXCELLENCE
SECBE AWARDS 2023
WINNER
Sustainability

Fortis House is an innovative modular housing scheme that exemplifies the transformative power of volumetric MMC methodology.

SENSE OF COMMUNITY

The Fortis House includes 23 homes—13 one-bed, 9 two-bed, and 1 three-bed—three of which are adapted for tenants with disabilities, offering diverse housing options specifically designed for vulnerable homeless households. The range of house types will promote community cohesion, providing a safety net and ‘move-on’ accommodation until individuals or household secure permanent home. The residences will be fully secured and overseen by an onsite manager responsible for property maintenance and resident security.



Site area (m ²)	3,082.4
No. of dwellings	23
1B2P 1-storey	9
1B2P maisonette	4
2B4P 1-storey	9
3B5P 1-storey	1
Total GIFA (m ²)	1,497.43
No. of PV	230
No. of heatpump	23

The communal garden with “infinity walkway” fosters inclusivity, improved wellbeing & community building.

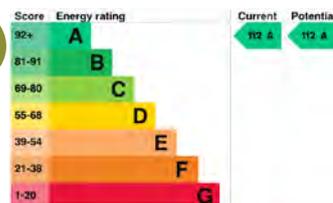
KEY OUTCOMES:

- Each apartment is self-contained, with no shared accommodation.
- All apartments exceed National Space Standards, featuring a private balcony (min. 5m²), extra storage.
- Landscaped gardens designed to create distinct sociable spaces and high quality outdoor green space.
- All apartments are dual-aspect, offering abundant daylight and cross ventilation to prevent overheating.
- A secure environment built to “**Secured by Design**” **Gold** Standard.
- **As-built airtightness level: 1.02** m³/(h.m²) @ 50 Pa—3 times better than design target (3 m³/(h.m²)@50 Pa).
- **As-built carbon emissions: -3.07** kgCO₂/m², surpassing zero-carbon benchmarks.
- **As-built SAP ratings over 100**, the homes are projected to save **1,231** tonnes of carbon over 30 years, and reduce water use by **554** kilolitres annually.
- Renewable technologies, including **230** solar PV panels and optional battery storage, support zero-energy-bill living (guaranteed for 5 years with Octopus Energy).
- Post-occupancy analysis confirms ultra-low running costs and high tenant satisfaction.
- **Net Present Social Value** of **£29.3** million with a **Benefit/Cost ratio of 4.95**.

AS BUILT PERFORMANCE

Predicted Annual Energy Use

38,285 kWh



Annual PV Energy Production

87.8 MWh

Number of PV	230
Total capacity (kWp)	104.55

Carbon Savings*

	CO ₂ Emissions (tonne/yr)	Over 10 Years	Over 30 Years	Over 100 Years
Fortis House	-1.77	-17.72	-53.17	-177.22
Over Part L	41	410.38	1,231.14	4,103.80
Over Typical Build	25	250.67	752.00	2,506.67

Water Savings**

Number of Occupants	Water Consumption (Litre Per Year)	Savings over baseline** (Litre Per Year)
67	2,504,928.33	554,040.42

*Carbon savings calculated using SAP calculated Dwelling emission rates (DER) against the building regulations Part-L Target Emissions Rates (TER); **Baseline water consumption based on England Compliance of 125L/person/day



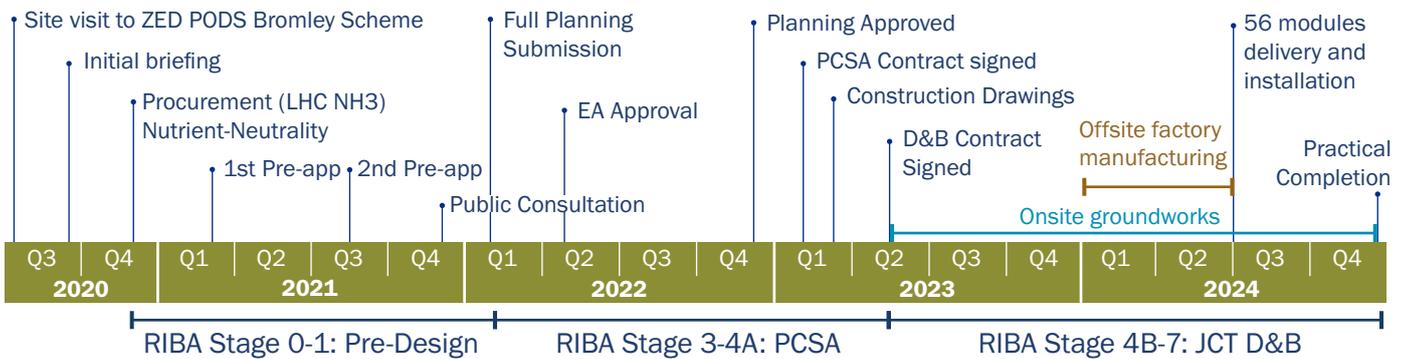
PIONEERING BROWNFIELD REGENERATION

The BOPAS-accredited MMC system, combined with a resilient flood mitigation strategy, enabled Ashford Borough Council to transform otherwise unviable land into a thriving, sustainable community. Using volumetric MMC, 56 modules were manufactured offsite and installed onsite in 7 days, while site groundwork progressed in parallel. Completed in just 53 weeks—twice as fast as traditional methods—the build minimised disruption and ensured a seamless programme.



Above: We used BIM to create 'Module Assembly Manual' for offsite manufacturing facility to optimise the assembly process, ensuring proper fit and alignment of modules, enabled better quality control, and reducing defects. Using ACC Build Software, Quality Assurance Competency were signed off.

MODULAR JOURNEY



From Left to Right - ABC Deputy Chief Executive Ben Lockwood, ZED PODS Director Rehan Khodabuccus, Cllr Bill Barrett, ABC Cabinet Member Housing and Homelessness



Above: Fortis House handover day

“ This is an historic day for Ashford as we deliver this first-class and truly innovative project. To be able to offer those in our society a safe and secure home is essential. To be able to do so while delivering strong environmental benefits is even more attractive. And I am also delighted to hear of our successful bid to Homes England to secure the grant monies that will subsidise the scheme.”

Cllr Bill Barrett

Portfolio Holder for Housing and Homelessness
 Ashford Borough Council

Environmental:

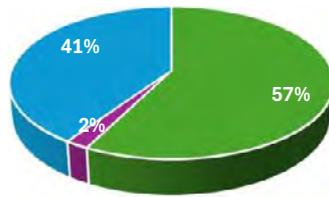
- **230** solar panels generate surplus energy annually.
- **23** MVHR integrated heat pumps operate at a COP of 3, ensuring high efficiency.
- Reduced waste through offsite prefabrication, achieving “zero waste to landfill”

Social:

- Safe, secure homes for 23 households (25 adults and 13 children) previously in temporary accommodation
- Inclusive, high-quality homes designed for a diverse range of tenants, including those with disabilities, offering spacious, dual-aspect, and accessible layouts.
- Low-carbon features that lower energy bills and help combat fuel poverty.

Economic Benefits:

- **Benefit/Cost ratio of 4.95** with combined socio-economic benefit of **£33.4m** including **£5.4m** saved on TA cost.
- **14** day-release prisoners gained NVQs through on-site training programs, achieved zero-reoffending rate.
- **36** local businesses were upskilled on sustainability/digital practices.



Benefit Class (Types of value created for society, residents, and other stakeholders.)

Cash Releasing

- *Avoided costs of providing temporary housing*
- *Savings on maintenance of brownfield land sites.*
- *Income uplift through increased council tax receipts.*
- *Lower annual maintenance costs*
- *Reduced lifecycle costs with fewer replacements.*
- *Avoided land acquisition costs (net of any acquisition expenses).*
- *Avoided homelessness-related costs.*
- *Reduced reoffending rates, lowering imprisonment costs.*
- *Future-proofed homes, avoiding future retrofit costs.*

Societal

- *Operational Efficiency and Reduced Carbon Emissions*
- *Use of local SME's and Local Employment*
- *BIM training for supply chain*
- *Improved resident health outcomes by avoiding fuel poverty (QALY benefit).*
- *Zero standing charge*
- *Increased supply of affordable housing*

Non Cash Releasing

Land value uplift (where LA retains land)



From Left to Right - Debansu Das (ZED PODS), Edward Jezeph, (Homes England), Rehan Khodabuccus (ZED PODS), Tracey Kerly (ABC Chief Executive)

“ I’m really pleased with this project, there is a housing crisis on right across the country. We’re ready to let these properties to those people that are so deserving to be able to be housed in permanent accommodation. I think that’s really the key point from my perspective. So, most of the people that will come into these homes will be out of temporary accommodation that they have been living in for some while. They get the opportunity to move in here really safe, secure, warm homes that we have been able to deliver in partnership with ZED PODS.”

Tracey Kerly

Chief Executive of Ashford Borough Council

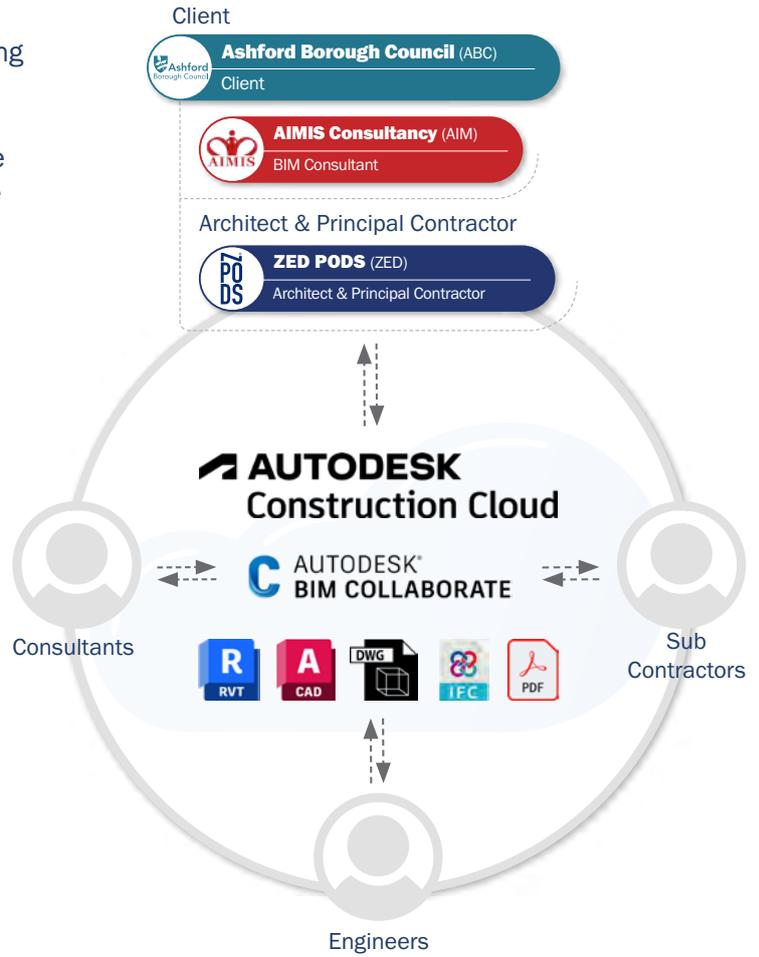
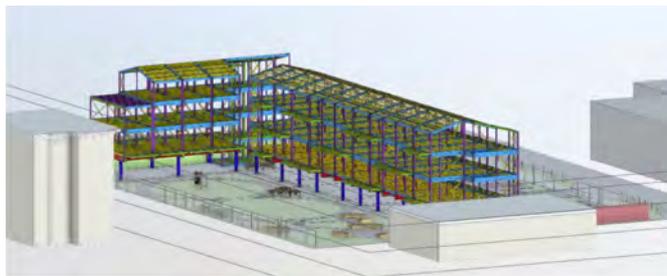
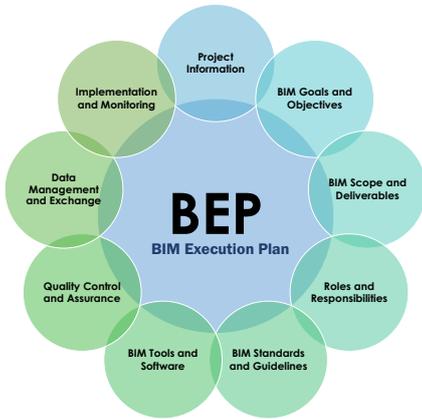
“ Fortis House has been funded and supported by Homes England’s affordable housing program and is a great example of a brownfield site in a flood zone three location, a really challenging site where ZED PODS, the manufacturer, have enabled the delivery of this complex project of sustainable and affordable housing. There’s PV on the roof, there’s air source, heat pumps, the homes are warm and comfortable, supporting those who need this quality accommodation.”

Edward Jezeph

Senior Manager, Home England

FORTIS HOUSE DIGITAL CONSTRUCTION — BIM ISO16950

Fortis House also marks ABC's pioneering adoption of digital construction via BIM Level 2 (ISO 19650), setting a benchmark for future sustainable developments through streamlined planning, rigorous quality control, collaborative workflow, lesser waste generation (offsite & onsite) to digitise this asset (digital twin) and ensure cost-effective proactive maintenance regime following "Golden Thread of information".



“ *This new accommodation ranks up there because **it is a miracle! A warm house to get back to, warm water to shower and bath.** Clean and brand new bedroom carpeted with great style. Own keys and balcony to enjoy within ones enclosure. Come 'on spring days ~ I can not wait for sunshine to have an ice cream on my own balcony. Plenty of storage in the kitchen and spacious enough for a sit-down meal. A view with trees and birds nesting in the distance, wow!! Feels so good with lifting my spirit in terms of mental health.”*



Nsude
Resident of Fortis House

INTERIORS — 3D VIRTUAL TOUR

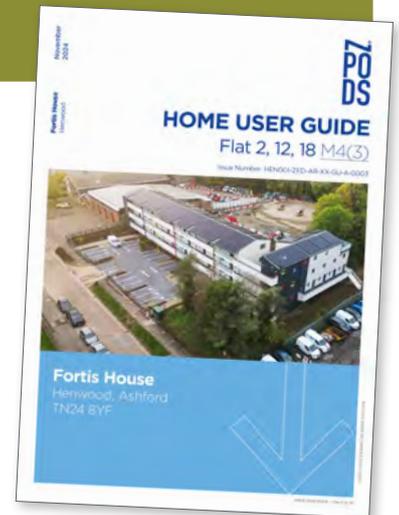
GIFA: 52.3 sqm



GIFA: 71 sqm



GIFA: 92 sqm



Supported Housing Scheme, Sheffield

6 net zero in operation move-one homes as part of the Stock Increase Program

Client: Sheffield City Council

Type of Construction: Offsite Volumetric Modern Methods of Construction

Project Location: Woodseats, Sheffield

Description: 6 self-contained zero carbon (in operation) homes using ZED PODS design and Volumetric MMC Construction

Status: Completed (August 2025)

Est. Contract value: £1.5m



With funding from the Department of Levelling Up, Housing and Communities

The development consists of 6 self-contained single person residential homes built offsite from fully fitted volumetric modules using ZED PODS award-winning low energy modular build system. Our inhouse architects have pioneered the strategy to bridge the gap between standardisation and design flexibilities in response to planning and the client's requirements. Without compromising the core values to deliver high quality, our net zero carbon homes have been considerably exceeding the building regulation requirements on all fronts & low running costs for the occupants.



Before: Brownfield Site

This project involves regeneration of a cleared former garage site in council ownership unlikely to be suitable or viable for the development of traditionally constructed council homes due to its size and topography. The homes were designed by ZED PODS team of in-house architects, using a 'fabric-first' approach – with walls, ceilings, windows, doors and roofs all super-insulated, achieving high levels of air tightness. As part of Changing Futures Sheffield, the council have worked with people with lived experience of housing support services to co-design key elements of this project.



CARBON SAVINGS
4.1
Tonnes/yr

WATER SAVINGS
53,845
Litres/yr

Energy Rating
A

Site area (m ²)	1,751
No. of dwellings	6
Unit type	1B1P
Unit GIFA (m ²)	37.5
Total GIFA (m ²)	225
No. of PV	132
No. of heatpump	6

This project delivers 6 move-on homes as part of the Council's Stock Increase Programme, enabling individuals to successful move-on to a fully independent home within 2 to 3 years, with investment from both the council (including from the Local Renewable Energy Fund) and the Department of Levelling Up, Housing and Communities.



“

I am delighted to see the Council deliver its first 'net zero in operation' Council homes. This is an important step for the city. It's been great to visit these homes upon their completion, and I will be particularly keen to hear from residents about their experience of living in these homes moving forwards.”

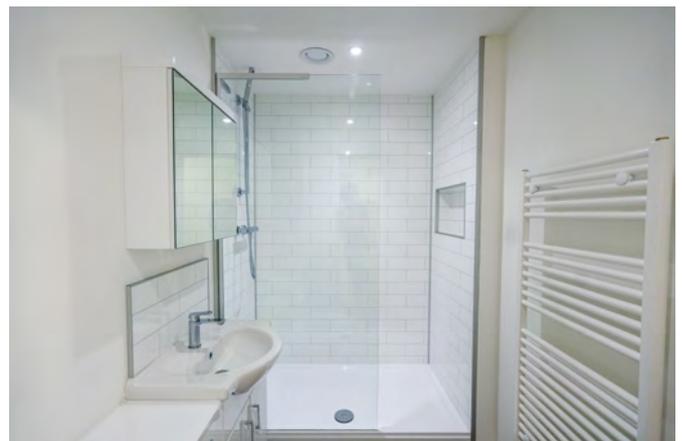
Cllr Douglas Johnson

Chair of Sheffield City Council's Housing Policy Committee



SHEFFIELD'S FIRST COUNCIL HOMES TO ACHIEVE 'NET ZERO CARBON IN OPERATION'

The homes are fully electric, fitted with heat pumps and roof-mounted solar photovoltaic panels. This ensures that 100% of the in-use carbon emissions are offset, making the homes 'Net Zero Operational Carbon'. This significantly reduces running costs for residents and contributes to the council's ambition to reduce its carbon emissions to net zero by 2030. In addition, a whole life cycle carbon assessment is being undertaken using One Click software to identify all environmental impacts of the scheme over its lifetime. The energy and environmental performance of the buildings exceed current building regulations.



AS BUILT PERFORMANCE

Energy Performance Certificate

Calculation Type: New Build (As Built)

1 Duffield Place
SHEFFIELD
S8 0DS

Energy Rating
A

Valid until
7 May 2035

Certificate number
0360-3588-1050-2605-4935

Above: 'As Built' EPC A rating of Crofts House.
All 5 units received rating A

Air Test Result

Air test results varied between 1.40–1.43m³/h/m² achieving near Passivhaus standard, all below ZED PODS design target. The achieved values are 80%+ better than the national compliance level of 5 m³/h/m²

Test Results			Pass
Target:	≤ 1.50	m ³ .h ⁻¹ .m ⁻² @50Pa	<div style="font-size: 2em; font-weight: bold; color: white;">1.40</div> <div style="font-size: 0.8em; color: white;">m³.h⁻¹.m⁻²@50Pa</div>
Air Flow Coefficient (C _{env}):	23.810	m ² .h ⁻¹ .Pa ⁻¹	
Air Leakage at 50 Pa (Q ₅₀):	206.568	m ³ .h ⁻¹	
Air Flow Exponent (n):	0.55		
Coefficient of Determination (r ²):	0.997		

This is to certify that the above name building has been tested by a registered provider in accordance with ATTMA TSL1, subject to the above statements regarding temporary sealing and deviations from these test standards.

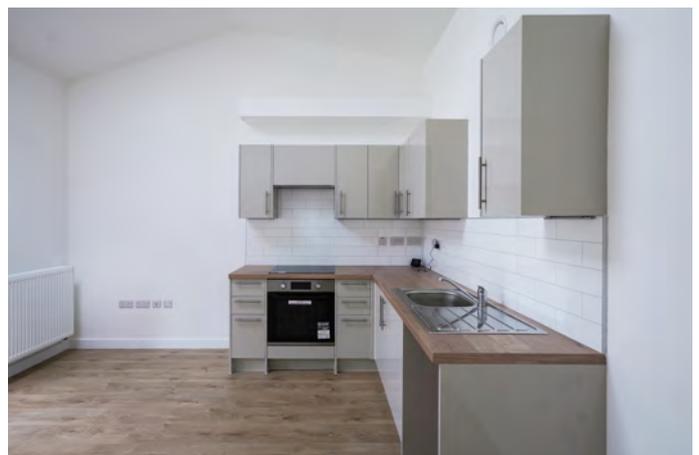
This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate. Enquiries about this certificate should be made to: Scheme Manager, ATTMA, Unit 3, Tannery Road, Loudwater, Buckinghamshire, HP13 7EQ or visit www.bcia.group/attma/

9YK2-24S7-SRZ7

Acoustic Test Result

Wall Test					Floor Test				
Certificate Number	Source Room & Volume	Target (D _{nt'w} +C _{tr})	Result (D _{nt'w} +C _{tr})	PASS	Certificate Number	Source Room & Volume	Target (D _{nt'w} +C _{tr})	Result (D _{nt'w} +C _{tr})	PASS
140990	Kitchen/Living: 63.4m ²	>=45 dB	57 dB	PASS	140991	Bedroom: 18.8m ²	>=45 dB	62 dB	PASS

Testing date: 25th January 2024 by The Sound Insulation Testing & Measurement Association (SITMA)



The development has been awarded the 'Secured by Design' Gold Award



Crofts House, Sanford

Delivering Affordable, Zero-Operational-Carbon Homes in Rural Devon

Client: Mid Devon District Council (MDDC)

Type of Construction: Offsite Volumetric modern methods of Construction

Location: Crofts House, Sandford, Crediton, EX17 4NR

Description: 5 high-quality, zero carbon in operation dwellings

Status: Completed (May 2025)

Scope: Turnkey package (Including all RIBA stages design works and planning support, offsite manufacture, onsite works, groundworks, completion and handover)

Funding Support: Homes England and One Public Estates



Crofts House is a pioneering rural affordable housing development that has transformed an underused council-owned contaminated garage site in the village of Sandford, Mid Devon, into five high-quality, NDSS-compliant social rent homes. Delivered by ZED PODS in partnership with Mid Devon District Council (MDDC), the scheme is the first rural, high-impact, zero-operational-carbon housing project in the district and a flagship example of how precision-engineered Modern Methods of Construction (MMC) can address housing need rapidly, sustainably, and with strong community buy-in.



Before: Garage site

Designed and delivered within just nine months, Crofts House sets a new benchmark for delivering value-for-money, environmentally intelligent, and socially impactful housing in rural contexts.



CARBON SAVINGS
11
Tonnes/yr

WATER SAVINGS
160,020
Litres/yr

Benefit/Cost Ratio
5.53

Site area (m ²)	412
No. of dwellings	5
1B2P 1-storey	4
1B2P 2-storey	1
Total GIFA (m ²)	267.2
No. of PV	36
No. of heatpump	5

Made in Peterborough

Energy Rating
A

CONTEXT & NEED

MDDC, like many rural authorities, faces a chronic shortage of affordable homes—particularly smaller, accessible units that enable residents to stay in their communities. Traditional construction methods had proven slow, costly, and difficult to mobilise for small, scattered rural sites. Sandford, despite its strong village character and amenities, had residents on the housing waiting list but no recent delivery of social rent homes.

Crofts House was inspired by “Asset Based Community Development” strategy, which seeks to re-purpose underused council-owned assets for maximum community value. The site, previously used as a garage court, offered an opportunity to meet local housing need while improving the area’s visual and functional quality.



“ZED PODS are delivering projects to a really high standard. The environmental credentials and build quality are great, and they reduce maintenance costs for MDDC.”

Paul Britton, One Public Estate

“We can deliver exactly the accommodation we need, without compromising on standard or specification.”

Simon Newcombe, MDDC

DESIGN APPROACH & SITE INTEGRATION

The design brief prioritised low-carbon living, accessibility, and neighbourhood integration.

Key design choices included:

- **Fabric-first plus renewables:** Alu-clad triple glazing, airtightness below $1\text{m}^3/\text{m}^2/\text{hr}$, and “breathing wall” construction for superior indoor air quality.
- **Renewable energy systems:** Roof-mounted photovoltaic panels generating **13,512 kWh/year**, paired with integrated Mechanical Ventilation with Heat Recovery (MVHR) and air source heat pumps.
- **Accessibility:** Ground-floor wheelchair accessible units ensuring inclusivity for residents with mobility needs.
- **Privacy & massing:** Buildings set back from neighbouring properties, with habitable room windows and balconies oriented towards mature tree foliage to prevent overlooking.
- **Connectivity:** Retention of the existing vehicular access, addition of two new pedestrian pathways linking to existing footpaths, and provision of secure cycle storage.

The rural location introduced unique constraints, including narrow access roads, telegraph poles with overhead lines, and the need to maintain existing parking and avoid overshadowing. These were resolved through careful site planning, traffic management, and community engagement.



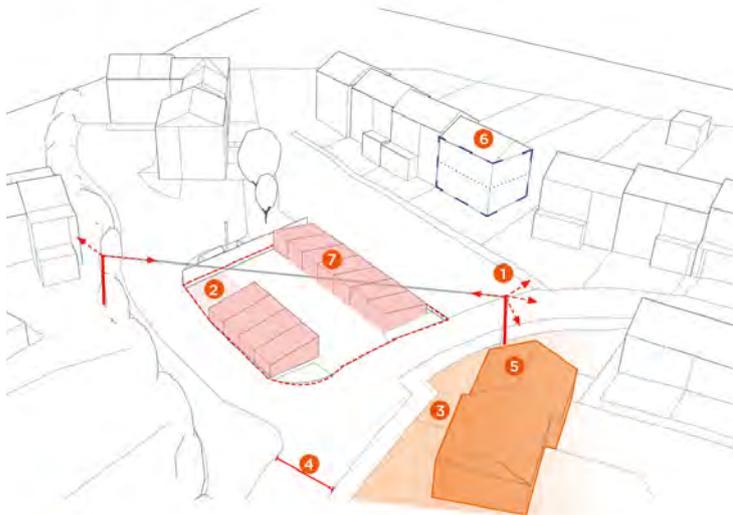
OVERCOMING BARRIERS

Delivering Crofts House required navigating multiple physical and contextual constraints typical of rural infill sites:

- Telegraph pole and overhead cables—Careful design coordination with utility providers ensured safe clearance, avoiding costly relocation works while maintaining access for future maintenance.
- Existing parking provision—The scheme retained and rationalised both informal and formal parking spaces, integrating them into the site plan to avoid displacement impacts.
- Proximity to neighbouring properties—Building massing and orientation were adjusted to maximise separation distances, protect privacy, and avoid overlooking.
- Narrow access roads (3.7–4.9m width)—A tailored logistics and traffic management plan enabled module deliveries via village lanes with minimal disruption.
- Single-storey bungalows nearby—The design respected the established scale, using sensitive roof heights and set-backs to integrate with the surroundings.
- Mixed street typologies—Materials, detailing, and façade rhythms were chosen to complement the local character while introducing contemporary quality.
- Existing garages and storage units—The redevelopment replaced these underused structures with attractive, well-landscaped homes, improving site safety and visual appeal.

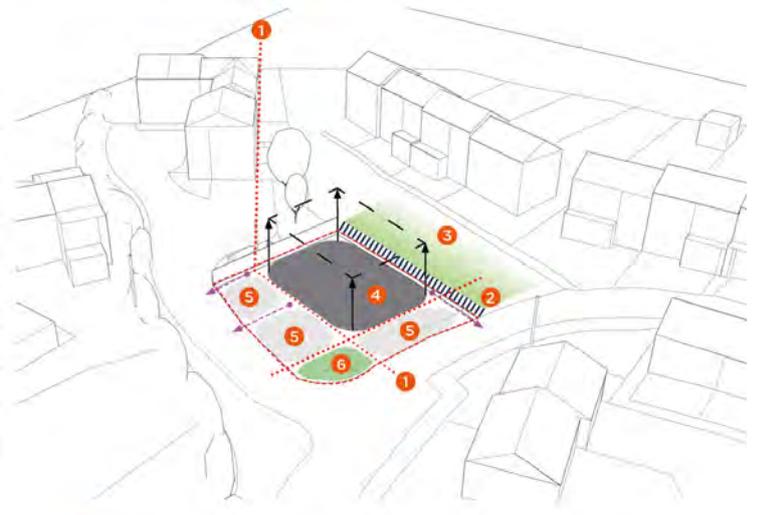
These bespoke design and delivery strategies ensured the project met technical requirements, planning expectations, and community acceptance.

Existing Site Constraints



- 1 Telegraph pole with overhanging cables running parallel to site
- 2 Existing informal & formal parking spaces
- 3 Close proximity to neighbouring property
- 4 Road width 3.7m - 4.9m
- 5 Single story bungalow units
- 6 Street character with typology mix of 1 and 2 storey dwellings
- 7 Existing garages and storage units

Potential Site Opportunities



- 1 Keeping within existing rear building line
- 2 Retention of existing retaining wall
- 3 Potential for green verge to act as buffer between development and existing properties located to the rear
- 4 Potential site for building location with max building height of 2-stories
- 5 Potential provision for parking
- 6 Provision of communal landscaping

COMMUNITY ENGAGEMENT

Early engagement with residents of Crofts House and Church Parks helped secure community support. Concerns about privacy, access, and parking were addressed through design changes and communication, ensuring minimal objections at planning.

The Asset Based Community Development approach also ensured the project reflected local priorities, building goodwill and setting a precedent for future schemes.

SUSTAINABILITY & PERFORMANCE

Crofts House is net-zero operational carbon, meaning it generates more renewable energy annually than its homes consume. This performance significantly reduces household running costs, critical for residents facing fuel poverty, and lowers MDDC’s maintenance and operational expenses.

Annual environmental savings include:

- **11** tonnes of CO₂ avoided
- **160** kilolitres of water saved

The homes’ 60-minute fire-rated external walls exceed Building Regulations (Part B), and the robust materials, such as alu-clad windows with a 60-year design life, ensure long-term resilience.

IoT-linked environmental sensors enable MDDC to continuously monitor building performance, allowing timely interventions to prevent moisture build-up, damp, and mould formation.

AS BUILT PERFORMANCE

Energy Performance Certificate

Calculation Type: New Build (As Built)

1 Crofts House Church Parks Sandford CREDITON EX17 4NR	Energy Rating <h1 style="font-size: 48px; margin: 0;">A</h1>
Valid until 28 May 2035	Certificate number 2815-3009-2305-3785-7200

Above: ‘As Built’ EPC A rating of Crofts House.
All 5 units received rating A

Air Test Result

Air test results varied between 1.50–1.63m³/h/m² achieving near Passivhaus standard, all below ZED PODS design target. The achieved values are 80%+ better than the national compliance level of 5 m³/h/m²

Test Results			Pass
Target:	<= 1.60	m ³ .h ⁻¹ .m ² @50Pa	<div style="font-size: 24px; font-weight: bold;">1.50</div> <div style="font-size: 12px;">m³.h⁻¹.m²@50Pa</div>
Air Flow Coefficient (C _{ov}):	19.648	m ³ .h ⁻¹ .Pa ⁻¹	
Air Leakage at 50 Pa (Q ₅₀):	321.676	m ³ .h ⁻¹	
Air Flow Exponent (n):	0.72		
Coefficient of Determination (r ²):	0.988		

This is to certify that the above name building has been tested by a registered provider in accordance with ATTMA TSL1, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate. Enquiries about this certificate should be made to: Scheme Manager, ATTMA, Unit 3, Tannery Road, Loudwater, Buckinghamshire, HP13 7EQ or visit www.bcta.group/attma/ or email admin@bcta.group.

Sound Test Result

Wall Test				
Certificate Number	Source Room & Volume	Target (D _{nt'w} +C _{tr})	Result (D _{nt'w} +C _{tr})	PASS
250425 AM	Bedroom: 31m ²	>=45 dB	62 dB	PASS

Floor Test				
Certificate Number	Source Room & Volume	Target (D _{nt'w} +C _{tr})	Result (D _{nt'w} +C _{tr})	PASS
250425 AN	Kitchen/Living: 62m ²	>=45 dB	57 dB	PASS

Testing date: 26th April 2025 by Soundguard Acoustics Ltd (Devon)

CONSTRUCTION INNOVATION

The project was delivered using Category 1 MMC volumetric modules, built to ±3mm tolerances in a BOPAS-certified factory. Key benefits of this approach included:

- **Speed:** Modules were manufactured in parallel with on-site works, halving the construction programme to just nine months.
- **Reduced disruption:** Careful delivery scheduling minimised disturbance to neighbouring homes during installation via narrow village lanes.
- **Precision:** An ISO 19650 BIM “Golden Thread” ensured efficient design coordination, clash detection, and seamless information flow for asset management.
- **Modules were 80% complete on arrival**, with all MEP systems, finishes, and renewable technologies pre-installed.



SOCIAL VALUE IMPACT – PRISONERS BUILDING HOMES (PBH) PROGRAMME

A distinctive feature of Crofts House is its integration with the PBH programme, a Ministry of Justice supported scheme enabling day-release prisoners to gain skills and work experience in modular construction in our factory in Peterborough.

For Crofts House, five day-release prisoners were directly involved in the factory build process.

The results speak volumes:

- **0%** reoffending rate for the cohort, compared to the national average of 25–30%.
- Estimated **£593,000** savings to UK taxpayers in reduced recidivism costs.

This initiative not only transforms lives but also addresses skills shortages in the construction sector.

ECONOMIC APPRAISAL OF SOCIAL IMPACT

The project achieved a Benefit-Cost Ratio of **5.53:1**, generating **£6.8 million** in net social value, as assessed through our “Social Value Impact Economic Appraisal Data Model” using HM Treasury Green Book principles. The model combines fiscal efficiency with high social impact across the project’s life-cycle.

17% of value impact came from cash-releasing benefits, including avoided temporary housing and brownfield maintenance costs, increased council tax, reduced life-cycle costs through MMC, savings from reduced reoffending, avoiding net-zero retrofit, etc.

83% came from societal benefits, including local SME use, job creation, BIM training, fuel-poverty avoidance, health gains, reduced carbon emissions, and zero standing charges. The scheme increased affordable housing supply and delivered significant wellbeing uplifts (WELBY) for vulnerable households.

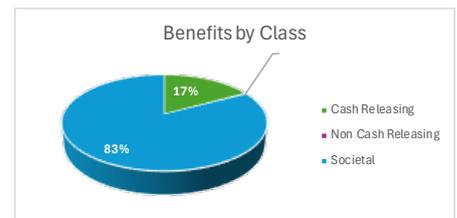
Project Details	
Region	South West
Development Start Year	2024
Practical Completion Year	2025
Acquisition Costs	£0
Development Costs	£1,493,706
Size Area (Ha)	0
Number of Units	5



Benefits

Total Discounted Benefits	£8,260,650
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Benefit Class	Total	Total Discounted Benefits
Cash Releasing	£3,051,764	£1,396,797
Non Cash Releasing	£24,000	£23,188
Societal	£16,364,697	£6,840,665
Unmonetisable	£0	£0
Total	£19,440,461	£8,260,650



Metrics

Total Discounted Benefits	£8,260,650
Total Discounted Costs (assumed incurred Yr 0)	£1,493,706
Benefit / Cost Ratio	5.53
Net Present Social Value	£6,766,944
Payback Year	2029

Unmonetisable Benefits

Climate Resilience
 Improvement of anti-social behaviour and increased community cohesion
 Efficiencies in regard to brownfield site management
 Provision of low carbon living training to residents

FUNDING & VALUE FOR MONEY

Crofts House demonstrates that sustainability and affordability can coexist:

- **£100,000** from the Brownfield Land Release Fund.
- **£506,305** from the Affordable Homes Programme.
- Net delivery cost: **£3,321/m²**—substantially below the cost of traditional EPC B builds (£3,724/m² in Bristol, £4,607/m² in Devon).

The use of durable, low-maintenance materials will further reduce lifecycle costs for MDDC, enabling reinvestment into future affordable housing projects.

RESIDENT & STAKEHOLDER FEEDBACK

MDDC received a total of 216 tenancy applications for the scheme. The incumbent residents received a welcome pack created by the local community on their own initiative.



“Everybody needs somewhere to live, especially those from Sandford. This project is a very good thing. I enjoyed watching it being built”

Marleen Stapleton (a local neighbour)



“I love it here, the flat is lovely.

I moved in and feel settled. I was welcomed by a local couple after about two weeks after moving in and they brought me a welcome pack with a voucher to use in the local shop. **The best thing about living here is the peace and quiet.** I am making it mine and it is so nice to have the space (the high ceilings). I have not lost space and I have gained outside space. **Moving here has improved my life.** Even my spider plants are thriving. They must like the environment, as they have grown lots.”

Miss Barden (Flat 1 Resident)

“I am very happy with our new home.

The best thing about living here is it doesn't get hot. The neighbours are welcoming. The location is great - moving here has improved my life.”

Mr Bailey-Brown (Flat 2 Resident)

IMPACT & LEGACY

Crofts House delivers far more than five homes:

- Addresses rural housing need for smaller, accessible, affordable homes.
- Cuts household energy bills to near zero, directly tackling fuel poverty.
- Sets a replicable model for rural net-zero housing delivery using MMC.
- Generates measurable social value through the PBH programme.
- Improves local environmental quality by replacing an underused garage court with landscaped, energy-efficient homes.

CONCLUSION

Crofts House stands as a proof-of-concept for how small, constrained rural sites can be transformed into high-quality, low-carbon, affordable homes - quickly, affordably, and with measurable social and environmental benefits. By integrating precision MMC, renewable energy, inclusive design, and social innovation, the project not only meets urgent housing needs in Sandford but also offers a blueprint for rural councils nationwide.

This is rural housing delivery that's design-led, high quality, high performing, socially inclusive without any compromise on sustainability and residents' well-being.

St. Andrews House, Cullompton

A social housing development of 6 zero operational carbon homes

Client: Mid Devon District Council (MDDC)

Designer & Principal Contractor: ZED PODS Limited

Type of Construction: Offsite Volumetric modern methods of Construction

Location: St Andrews House, Cullompton, EX15 1JA

Description: A social housing development of 6 zero operational carbon homes on a former brownfield garage site using ZED PODS' designs and BOPAS accredited build system.

Status: Completed (February 2024)

Funding Support: Brownfield Land Release Fund (BLRF 1) from One Public Estate & The Affordable Homes Programme (AHP) Grant from Homes England

Scope of Work: Full Turnkey Service (RIBA 0-7)

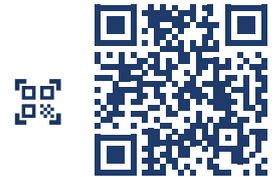


Despite financial strains & internal resource-gaps, Mid Devon District Council (MDDC) must rapidly build social-rented dwellings in response to their affordable-housing crisis (approximately 870 people/families on council waiting list), achieve their ambitious carbon-neutrality target of 2030, and prioritise well-being & safety of incumbent residents and local communities.



Before: Brownfield Garage Site

Mid Devon is a rural district in the agricultural heartland of Devon. They set a target for 30%+ of new homes to be built on 'brownfield' land, as they believe that it is more sustainable to reuse brownfield sites (without current beneficial use) than to build on land that has never been built on ('greenfield').



CARBON SAVINGS
10
Tonnes/yr

WATER SAVINGS
107,690
Litres/yr

Energy Rating
A

Made in Peterborough

Site area (m ²)	577.2
No. of dwellings	6
1B1P 1-storey	3
2B3P 1-storey	3
Total GIFA (m ²)	298.6
No. of PV	96
No. of heatpump	6

Benefit/Cost Ratio

8.15

Supported by the Land Release Fund and One Public Estate programme

The exemplar zero-operational-carbon, social-rented modular housing scheme, St Andrews House, designed & built by ZED PODS on a contaminated infill garage site in Cullompton, demonstrate how to embed innovation (MMC) & integrate sustainability goals to unlock constrained urban land parcels, adopt low-carbon design, low-carbon material specifications & usage of renewables, build rapidly “good-quality” SAP100+ rated healthy homes, enhance green spaces & biodiversity, involve local community and house vulnerable households. “Sustainability” is at the heart of the scheme design and with the added benefit of a leaner off-site manufacturing process with minimum construction waste this enables carbon payback within the lifetime of buildings.

Exemplar collaboration & partnership working overcame several design and operational barriers not only to achieve on-time & on-budget completion but became the first project for MDDC to apply for the national BLRF (Round1) from One Public Estates & the AHP fund from Homes England. Interestingly, the project is also the first to break grounds and achieve completion under BLRF1. The partnership has been featured in the “Social Housing at Pace: MMC Playbook” by the Housing Festival under the chapter of “Unlocking Unlikely Land”. This affordable housing project not only met Mid Devon District Council’s (MDDC) housing, well-being & sustainability goals but also marked the region’s first MMC-led sustainable development on brownfields.



Unit Type	GIFA/unit (m ²)	Electric meters	Water meters	Unit Type	GIFA/unit (m ²)
2 Bed 3 Person Unit 1, 3, 5	61.8	Blue square	Cyan square	1 Bed 1 Person Unit 2, 4, 6	38

ENERGY PERFORMANCE CERTIFICATE

Score	Energy rating	Current	Potential
92+	A	104 A	104 A
81-91	B		
69-80	C		
55-68	D		
39-54	E		
21-38	F		
1-20	G		

Carbon Dioxide Level



Humidity

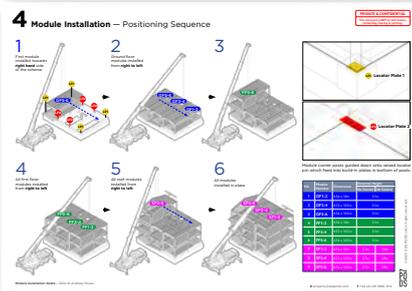
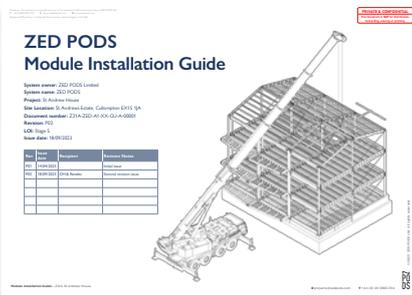


Temperature



ZERO CARBON HOMES – DESIGN & CONSTRUCTION

The uniqueness of the scheme emerged during the design phase. Employing a cutting-edge grid-based design, we efficiently arranged the massing of three one-bedroom and three two-bedroom units on the site. We have consciously removed numerous high embodied energy and carbon products from our construction system. Our master plan design, specifications, material selection, construction, and installation processes are all intricately tailored to facilitate the achievement of a zero-carbon development in operation.



Above: Innovative Off-site MMC - Use of lean off-site manufacturing process has reduced construction waste, increase precision, improve quality and reduce carbon footprint.

These modules, manufactured in our factory in Peterborough, had completed up to 90% following our “zero-waste to landfill” policy at factory-gate. Subsequently, the modules were transported and installed on-site within 2 days. The implementation of our light touch foundation method circumvents extensive ground excavation, effectively minimizing construction waste. This offsite construction enhances fabric efficiency by utilising low embodied carbon and highly recyclable materials. This approach results in minimised construction traffics, pollution, disruption, leading to reduced carbon footprints. Notably, our strategy involves reducing the reliance on concrete compared to traditional builds, thereby significantly lowering the carbon intensity associated with the construction process.

AS BUILT PERFORMANCE

The modular system is composed of build ups that are highly insulated, airtight, details that minimise thermal bridging and designed to optimise internal daylighting resulting in significantly reduced energy consumption by 70-75% over traditional build. (The scheme has achieved U-Values to **1.1-1.5m³.h-1.m² @50Pa**, EPC rating ‘A’ and SAP ratings of over **100**). Combined with renewable on-site technologies such as mechanical ventilation, air source heat pumps with 2 roof-mounted PV Panels generate more energy (13.3 MWh/year) to cover the remaining 25-30% energy demand for a home over the course of the year. This strategy completes the entire cycle, providing a Net Zero Energy Development with a highly optimised payback period for end users. Net zero not only benefits the planet and helps abate climate change but they reduce ongoing costs for the occupants. Given our specialism in zero-carbon social homes, this is a critical benefit for social housing residents who are often from low-income households and face “fuel poverty”. The St Andrew House will meet soon-to-be-implemented “Future Homes Standard” and most parameters of UN Sustainable Goals. This project will demonstrate that leading net zero brings a raft of benefits which help drive consumer choice in selecting low-carbon options where they are made available.

With estimated savings of **296.51** tonnes of carbon emissions over 30 years, and a yearly reduction of **107** kilolitres of water compared to baseline levels, the St Andrews House demonstrates significant environmental stewardship. Moreover, the scheme is designed to have no net carbon footprint over its lifetime. This means it will offset not only the carbon footprint of the original construction but also the ongoing maintenance and energy requirements needed to operate the homes annually.



INTERIORS – 3D VIRTUAL TOUR

GIFA: 38 sqm



GIFA: 61.8 sqm



February 2024
St Andrews House
Cullompton

ZED PODS

HOME USER GUIDE

Flat 1, 3, 5

Issue Number: Z21A-ZFL-XX-XX-GUA-A-0001

St Andrews House
Cullompton
EX15 1JA

Services Operation & Maintenance

3.1 Units & Appliances

The kitchen is equipped with a range of built units and wall units, a stainless steel sink unit together with laminated worktops and single basin mixer tap. 13A socket outlets have been provided for your electrical appliances which include a 4 ring electric cooking hob with a unit integrated extractor fan and an electric fan oven.

Please DO NOT attempt to carry out any electrical or plumbing works within the units. All repair works should be arranged by Mtd Deep Housing.

Switches to control all of these appliances are located on the wall above the corner of the kitchen worktop and have been labelled.

The designated area for the washing machine is situated adjacent to the under-site cupboard in the kitchen. Electrical and plumbing connections have been provided for a washing machine in the location shown below.

- Learn more, see how to videos**
- Extractor fan (deducting)**
URL: <https://www.zedpods.com/learn-more/extractor-fan>
- Four ring electric hob**
URL: <https://www.zedpods.com/learn-more/4-ring-electric-hob>
- Electric fan oven**
URL: <https://www.zedpods.com/learn-more/electric-fan-oven>
- Space of Washing Machine**
- Space of Fridge & Freezer**

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ZED PODS

MAINTENANCE SCHEDULE

Project: St Andrews House, Cullompton
Document Number: Z21A-ZED-XX-ZZ-OM-A-0001
Revision: P01
Date: 10/01/2024



ST ANDREWS HOUSE – SOCIAL VALUE IMPACT

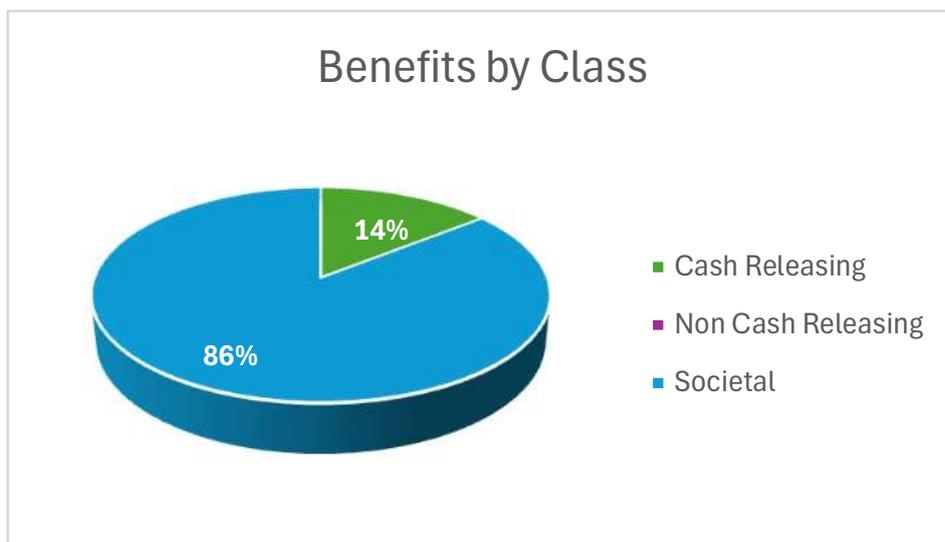
Benefit / Cost Ratio
8.15

Project Details	
Region	South West
Development Start Year	2023
Practical Completion Year	2024
Acquisition Costs	£0
Development Costs	£1,000,000
Size Area (Ha)	0
Number of Units	6

Benefits

Total Discounted Benefits	£8,154,809
----------------------------------	-------------------

Benefit Class	Total	Total Discounted Benefits
Cash Releasing	£2,672,949	£1,164,562
Non Cash Releasing	£0	£0
Societal	£16,347,777	£6,990,247
Unmonetisable	£0	£0
Total	£19,020,726	£8,154,809



Metrics

Total Discounted Benefits	£8,154,809
Total Discounted Costs (assumed incurred Yr 0)	£1,000,000
Benefit / Cost Ratio	8.15
Net Present Social Value	£7,154,809
Payback Year	2028

Unmonetisable Benefits

Climate Resilience
 Improvement of anti-social behaviour and increased community cohesion
 Efficiencies in regard to brownfield site management
 Provision of low carbon living training to residents

“ I have to admit that when we started on this journey, I never thought that it would generate so much interest and support. The aim was and still is to provide as much new social housing and to the best standard we could, and this is the first of many projects that will enable us to achieve this. So, this recognition shows just what a great team we have and what passion they have in what they do.”

Mike Lowman
Operations Manager, Mid Devon District Council

“ Having viewed these pods following completion, I can vouch for their excellence. I know more are planned. Well done MDDC for running with this initiative.”

Kim Glanville
Housing Options Officer, Mid Devon District Council



St Andrews House module lifting day

“ We are extremely grateful and feel very lucky to have got a property at St Andrews House. It is a huge relief that we will not be in temporary housing anymore and we will welcome our baby in our lovely permanent home. **We love the flat, it's so bright and airy and we never want to leave.**”

Ellie
St Andrews House Resident



How would you rate the interior of the apartments?

9.8 average rating



How would you rate the building in terms of its design and layout?

8.6 average rating



How would you rate the homes in terms of overall quality?

9.3 average rating



How would you rate the building in terms of its aesthetics?

8.3 average rating



Noise Levels: How would you rate the noise levels within your apartment during both daytime and nighttime?

9.0 average rating



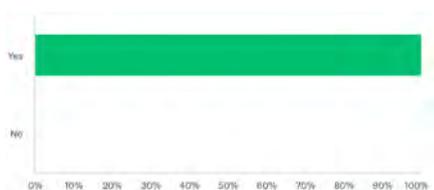
Communication: How satisfied are you with the communication channels provided by the management team regarding announcements, home user guide, etc.?

7.0 average rating



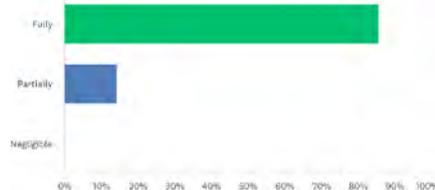
Would you recommend St Andrews House to people who needs a home?

Answered: 7



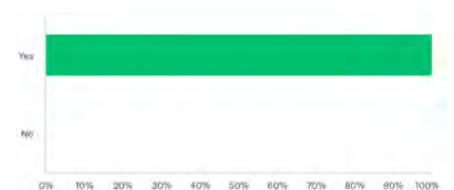
Has the project met your expectations for sustainable development?

Answered: 7



Do you agree that the project has significantly transformed the brownfield site?

Answered: 7



ST ANDREWS HOUSE VISITOR'S FEEDBACK

“

It is clear that a lot of time has been spent understanding what residents want/need and how best to make this the most sustainable energy efficient home it can be – what I particularly liked was the attention to detail – this scheme illustrates well that social housing can be architecturally pleasing and excellent quality – a home residents wish to live in and are proud to live in - delivered on a micro brownfield site making the best use of public assets and funding.”



Sophie Baker

National Delivery Manager, Prisoners Building Homes Program

“

It's great to see such a positive collaboration between Mid Devon District Council and ZED PODS in unlocking a difficult brownfield site and delivering affordable homes. These have been built to a high standard and their energy performance credentials enable the new residents to have lower running costs, which is incredibly important in Council-owned rented properties. Speed of delivery is testament to the many benefits in utilising MMC to help meet housing needs within the area.”

Paul Britton

Regional Programme Manager (SW)
One Public Estate, Local Government Association



“

Looks great and a real improvement to the existing site”

Cassandra Harrison

Housing Enabling Officer, East Devon District Council

“

Fits in well with the surroundings and a low energy development”

Graham Davey

Teignbridge Council

“

The orientation of each apartment and the additional features of the balconies which allows each occupier to enjoy more space and well being”.

Hayley Morrish

North Somerset Council

“

The way the open plan living space and large balconies have been designed to maximise the incredible view, and the positive impact this is likely to have on the residents.”

Ellen Grist

Research & Evaluation Lead at Housing Festival | Associate at Futureground

Shapland Place, Tiverton

8 zero-operational carbon social housing scheme in flood zone 3 area

Client: Mid Devon District Council (MDDC)

Type of Construction: Offsite Volumetric modern methods of Construction

Location: Tiverton EX16 5FF

Description: New ultra-low energy homes on a former garage site using ZED PODS' designs and BOPAS accredited build system.

Present Status: Complete (November 2024)

Funding Support: Brownfield Land Release Fund (BLRF 1) from One Public Estate & The Affordable Homes Programme (AHP) Grant from Homes England

Scope of Work: Design & Build (RIBA 0-7) – Full Turnkey Package (Principal Contractor)



With 3000 people in need for social housing, Mid Devon District Council need to build more social housing schemes at a faster pace while achieving carbon neutrality by 2030. ZED PODS in partnership with the Mid Devon District Council (MDDC), have designed and built 8 energy-efficient modular homes on council- owned, difficult-to-build, brownfield sites occupied by unused garages in Tiverton. The housing scheme will be built on a steel podium at the site located in Flood Zone 3 – the first-in-the-UK, and is set to be carbon-neutral, making this one of the first social housing projects of this type within the UK.



Before: Contaminated garage site in Flood Zone 3A



CARBON SAVINGS
14
Tonnes/yr

WATER SAVINGS
107,690
Litres/yr

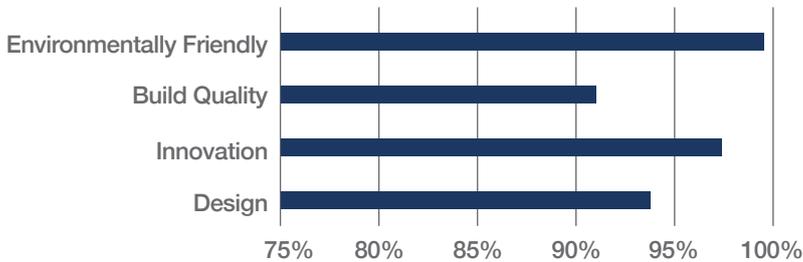
Benefit / Cost Ratio
4.68

Site area (m ²)	1,193
No. of dwellings	8
1Bed 1Person	4
2Bed 4Person	3
3Bed 4Person	1
Total GIFA (m ²)	438.5
No. of PV	144
No. of heatpump	8

ACHIEVING PLANNING

Early process innovations, true collaboration with the council & stakeholder engagement with 430 people during pandemic, helped to obtain planning permissions. Every home has superior building envelope, heat pumps, solar panels for ultra-low energy use, creating zero-carbon community. The scheme demonstrates provision of attractive, affordable, rapid build social homes on underutilised land.

MDDC is mostly rural familiar with traditional construction. To deliver modular homes, we had to win “hearts and mind” of local community. Extensive stakeholder engagement, using full-sized 1 bed 2 storey demo home, over 6 months brought 438 visitors. Over 90% of them approved these homes near to their place. (Overcoming NIMBYISM)



Q. Would you like to see ZED PODS Schemes developed where you live?

Yes: 99 No: 2

“Love the unit! An innovative solution to the diverse housing we need.”
“I have looked round the ZED PODS in Cullompton and think that the project is a brilliant idea to provide more social housing quickly and on sites that are easily available.”
“It is really exciting and has to be the way forward for housing!”

Above: Public Consultation Result

“Our partnership with ZED PODS continues to grow successfully and is very much underpinned by shared values, innovation and a collaborative approach to achieve our goals. As a team we’re able provide high-quality, affordable social housing where its most needed and at pace. Central to this is a regenerative, sustainable approach to building that benefits our tenants and communities long-term. Having several successful schemes complete and a strong pipeline of sites going forward is testimony to the value we place in working together.”



Councillor Simon Newcombe
Mid Devon District Council



Score	Energy rating	Current	Potential
92+	A	103 A	103 A
81-91	B		
69-80	C		
55-68	D		
39-54	E		
21-38	F		
1-20	G		

ZERO CARBON HOMES – DESIGN & CONSTRUCTION

Zero-carbon and sustainable housing are at the heart of the scheme. The building fabric has been optimised to be as lean as possible ‘**Be Lean**’, utilising super-insulation build ups, high levels of airtightness, reduced thermal bridging, triple glazing and mechanical heat recovery ventilation systems. The units have been designed to achieve with SAP ratings over 100. The scheme will save 13 tonnes per year compared with a traditional new build.



The feasibility of decentralised energy production as a ‘**Be Clean**’ measure has been assessed. The site is not near to, or part of, either an existing or planned district heat network, and the scale of the development does not lend itself to district heating. The building fabric and energy requirements are also minimised to the level where district heating would be the optimal choice of heating system. On-site combined air source heat pump technologies have specified as the most appropriate for a development of this size and design.

All options available under the ‘**Be Green**’ renewable energy generating technologies have been assessed. Solar PV panels to meet electricity demands and Combine heat pumps for hot water demand are considered the most appropriate technology to meet.

The overall approach to reducing CO₂ emissions for the scheme exceeds the requirements of the Building Regulations and Adopted Local Plan Policy DM2 to become a **Net Zero Carbon development**. The outcomes of this report demonstrate the reductions in Dwelling Emissions Rates (DER) versus Typical Emissions Rates (TER) and DFEE versus TFEE to evidence the Net Zero Carbon Strategy.

CARBON SAVINGS (TONNES CO₂EQ)

	CO ₂ Emissions (Tonne/yr)	Over 10 Years	Over 30 Years	Over 100 Years
Project Impact	-1.24	-12.44	-37.33	-124.44
Over Part L	11	108.80	326.40	1,088.01
Over Typical Build	8	83.11	249.32	831.07

ANTICIPATED CARBON EMISSIONS

Part L Compliance		Standard New Build		Shapland Place Scheme	
CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)
TER		UK Average DER		Anticipated DER	
32.10	13,205	15.82	7,066	-3.26	-1,244

Note: new build data taken from ONS housing efficiency and median property sizes

WATER SAVINGS (LITRE)*

Number of Occupants	Water Consumption (Average L/Person/Day)	Savings over baseline** (L Per Year)
20	103.06	160,271.70

*Not including sprinkler demands or external usage. ** Baseline water consumption based on England Compliance of 125L/person/day from Building Regulations PartG 2010 with 2016 amendments)

AS BUILT DER & TER

Units	Floor Area (m ²)	DER* (kgCO ₂ /m ²)	TER** (kgCO ₂ /m ²)
1	74.46	-0.55	27.37
2	40.28	-6.16	30.56
3	40.28	-6.16	30.56
4	68.16	-1.75	27.40
5	68.16	-1.68	29.97
6	40.28	-5.30	33.02
7	40.28	-2.03	33.02
8	68.16	-1.68	29.97
Total	440.06	-25.31	241.87
% DER/TER		PASS	
108.99 %			

*DER: Dwelling Carbon Dioxide Emission Rate

**TER: Target Carbon Dioxide Emission Rate

SHAPLAND PLACE – SOCIAL VALUE IMPACT

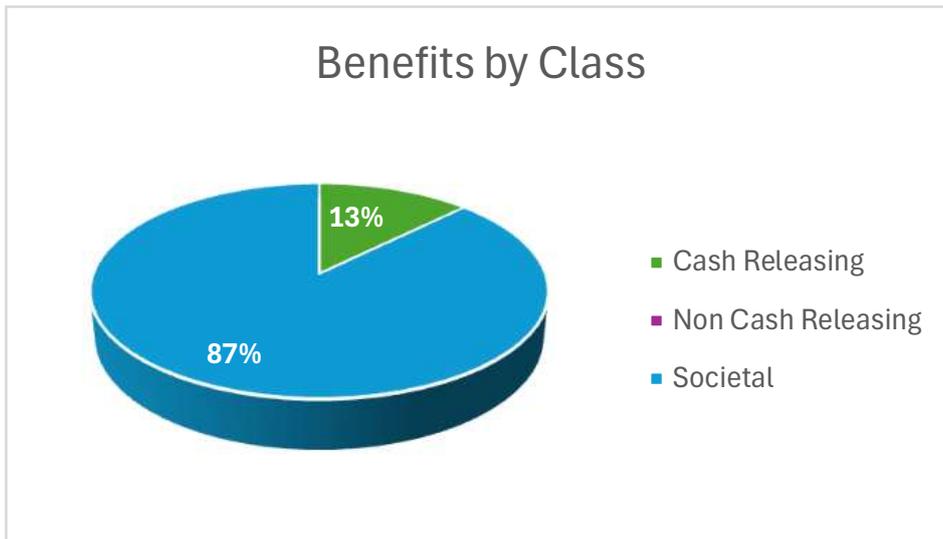
Benefit / Cost Ratio
4.68

Project Details	
Region	South West
Development Start Year	2023
Practical Completion Year	2024
Acquisition Costs	£0
Development Costs	£2,200,000
Size Area (Ha)	0
Number of Units	8

Benefits

Total Discounted Benefits	£10,289,928
----------------------------------	--------------------

Benefit Class	Total	Total Discounted Benefits
Cash Releasing	£2,005,975	£1,295,066
Non Cash Releasing	£0	£0
Societal	£20,814,687	£8,994,862
Unmonetisable	£0	£0
Total	£22,820,662	£10,289,928



Metrics

Total Discounted Benefits	£10,289,928
Total Discounted Costs (assumed incurred Yr 0)	£2,200,000
Benefit / Cost Ratio	4.68
Net Present Social Value	£8,089,928
Payback Year	2029

Unmonetisable Benefits

Climate Resilience
 Improvement of anti-social behaviour and increased community cohesion
 Efficiencies in regard to brownfield site management
 Provision of low carbon living training to residents

Hill Street House (Ty Stryd y Bryn), Newport

A 100% Social Rent, 2 storey building on an existing car park

Client: Linc Cymru Housing Association and Newport City Council

Type of Construction: Offsite Volumetric Modern Methods of Construction



Project Location: Hill Street House, Newport, NP20 1LZ

Description: Full turnkey for building 12 NDSS 1-beds apartments using ZED PODS designs and BOPAS accredited build system.



Status: Completed (September 2022)

The development consists of a two storey terrace of 12 separate units. The ground floor units will be level access from a patio walkway on the car parking side, the first floor units will be accessed via a 1.5m wide external walkway accessed via two semi enclosed staircases.

Each apartment has its own independent structure which ensures robust party wall construction performance to comply with building regulations and the fire safety plan.

Our design ensures maximum daylight, and public and private amenities for wellbeing. Each residential unit is fully fitted to connect to utilities, including telephone and internet connectivity; and, with a full turnkey solution, each unit is fully self-contained, including a bathroom and a kitchen with appropriate facilities.



CARBON SAVINGS
9.9
Tonnes/yr

WATER SAVINGS
107,690
Litres/yr

Site area (m ²)	1,424
No. of dwellings	12
Unit type	1B1P
Unit GIFA (m ²)	38.13
Total GIFA (m ²)	457.5
No. of PV	36
No. of heatpump	12



HRH Visit to Hill Street House as part of his Homewards Initiative

KEY INNOVATION

As detailed, the development meets all the ‘Must’ and all the ‘Should’ criteria, and our focused ‘WILL Goals’. ZED PODS key innovation criteria to include Well-being of **Future Generations (Wales) Act 2015**. The development has the 7 WFGA Goals at its heart with our focus on CO₂, capital and energy as our WILL goals. We are fully committed to the MUST criteria.

<p>HOUSING DELIVERY</p> <p>100% affordable, inclusive & low carbon living (WILL Goal: Capital)</p>	<p>LAND DEVELOPMENT</p> <p>Using a unique approach to bring car park into use for residential development (WILL Goal: Capital / CO₂ / Energy)</p>	<p>MMC</p> <p>Off-site volumetric housing (WILL Goal: Capital / CO₂ / Energy)</p>	<p>DESIGN & LAYOUT</p> <p>Re-establishing link to encourage active lifestyles (WILL Goal: CO₂ / Energy)</p>
<p>ARCHITECTURAL FEATURE</p> <p>Upbringing local character and reinforcing safety and security for wider community. (WILL Goal: Capital / CO₂ / Energy)</p>	<p>SUSTAINABILITY</p> <p>High-quality, ultra-low carbon, car free development (WILL Goal: Capital / CO₂ / Energy)</p>	<p>HEALTH & WELL-BEING</p> <p>Maximising opportunities for cycling, walking and sustainable transport including electric vehicle infrastructure (WILL Goal: Capital / CO₂ / Energy)</p>	<p>REGENERATION</p> <p>Maximising the site value by turning an existing car park into a secured residential development with prescribed amenity spaces and services. (WILL Goal: Capital / CO₂ / Energy)</p>



Before

Hill Street is a steeply sloping site with narrow access, most modular providers will consider this site unsuitable.



After

We developed innovative logistics strategy, lifting plan, and module design to make this site viable.

“

The Hill Street homes mark a positive step in tackling the housing crisis in the Newport area and will be a model for further green schemes to combat the lack of affordable, energy efficient homes in south Wales.”



Louise Attwood
Linc Cymru HA



AS BUILT PERFORMANCE

Energy Performance Certificate

Calculation Type: New Build (As Built)

Pod 1 Hill Street House Hill Street NEWPORT NP20 1LZ	Energy rating A
Valid until 3 August 2032	Certificate number 0340-3894-7080-2202-7455



Sound Test Result

Sound test results exceed national average and ZED PODS targets ensuring residents will not experience any disruption from exterior sounds or neighbouring units. Testing demonstrates 51dB reduction between horizontal units and 56dB reduction between vertical units.

Wall Test	Certificate Number	Source Room	Source Room Volume	Target $D_{nT_w} + C_{tr}$	Result $D_{nT_w} + C_{tr}$	PASS
	90896	Living Room	60.7m ²	>=45 dB	>=51 dB	PASS

Floor Test	Certificate Number	Source Room	Source Room Volume	Target $D_{nT_w} + C_{tr}$	Result $D_{nT_w} + C_{tr}$	PASS
	90897	Living Room	60.7m ²	>=45 dB	>=56 dB	PASS

Air Test Result

Air test results varied between 0.87 - 0.99 m³/h/m² achieving near Passivhaus standard far below ZED PODS target of 2 m³.h-1.m³. The achieved values are 80%+ better than the national compliance level of 5 m³/h/m²

Test Results			Pass
Target:	<= 10.00	m ³ .h ⁻¹ .m ² @50Pa	<div style="font-size: 2em; font-weight: bold; text-align: center;">0.87</div> <div style="text-align: center;">m³.h⁻¹.m²@50Pa</div>
Air Flow Coefficient (C _{env}):	4.053	m ³ .h ⁻¹ .Pa ⁻¹	
Air Leakage at 50 Pa (Q ₅₀):	120.592	m ³ .h ⁻¹	
Air Flow Exponent (n):	0.87		
Coefficient of Determination (r ²):	0.992		

Air Permeability: **0.87** m³.h⁻¹.m²@50Pa

This is to certify that the above name building has been tested by a registered provider in accordance with ATTMA TSL1, TSL2 or TSL3, subject to the above statements regarding temporary sealing and deviations from these test standards.

This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate. Enquiries about this certificate should be made to: Scheme Manager, ATTMA, Unit 3, Tannery Road, Loudwater, Buckinghamshire, HP13 7EQ or visit www.bcta.group/attma/



Anticipated Carbon Emissions

Part L Compliance		Standard New Build		Hill Street House	
CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)
TER		UK Average DER		Anticipated DER	
33.16	12,664	15.82	6,042	7.16	2,734

* New build data taken from ONS housing efficiency and median property sizes

Carbon Savings (Tonnes CO₂,eq)

	CO ₂ Emissions (tonne/yr)	Over 10 Years	Over 30 Years	Over 100 Years
Project Impact	2.73	27.30	82.0	273.4
Over Part L	46	458.92	1,376.76	4,589.22
Over Typical Build	30	301.64	904.91	3,016.38

Water Savings (Litre)*

Number of Occupants	Water Consumption (L Per Year)	Savings over baseline** (L Per Year)
12	440,184	42,945.31

*Not including sprinkler demands or external usage
 ** Baseline water consumption based on Wales Part-G Compliance of 110L/person/day from Building Regulations Part G 2010 with 2016 amendments)

TESTIMONIALS

“

There is a real community spirit here, it's nice. When I walked in for the first time in September it was completely overwhelming, to go from what I was living in to this. I'm so happy here. Private renting was a no-go for me as there is no way I could have afforded it. It was either pay my rent or eat and don't pay the rent.”

Sam Lewis

Hill Street House Resident



Tenant Sam Lewis with BBC Matt Allwright

“

I was on the housing register for years and continued to work throughout that time. When I speak about it I get emotional. I've worked all my life, but private renting was complicated and too expensive. Everything I tried there was a barrier.

I just cried when I realised I'd got this place. I read the message and I cried. I thought: 'Finally a safe home.' My life is now stable, if it wasn't for this place I don't know how I'd have ended up. I hope to God everyone in need like I was gets their own little place as I have”

Joanne Bradley

Hill Street House Resident



Joanne was homeless before being selected as one of the first ever people in Wales to live in an eco-friendly modular home.

“

The Hill Street House is providing a safe place for our wonderful residents to live and flourish, knowing that this is a permanent place to call home. The project, which was made possible by our partnership with Newport city council, Welsh Government and ZED PODS, plays a part in tackling the lack of affordable homes across Wales. Linc will be looking for more opportunities to develop homes that meet government net zero targets and work towards a sustainable future.

The Hill Street House mark a positive step in tackling the housing crisis in the Newport area and will be a model for further green schemes to combat the lack of affordable, energy efficient homes in south Wales.”

Louise Attwood

Executive Director of Property & Commercial
Linc Cymru Housing Association



“

...With around 9,000 people on Newport's housing waiting list, providing high-quality, energy efficient homes is vital. The ZED PODS technology appealed to us due to its environmental credentials. The Hill Street project takes a placemaking approach, creating a community that is connected and vibrant. With the train station just a short walk away and the city centre on its doorstep, its sustainable location is set to benefit our new residents. The energy efficiency measures in place, mean that we can provide our residents with homes that are cheaper to run and fit for the future, meeting our long-term commitment to their quality of life and wellbeing...By working alongside ZED PODS, Newport City Council, and Welsh Government, we hope these homes will enable our new residents to live happy, healthy, fulfilled lives.”



Sian Diaz

Development Director
Linc Cymru Housing Association

“

This Hill Street development uses some of the most up to date technology and environmental sensitive methodology to reduce costs and provide high quality accommodation. I am sure that if approved, the project is going to provide a wonderful, cost effective and stable opportunity for the 12 new occupants, one which I hope inspires many of them into training or gainful employment, where that is needed, together with a desire to be pioneers of positive community action.

I am delighted to support this development and hope that full retrospective planning consent is granted and, that moving forward, the local authority will review the success of the project and choose to replicate it in other locations across the city.”

Fran Richley

Operations Manager
Eden Gate Homeless Centre

Kevin Fenton Mews, Bromley

25 affordable, low-energy, high-quality new homes in Bromley

Client: London Borough of Bromley (LBB)

Scope of work: Design & Build – Full Turnkey Package (Principal Contractor)

Type of construction: Offsite Volumetric Modern Methods of Construction (MMC)

Location: 1-25 Kevin Fenton Mews, Bromley BR1 5FF

Description: 25 self-contained social-rented homes comprising of 1 & 2-beds apartments using ZED PODS designs and BOPAS accredited build system.

Status: Completed (December 2021)



This project is a pioneering, environmental and socially focused development for London Borough of Bromley (LBB), providing 25 homes for vulnerable households who are in temporary accommodation and mostly living outside the borough.

LBB wanted to build super energy-efficient new homes after a gap of several decades. Working with them, our in-house design team created an innovative zero-carbon housing scheme in the airspace above the Burnt Ash Lane car park. It is a 100% affordable residential scheme comprising of two blocks of 25 apartments, over 80% of existing car parking spaces for the local community. The car park has been also upgraded with additional five CCTVs for the development and two 4.5m pole mounted for the carpark, 15 EV chargers, new 40 cycle storage and new areas of planting.



The steel framed volumetric structure comes with “fabric first” approach combined with on-site renewable energy generation in the form of photovoltaic panels and solar assisted heat pumps to achieve a net zero operational carbon rating in SAP with as build SAP ratings exceeding 100 (A-rating).

CARBON SAVINGS

46

Tonnes/yr

WATER SAVINGS

537,501

Litres/yr

Energy Rating

A

Site area (m ²)	2,842
No. of dwellings	25
1B2P Maisonette	10
2B3P M4(3)	6
2B3P 2-storey	9
Total GIFA (m ²)	1,606.9
No. of PV	204
No. of heatpump	25

ZED PODS specialise in bringing forward development on constrained sites that are tricky to build. Our innovative off-site volumetric construction makes these kinds of sites including Burnt Ash Lane in Bromley are viable. Carparks are often vital community services and need to be kept in operation. Traditional build methods would not work on this scheme.

FEW MEASURABLE OUTCOMES:

- Exceed all planning standards
- Zero wastage in manufacturing process and reduced waste during on-site construction process
- Increased the quality of the internal environmental performance & and created zero operational carbon homes
- Installation of 50 modules on raised platform within a fortnight to reduce disruption to local community
- Super-insulated, airtightness construction with less than 1.3 air changes per hour @ 50 PA
- Low energy ASHP with high performance minimum COP of 3 (According EN14511 is calculated for the heat pump and counter flow heat exchanger combined, for more detail see Nilan Compact S data sheet Version 3.00)
- Solar PV panels with 2.6 kW's per apartment were factory fitted and generate more energy than is consumed annually.

INNOVATIVE OFF-SITE MMC

Use of clever design and lean off-site manufacturing process has helped to achieve the above and reduce construction waste, increase precision, improve quality and reduce carbon footprint.



Above: The steel podium platform be installed in days than months



Above: Off-site Production — up to 90% of the building work is completed in the UK based factory so once the groundworks are completed, the units were delivered to site and installed in matter of weeks.

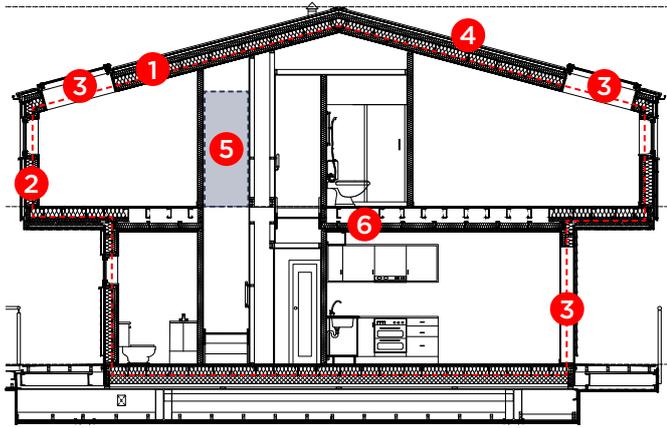


Above: On-site Construction — minimising on-site works reduce the amount of noise pollution generated by machinery for cutting, drilling; fitting out the modules off-site means that for less materials and components are stored on site helping to keep the area clean and tidy; Off-site material cutting and processes reduce amount of airborne dust created during works, improving air quality.



ZERO CARBON STRATEGY

A combined strategy of enhancing building fabric, maximising the number of energy efficiency measures, and applying low carbon and renewable technologies.



Above: Long Section – ZED PODS modular construction adopts a fabric first approach to increase energy efficiency and mechanical ventilation to recycle waste heat in the air. The remaining space heating, hot water and electricity demands are met with on-site renewable energy systems.



U-Values
 Wall: **0.15** W/m².K
 Roof: **0.12** W/m².K
 Floor: **0.11** W/m².K



Permeability
2.0 m³/m²/hr



U-Values
 Opening: **0.82** W/m².K



PV Production
59,725 kWh/Yr

Energy Performance Certificate

12 Kevin Fenton Mews
BROMLEY
BR1 5FF

Energy rating

A

Valid until
29 September 2032

Certificate number
9232-9131-4200-0280-0276

Anticipated Carbon Emissions

Part L Compliance		Standard New Build		Kevin Fenton Mews	
CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)
TER		UK Average DER		Anticipated DER	
25.48	41,162	15.82	25,434	0.61	4,730

*New build data taken from ONS housing efficiency and median property sizes

Carbon Savings (Tonnes CO₂ eq)

	CO ₂ Emissions (tonne/yr)	Over 10 Yrs	Over 30 Yrs	Over 100 Yrs
Project Impact	4.73	47.30	141.90	473.00
Over Part L	46	458.92	1376.76	4589.22
Over Typical Build	30	301.64	904.91	3016.38

Water Savings (Litre)*

Number of Occupants	Water Consumption (Average L/Person/Day)	Water Consumption (L Per Year)	Savings over baseline (L Per Year)
65	102.36	2,430,154.35	537,501.90

*Not including sprinkler demands or external usage



INTERIORS — 3D VIRTUAL TOUR



Maisonette
GIFA: **58.3** sqm



GIFA: **72.7** sqm



Part M4(3) Compliant
— Wheelchair user dwellings
GIFA: **61.6** sqm

Captain Sir Tom Moore House, Hinchingsbrooke

2 storey on ground self-contained key workers accommodation

Client: North West Anglia NHS Foundation Trust

Type of construction: Off-site Volumetric Modern Methods of Construction

Location: Hinchingsbrooke Hospital, Huntingdon, Cambridgeshire

Description: Full Turnkey for building 10 Space standard compliant one-bed apartments using ZED PODS designs.

Status: Completed (May 2020)



North West Anglia
NHS Foundation Trust

North West Anglia NHS Foundation Trust, working in collaboration with ZED PODS, worked collaboratively to design a scheme that could be deployed in circa 13 weeks on a constrained site to deliver much-needed accommodation for new nurses and medical students on site at Hinchingsbrooke Hospital in Huntingdon. The scheme was designed to provide key worker accommodation for frontline staff and will offer high quality low carbon housing at below market rates.



Above: 'Before' and 'After' pictures of 'Captain Sir Tom Moore House' key worker housing development

SAP Ratings	99A (see note below)	Carbon Emissions (t/yr)	Avg -0.91	
DER	1.39	M&E	1.5 kW PV, MVHR, Solar-assisted Heat Pumps	
U-Values	Roof: 0.13	Floor: 0.12	Wall: 0.15	Openings: 0.82



Site area (m ²)	680
No. of dwellings	10
Unit type	1B1P
Unit GIFA (m ²)	38
Total GIFA (m ²)	380
No. of PV	132
No. of heatpump	10

Captain Sir Tom Moore House key worker housing development Project Programme Chart: 10 x one-bed apartments / studio

Timescale													
Weeks	1	2	3	4	5	6	7	8	9	10	11	12	13
Building													
Project Design, Final Drawings & Approval													
Procurement of materials & Factory Production													
Groundworks													
Site Set-up / Preparation / Foundations / Service Connections etc.													
Site Works													
Delivery & Installation													

AS BUILT PERFORMANCE

Total Floor Area

381 m²

Energy Segments	kWh/yr
Heating	2731
Cooling	1761
Lighting	2693
Equipment	3231
Fans	854
Pumps	653

Energy Use Intensity

kWh/m²/yr

2030 challenge: 39
Actual: 26



Above: On-site 1.5 kW PV

Anticipated Carbon Emissions

Part L Compliance		Standard New Build		Captain Sir Tom Moore House	
CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)	CO ₂ (kg/m ² /yr)	Total CO ₂ (kg/Yr)
TER		UK Average DER		Anticipated DER	
33.16	12,664	15.82	6,042	3.97	1,511

* New build data taken from ONS housing efficiency and median property sizes

Carbon Savings (Tonnes CO₂eq)

	CO ₂ Emissions (tonne/yr)	Over 10 Years	Over 30 Years	Over 100 Years
Project Impact	1.51	15.10	45.30	151.10
Over Part L	13.1	131.00	393.00	1308.70
Over Typical Build	4.5	45.00	135.00	451.60



“

We are very pleased with the finished result of the studio apartments. Onsite accommodation at Hinchingsbrooke has been needed for some time, so this is a great place for our staff to have that option to cut down their commute and stay closer to work for periods of time, in comfortable surroundings”.



Graham Wilde
CEO of NW Anglia NHS Foundation Trust

RELOCATABLE SCHEME

Captain Sir Tom Moore House has remained in excellent condition since its completion in 2020. ZED PODS has now been commissioned by the Trust to relocate the entire development within the hospital site and add 42 new units, with groundworks scheduled to begin in 2026.



Captain Sir Tom Moore House in Jan 2024



To be relocated in 2026 with additional 42 units

