

S CO-HOSTING THE **OFFSITE SUMMIT**

T EXPO

17.09.2024

International best practice

Join in the conversation

@buildoffsite | @CIRIAupdates | @ExploreOffsite
#OffsiteSummit | #CollaboratingForImpact





JES CO-HOSTING THE JEST SUMMIT

AT

OFFSITE EXPO 17-18 SEP 2024

18.09.2024 15:30 - 16:50 | Session 4

BOS Innovation Hub Challenge





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AT

OFFSITE EXPO

17.09.2024 15:30 – 16:50

Ken Davie

Industry Advisor BUILDOFFSITE

BOS Innovation Hub Challenge



Join in the conversation

@BUILDOFFSITE @CIRIAupdates @ExploreOffsite

```
#BUILDOFFSITE  #BOS | #CollaboratingForImpact
#ExploreOffsite  #OffsiteExpo  #OffsiteSummit
#InnovationHubChallenge  #Digital  #Innovation
#NetZero  #SustainableConstruction
```



Celebrating 20 years of BUILDOFFSITE

Set up in 2004 as the voice of the industry, BUILDOFFSITE has sought to promote, support and increase the adoption of offsite and pre-manufactured solutions for the built environment.

"To be the trusted independent voice of the construction industry with respect to offsite and pre-manufacturing, and to provide all relevant support to our members and other stakeholders."



Join BUILDOFFSITE





Networking | Events
Exhibition Seminars
Site visits | Advice & Guidance
Knowledge Sharing | Publications
Marketing & Promoting Members
Influencing



BUILDOFFSITE members



















































































































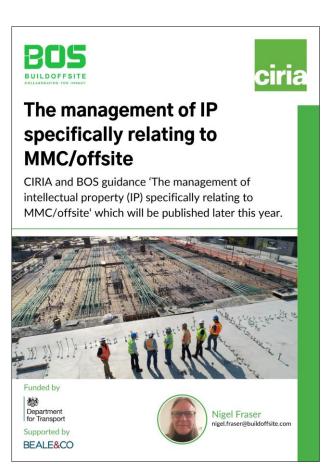




BUILDOFFSITE guidance 2022 – 2024







Client Group proposal approved for 2023 – 2024

Performance specifications guidance



Upcoming BUILDOFFSITE events

2-4 October

Structural Timber Awards 2024

13 November

DfMA for net zero carbon

20-21 November

London Build Expo

28 November

BOPAS Forum

4 December*

BOS Christmas members' meeting

Spring 2025*

Using performance specifications to facilitate the adoption of MMC – new BOS/CIRIA guidance

*Provisional date





S CO-HOSTING THE **OFFSITE SUMMIT**



BOS Innovation Hub Challenge

MEET OUR FINALISTS











17.09.2024 15:30 - 16:50

IS CO-HOSTING THE OFFSITE SUMMIT



OFFSITE 17-18 SEP 2024

BOS Innovation Hub Challenge

MEET OUR JUDGES



Dave Roberts Coventry University



Samantha Ferneley Vista Insurance



Joanne Bridges **Bridges Communications**



Keith Blanshard BUILDOFFSITE



JFFSITE SUMMIT









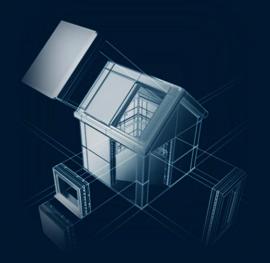


BOS Innovation Hub Challenge FINALIST

John Arthur
Chief Executive
Abode Industries

Prof Robert Barker FRIBA
Director
Abode Industries

BYGO



THE FUTURE OF CONSTRUCTION

by







PROBLEMS WITH HOUSING



Cost Uncertainty?



Poor Quality Workmanship?



Lasting Maintenance Problems?

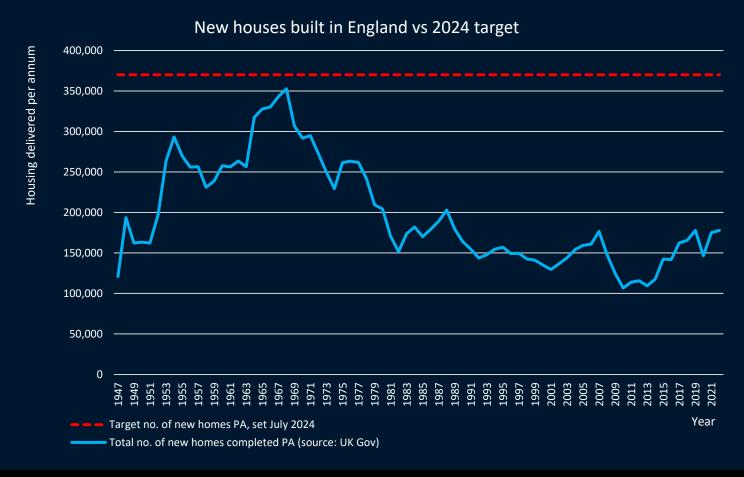


Production Is Largely Unmodernized





...and we will not meet DEMAND







THE ROOT CAUSE

CONSTRUCTION IS AN UN-MODERNISED INDUSTRY

Largely unchanged in 70 years! ...compared to...







BACKGROUND - in 2018

John'the Aerospace Engineer' built his first modular house



In 2020 He conceived BYGO and met Robert...

Robert 'The Architect/develo designed a fast, prefab, home



Cost <£1500/m². 3 RIBA awards & shown on GRAND DESIGNS



IMAGINE

If ordering a house was as easy & dependable as buying a new car...

Not fraught with worry!







OUR SOLUTION



Fast track production.
Use tech from other industries.



Make building parts versatile, with universal connectors



Adopt current gold standards. In the future they will be the norm.



Give customers control. Fix price from the outset





CONCEPT



Subdivide a building into mass-produceable parts



Standardize interface between parts



Build the parts to exacting tolerances



Make factories scalable to meet demand



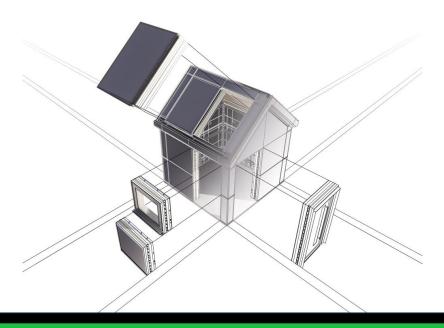
Automate the design process with Al



Make the construction process foolproof



AUTOMOTIVE MEETS ARCHITECTURE





THE STATE-OF-THE-ART. So what's new..?













TRADITIONAL

- All stages slow
- Inaccurate
- Expensive

TIMBER-FRAME

- Faster on site
- Long lead-time
- Low-cost

PANELISED

- Faster on site
- Long lead-time
- Low-cost

SIPs

- Faster on site
- Long lead-time
- Low flexibility

V. MODULAR

- Lead-time
- Inflexible
- Expensive

BYGO

- Quick
- Precise
- Economic

Lean Overheads, No need for huge orders and flexibility mean **BYGO** is different





STANDARDISED PARTS

Integral

- Structure
- Insulation
- Waterproofing
- Fire protection
- Acoustic control
- Service routes
- Fixings for finishes (inside and out)
- Zero Carbon by design









VERSATILE

To suit any site and any brief

- Multi-storey
- Pitched roof / flat roof
- Any use (housing, schools etc)
- Interchangeable
- Extendable



CUSTOMISABLE

To suit local planning requirements

+

- Support framing for
- External Cladding
- Balconies
- Solar Shading
- Canopies













UPGRADABLE

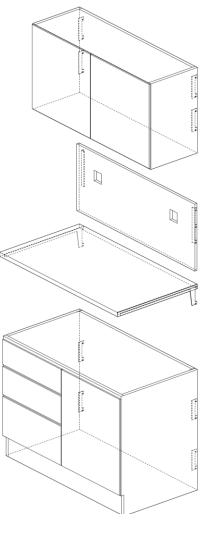
Ready for easy fix:

- Services
- Wall panels
- Kitchen units
- Curtains etc.

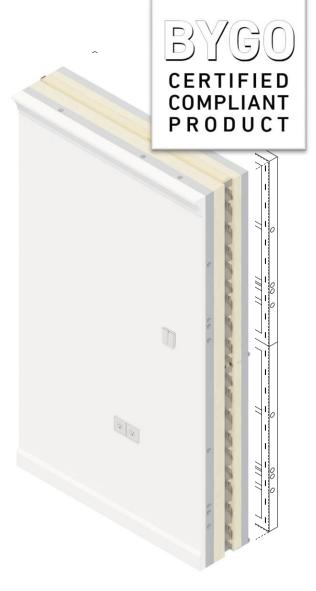


Integrated conduit runs and fixing points

Everything standardized and available.



Integrated 3rd party fixtures



3rd party compliant finishes







HOW IT WORKS



Choose from a template design



Customise to suit your needs and budget



Purchase online or instore (fixed price)



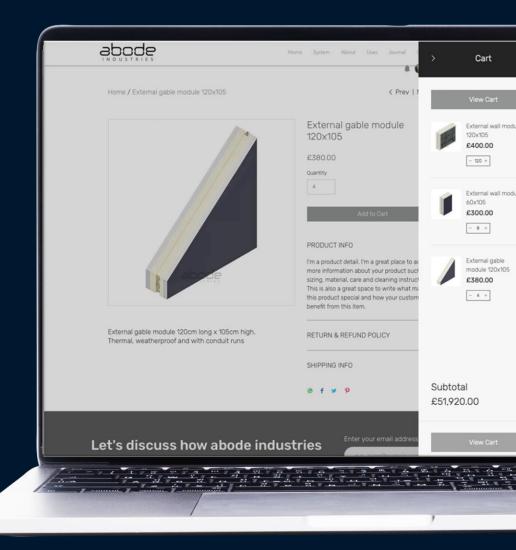
Erect on site or use trained installer



Bulk discounts for trade + 30 days credit



Consider future upgrades or add-ons

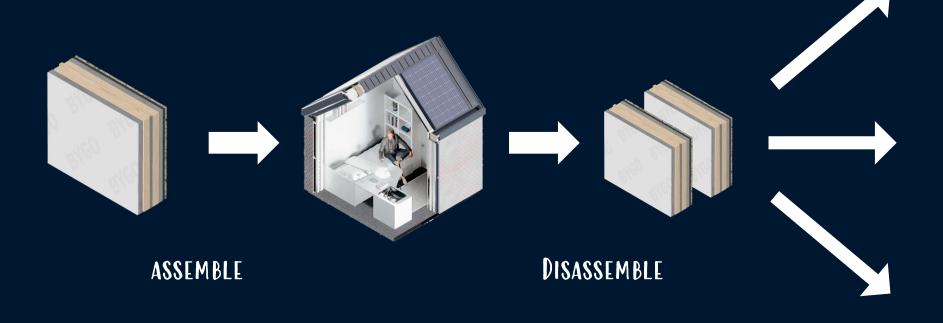


BUY ONLINE . . . JUST IN TIME



BUILT FOR RE-USE

CIRCULAR ECONOMY





OR



OR





CUSTOMER BENEFITS





SUSTAINABLE - OUT OF THE BOX





FIXED SUPPLY PRICE



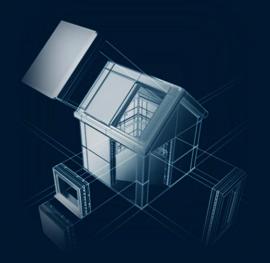


SMART, EASY MAINTENANCE





BYGO



THE FUTURE OF CONSTRUCTION

by









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'Dragon's Den Style' Questions

John Arthur
Chief Executive
Abode Industries

Prof Robert Barker FRIBA
Director
Abode Industries



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UNIPART CONSTRUCTION TECHNOLOGIES BOS Innovation Hub Challenge FINALIST

Dave Allen
General Manager
Unipart Construction Technologies

Unipart Construction Technologies

Transformational Building and Infrastructure Solutions for the Global construction industry





Unipart Construction Technologies

UCT specialises in creating innovative new Manufactured Reinforcement Systems (MRS) for structural concrete, and modular MEP Support Structures for building service installation.

Manufactured Reinforcement Systems

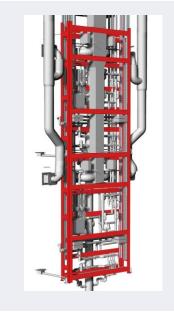
Building Solutions



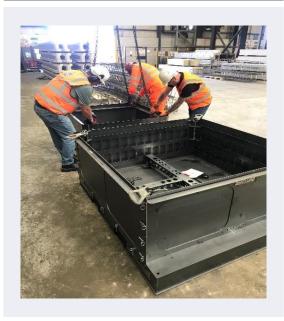
Infrastructure solutions



MEP Support Structures



Moulds and tooling





A New Technology

Frames precisely engineered and manufactured from laser cut profiles.

Connected using patented joining features.

Designed to incorporate and control a variety of cast-in or pre-installed components including:

- Lifting points
- Mounting points
- Halfen channels
- Bespoke components
- Off-the-shelf fixings







Key advantages

The UCT technology offers an array of unique benefits



Greener

Lower Carbon - Supporting Net Zero commitments



Faster

To manufacture and install.
Reduces installation programmes.



Safer

Protect your workforce and reputation.



Stronger

Optimised MRS increases strength by +40%.



More Precise

Accuracy +/- 2mm



Systemically lower cost

When deployed as a system



A catalyst for Modern Methods of Construction

Our technology:

- Is Designed for Manufacture and Assembly (DfMA).
- Eliminates the need for specialist steel fixers and welders.
- Is manufactured off-site for just-intime delivery.
- Is suitable for a broad range of applications.





Building Solutions

Residential and Commercial Construction





Beams

A pre-cast slim floor beam solution to maximise usable space in residential construction







Designed to be **integrated seamlessly** with PCE Ltd's HybriDfMA method of construction on their Fulton Road project in Wembley, London.

Pre-cast solution offers **faster installation** than cast in-situ options

Increased accuracy and rigidity aids ease of installation

Beam depth minimised to 200mm allows an additional floor to be included every 10 storeys.

Engineered to work with standard slab floor depths



Columns





Installed in the Manufacturing Technology Centre's Healthcare Demonstrator in Coventry, UK

Reduced mould set up time prior to concreting

Lifting points and interfaces with other structural components accurately positioned and controlled

MRS technology facilitates slimmer sections to **reduce embodied carbon**

Laser cut precision guarantees concrete cover is achieved





MEP Support Structures

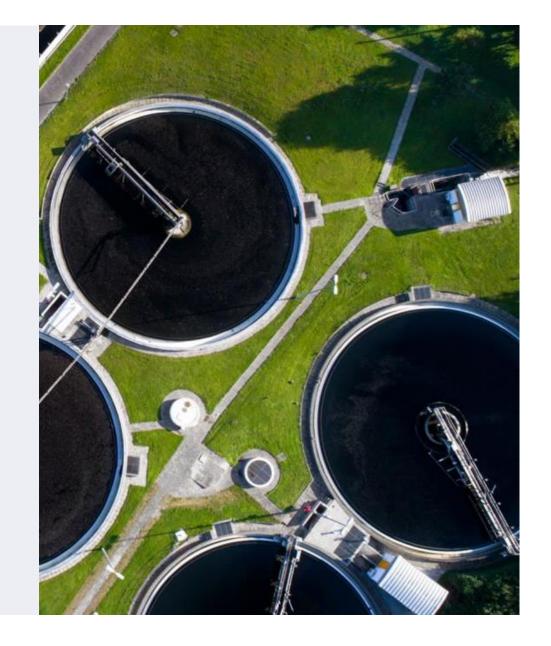
- Modular stainless sheet steel solutions to eliminate welding.
- UCT provide the full structural design and manufacturing solution.
- Solutions can be provided either fully assembled or flat-packed for customer assembly.
- Assembly process is deskilled, much faster, and safer.
- Additional benefits include etched instructions, guaranteed pipe alignment, and longevity.
- Services pre-installed for easy connection onsite.





Infrastructure Solutions

Build infrastructure faster and more efficiently





Applications in:



Communications



Social infrastructure



Defence



Transportation



Energy

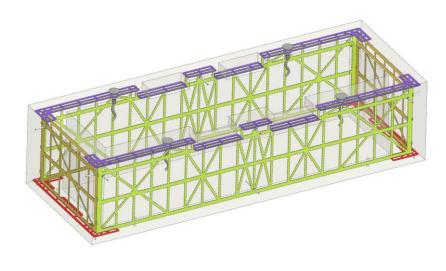


Water



Service Riser Upstands for prisons

MRS frames supplied flat pack to support prisoner rehabilitation programme



Simplified single layer design

Assembly instructions laser cut into frame

Lifters **precisely**positioned from MRS

80% improvement in assembly time

63% steel reduction vs current design





Retaining Walls

Seal Wall precast products for the water industry

40% reduction in steel required vs. current design.

Simplified assembly reduces process time

Eliminates current issues with rebar frame fabrication **variability**

Optimised for temporary and permanent loading requirements

Independently tested and validated for structural and crack control performance





Unipart Construction Technologies

Transforming the global construction industry

For more information please contact:

Dave Allen, General Manager <u>dave.allen@unipart.com</u>
Michael Starr, Commercial Manager <u>michael.starr@unipart.com</u>





JES CO-HOSTING THE JEST SUMMIT







'Dragon's Den Style' Questions



Dave Allen
General Manager
Unipart Construction Technologies



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BOS Innovation Hub Challenge FINALIST

Anas Ayoub

Founder and Digital Construction Director

XD House

Megan Hughes

Digital Construction Manager

XD House



XD HOUSE

BUILDOFFSITE Innovation Hub Challenge

17th September 2024

Presented By



Anas Ayoub

Construction Director



Megan Hughes Digital Construction





XD House

XD House is an award-winning Digital Construction consultancy specialized in algorithmic design and automation.



Design & Workflow Automation

AEC Delivery Team



Customized Plug-ins



Platform Interoperability



Real-time Data Reporting







B05











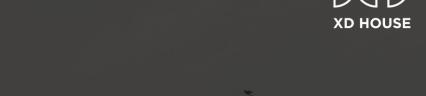
The Challenge

Roof Design & Fabrication

Issue: Traditional roof design is time-consuming and prone to human error, with the need to manually draft intricate roof component.

Solution: By **automating** the roof design process, our Revit plug-ins can generate roof structures efficiently, significantly reducing human error.





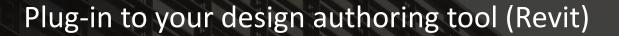






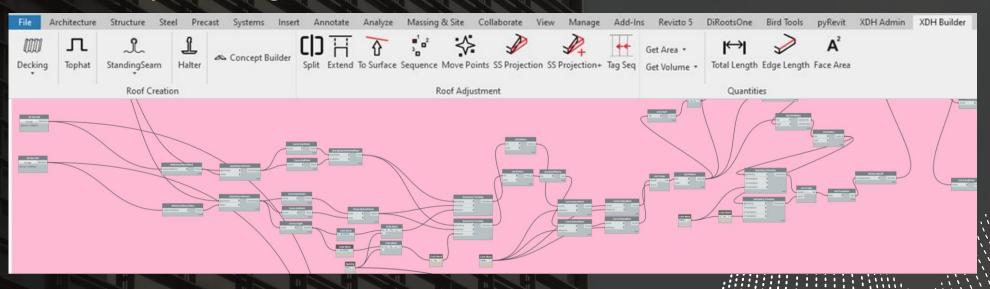
XD HOUSE

The XDH Builder Plug-In



Visual scripting supported by user-friendly controls

Automate your design workflows and reduce time, cost and material.







The XDH Builder Plug-In









Automates tasks and optimizes materials



Promotes sustainability and waste reduction

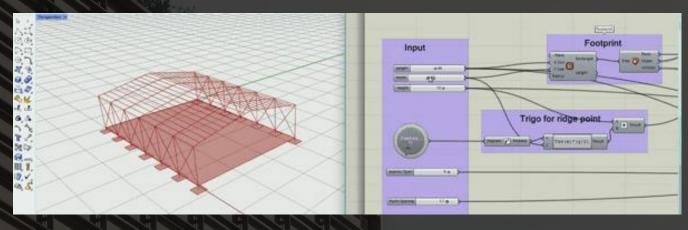


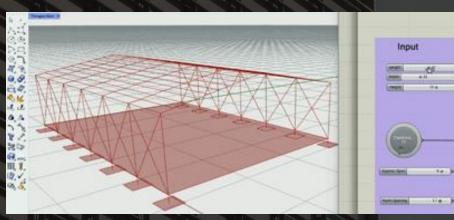
Enhances collaboration and project management



Automated Structure

Automatically update your designs based on scripts, inputs and parameters!









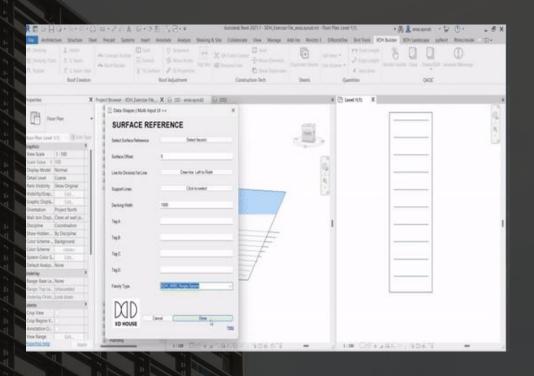


Automated Roof Creation

Automatically design your roof structure based on a set of parameters, material and fabrication constraints.

Export them as shop drawings and automatic CNC machine file formats – ready for assembly.

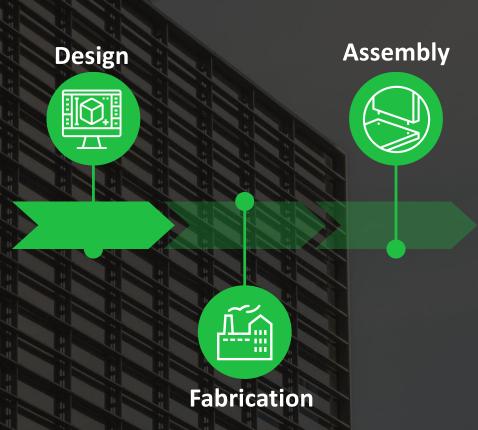






Project Application

XDH Builder has been successfully deployed in multiple large-scale projects, demonstrating its ability to accelerate project timelines and reduce costs through streamlined coordination.





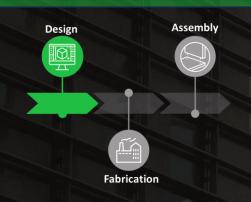




Design Automation

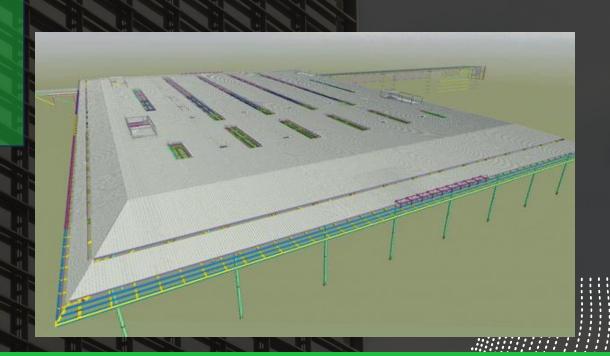
- Automate detailed roof modelling with embedded meta data
- Create cut list for fabrication
- Generate quantities

Plugins: Video Link











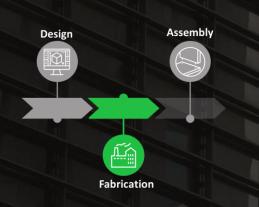
Fabrication Automation

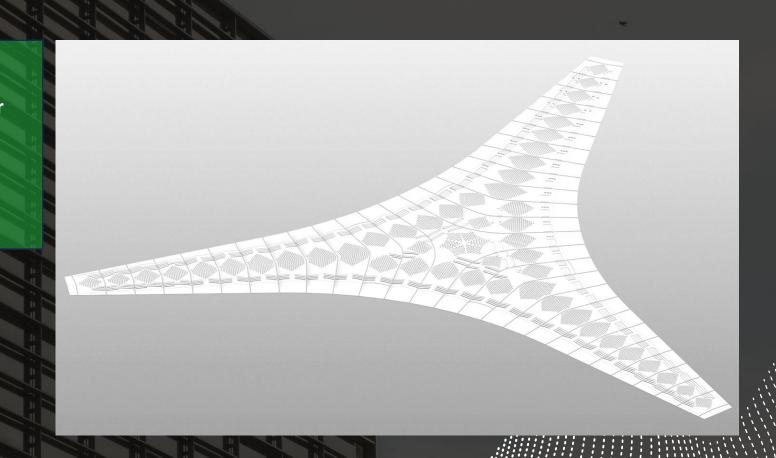
B05

XD HOUSE

- Transfer metadata in excel for QAQC
- Automation of fabrication drawings for CNC machine, 7922 number of skylight funnel (200 Fabrication drawings in 5mins)

Presentation link: Video Link



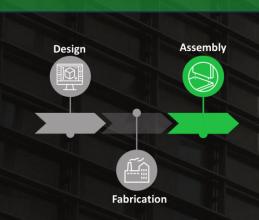


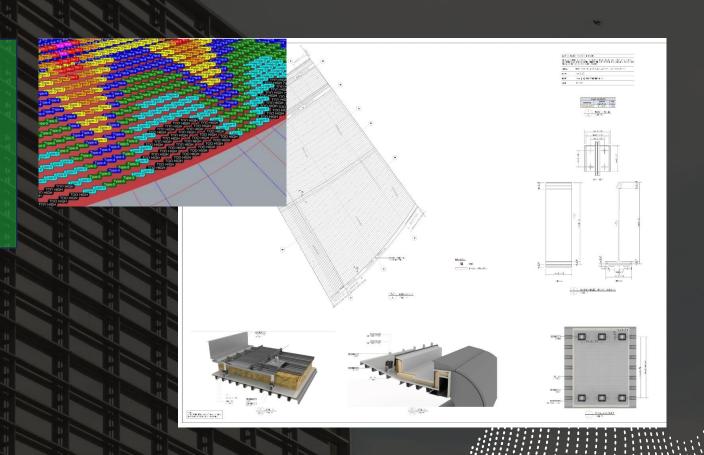


Assembly Automation

- **B**05
- XD HOUSE

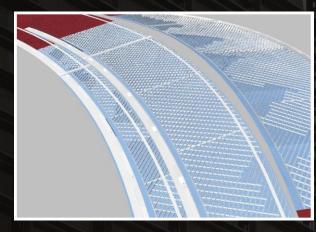
- Automated shop drawings extracted from the model (scripting)
- Automatic views created on sheets
- Automatically exported to model file types to be ready by the CNC machine

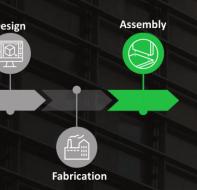






Assembly Automation



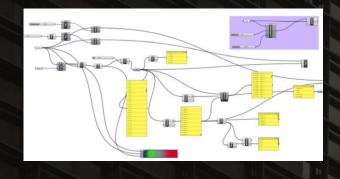


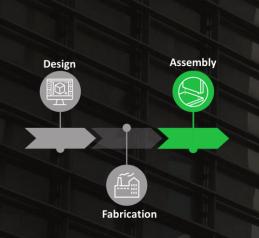






Assembly Automation











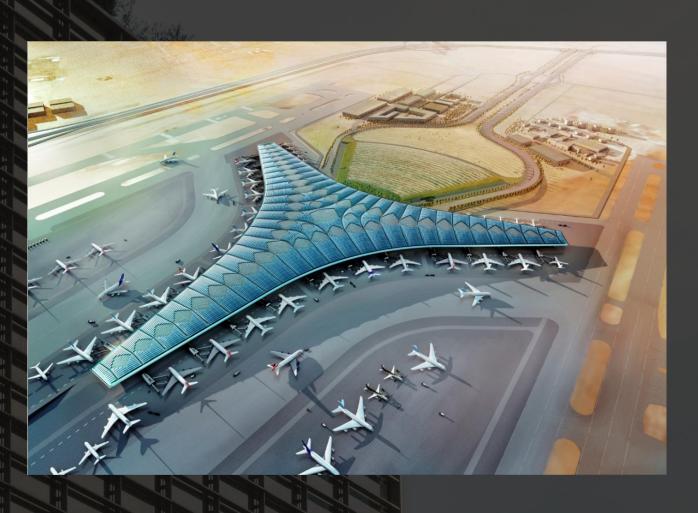
Examples of Successful Application





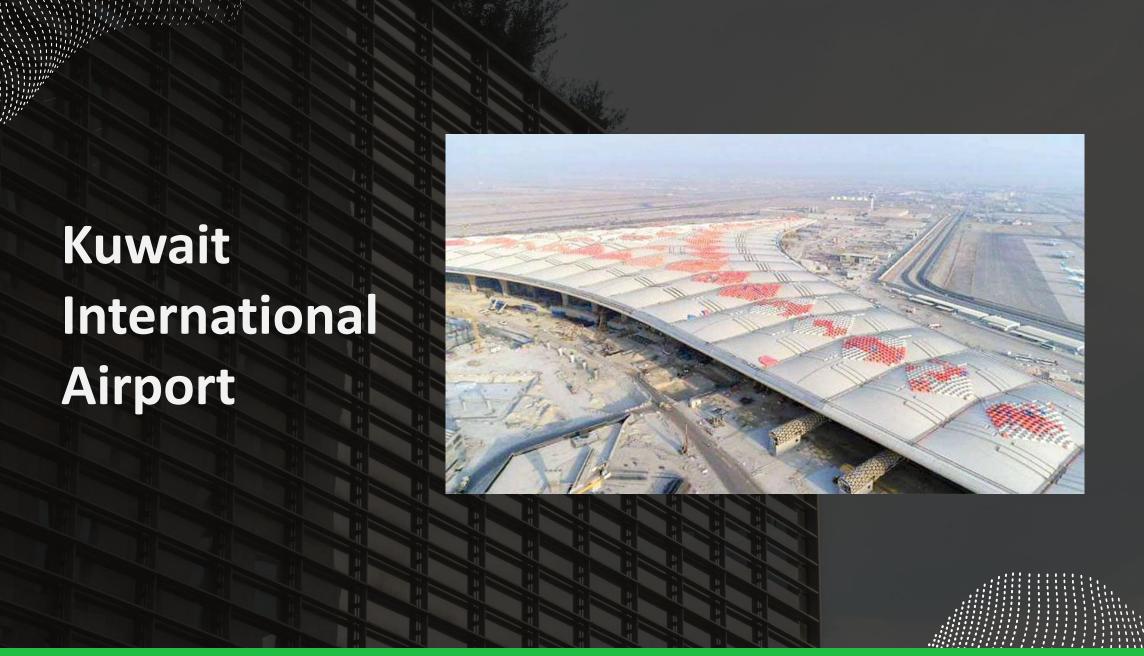












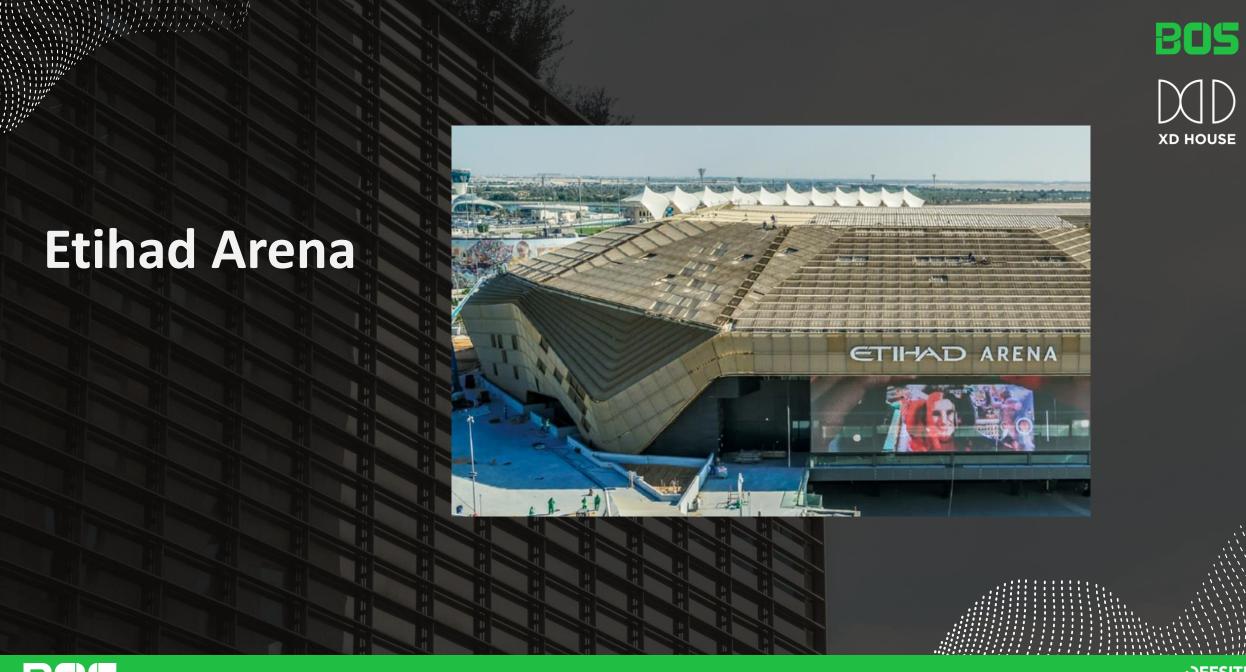




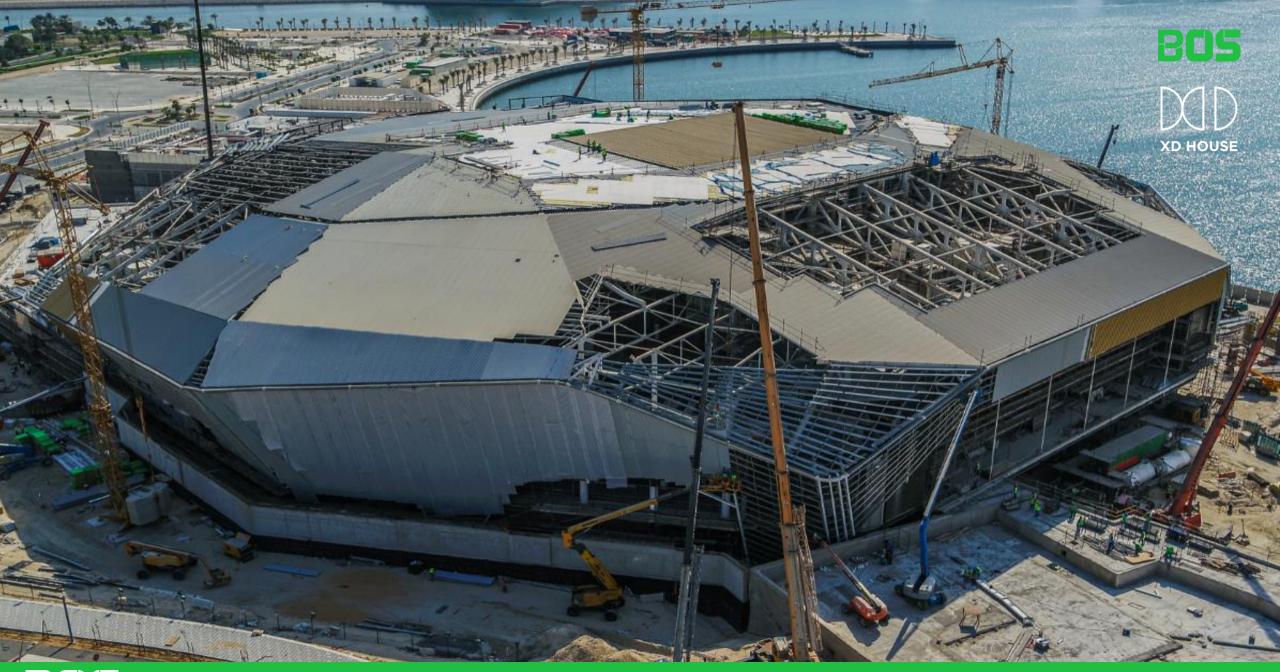








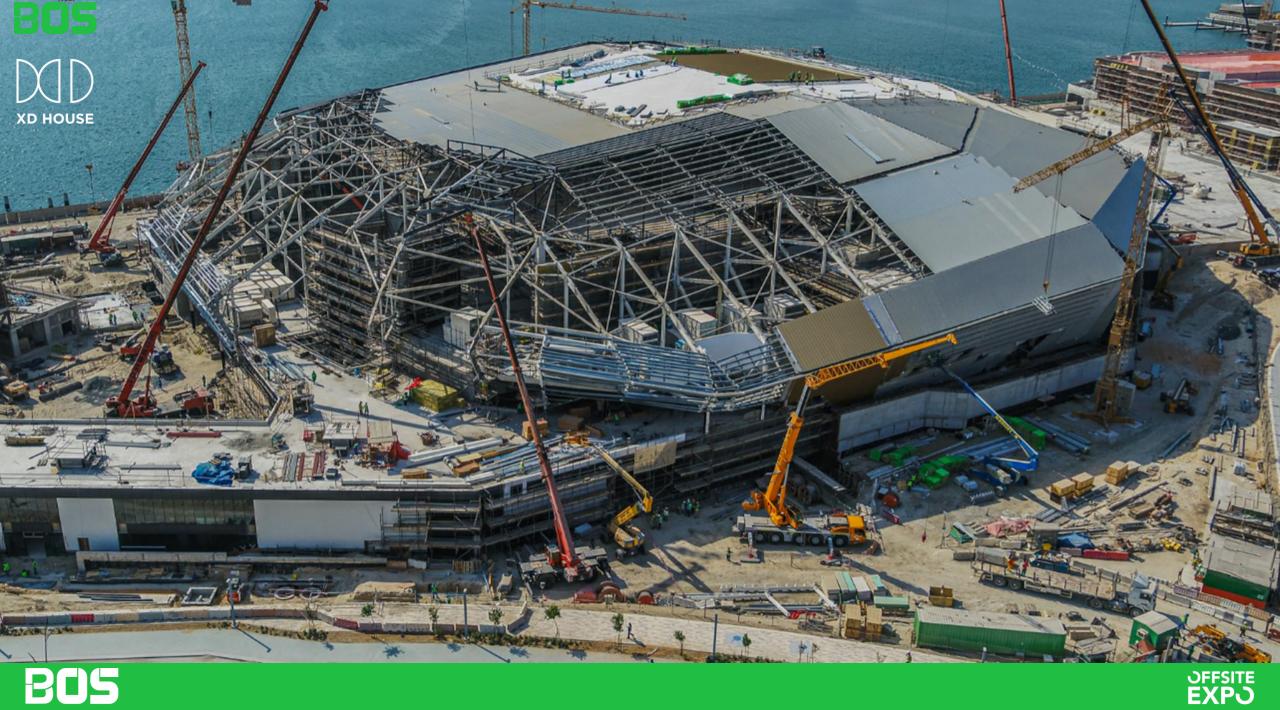




B05



B05

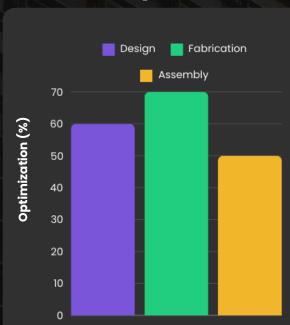


Resource, Productivity and Financial Savings

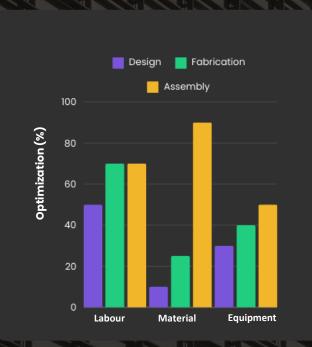


XD HOUSE

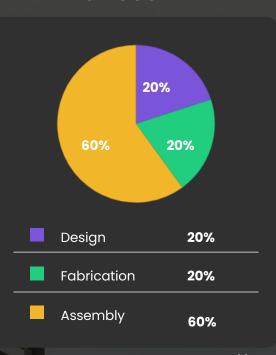




Resources



Finances

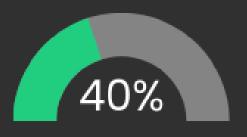


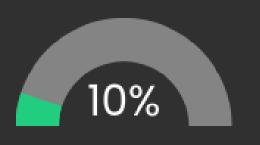


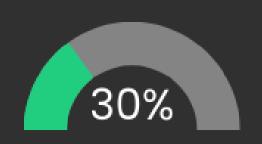
Construction Efficiency



XD HOUSE







Reduced Carbon Footprint

Reduced Emissions (Whole Life Cycle)

Reduced Energy Consumption

Reduced material waste through optimizing material use and ensuring precise calculations during the design phase



AI in Construction Automation





Ex: What is the expansion and the contraction for a standing seam sheet for a 78 m length

I want to use a ... , what can I use?

Give some recommendation on links/products

The expansion is...
The contraction is...





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'Dragon's Den Style' Questions

Anas Ayoub

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Digital Construction Manager

XD House



JFFSITE SUMMIT







BOS Innovation Hub Challenge FINALIST



Henry Mayell
Co-Founder and Chief Operating Officer
Viability (previously Hesti)





Our Team



Henry Mayell Co-founder & COO



Adrià Tarrida Co-founder & CEO



Paul Higgs MRICS Co-founder & Investor



Tom Nunn Senior Software Engineer



Simon Pither
Data Lead



Brendan Hindle Sales & Partnership Lead



Mouna Ichidou Founders Associate

INTRODUCTION



Accurately assess, optimise and de-risk property development projects *in seconds*

- Automatically assess the development viability of any site in the UK
- Combine accurate data with the methodologies of industry giants
- Run scenario analysis to evaluate Modern Methods of Construction
- Promote sustainable development with reduced embodied carbon

Housing Crisis

370,000

New homes per year

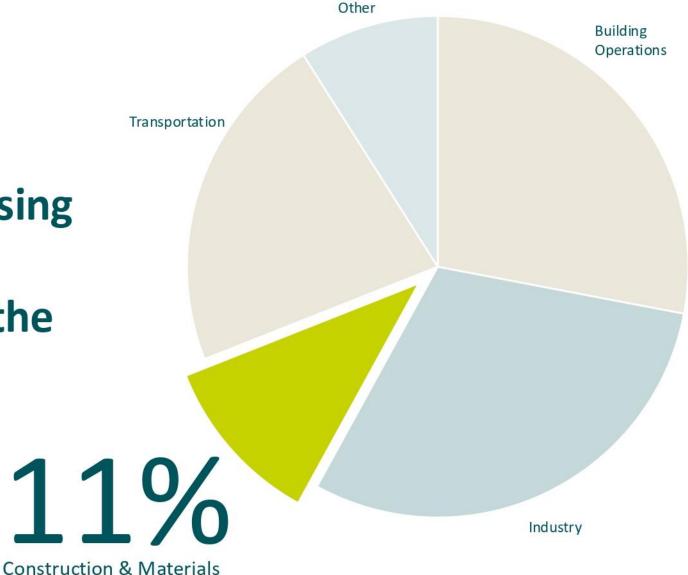
Positive strides

- Grey belt
- Revised targets
- Planning progress



Climate Crisis

If we build these homes using traditional methods of construction, we will use the entire UK carbon budget!



Modern Methods of Construction

An industry developing innovative solutions that will be essential to delivering housing sustainably.

45%

30%

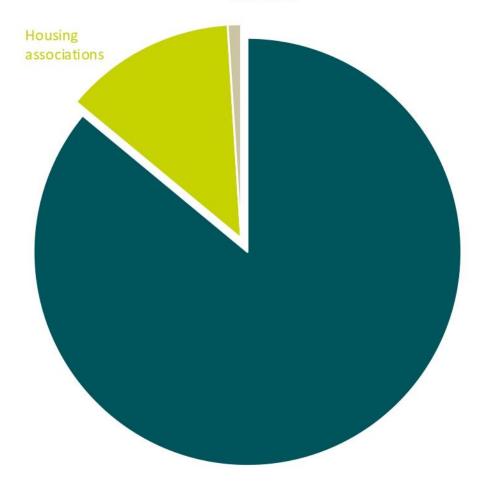
What's preventing widespread adoption?





THE PROBLEM

Local



86%
Private sector

Financial Viability

Sites must be financially viable to operate a business, pay employees and secure financing.



Assessing development sites is incredibly complex

Time

 Gathering and analysing the critical information required to optimise potential, mitigate project risks and make the best land offers can take months.

Risk

- Abortive costs
- Fees

Viable opportunities are hard to come by

- Landowner expectations
- Affordable housing
- Biodiversity Net Gain
- Nutrient Neutrality, CIL, S106

Lack of time and resources to evaluate MMC

Unknowns

- Could MMC make this site viable?
- Will MMC increase costs and reduce profits?
- Which manufacturers could deliver a scheme like this?
- How do I compare like with like?
- What would the impact be on sustainability?



A software for the homebuilding industry







Land Agents



Housing Associations



Consultants & Architects

Site Identification

Identify and pre-empt risks and challenges and instantly decide whether a site has potential

Detailed Financial Modelling

Build detailed financial models with cashflow forecasting suitable for securing project finance

Instant Viability Assessments

Evaluate every possible development scenario and build methodology and optimise the use of any UK site

Evaluating Modern Methods of Construction

Instantly assess the impact of introducing modern construction methods and consider the best suited manufacturers to the scheme

Supporting the growth of offsite manufacturers

- Lead generation
- Building qualified pipelines
- Getting MMC in the conversation early
- Improving uptake

At no cost to the manufacturer



Working with industry leaders



Natural Building Systems







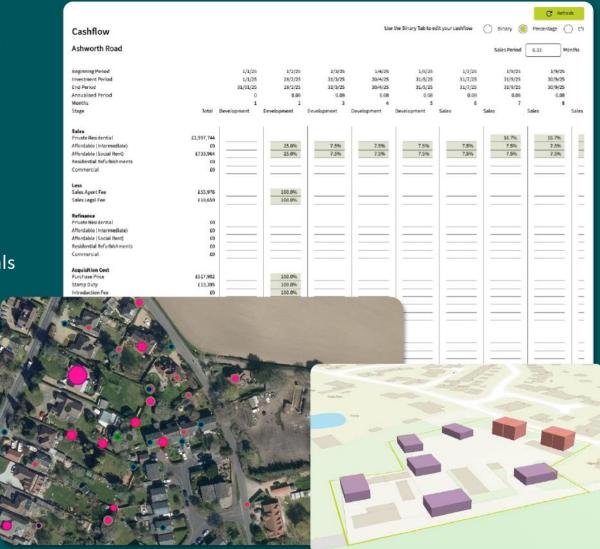
Business Model

B2B SaaS

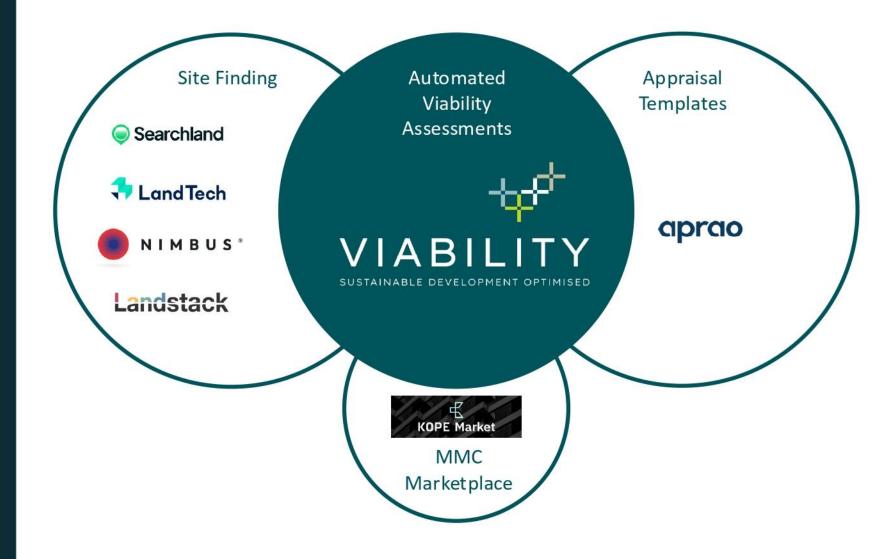
- Subscription for the homebuilding industry to assess site viability
- Tiered subscription packages

Marketplace

- Connecting manufacturers with developers
- No cost to the manufacturer
- Introduction fee for successful deals



Competition



HM Land Registry

Ordnance Survey

Office for National Statistics

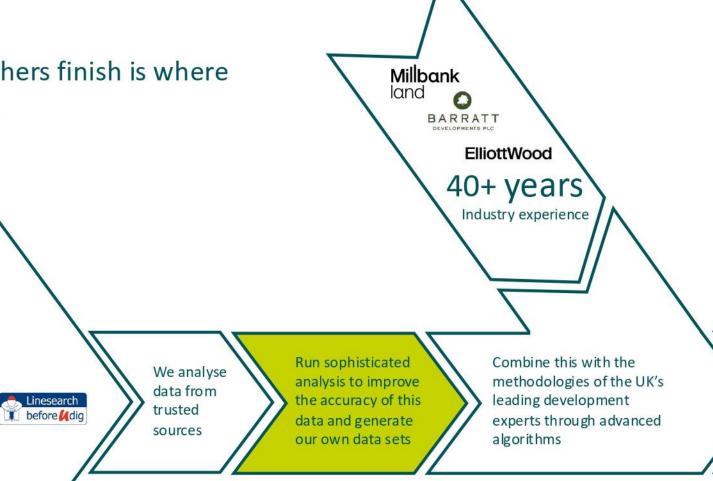
Historic England

nationalgrid

💸 gentian

BGS British Geological Survey

Where others finish is where we begin

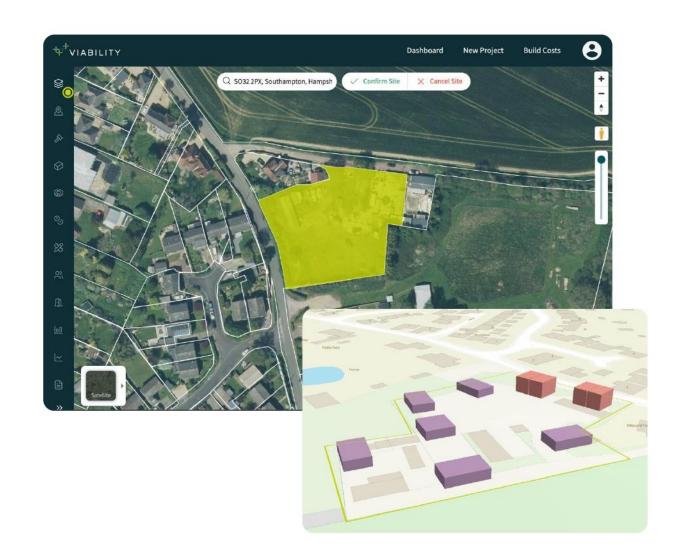


Automatically assess multiple development scenarios and optimise any site Generate detailed financial modelling and viability results



Identify any site in the UK and answer the questions it takes months to assess manually

- What are the site constraints?
- What's the best mix of house types and sizes?
- What does a policy compliant scheme look like?
- Which offsite manufacturers would suit this project?
- What would be the impact on Viability of adopting MMC?





Funding

We've raised £535,000

- VC backed
- Innovate UK funding

Innovate UK

Incubators and Accelerators

- The business was founded on the Carbon13 Venture Launchpad
- We have completed the Geovation Accelerator run by the Land Registry and Ordnance Survey
- We have completed the Inc accelerator run by the Aster Housing Association









Endorsed by our early users

"With Viability, I was able to run a full viability analysis for a site I was familiar with in minutes. It would have taken me at least a day or two and was happy to find the results were really accurate"

Oliver Watkins, Land Director BEAUFORT HOMES



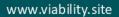
Henry Mayell

henry@viability.site



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'Dragon's Den Style' Questions



Henry Mayell
Co-Founder and Chief Operating Officer
Viability (previously Hesti)

BOS INNOVATION HUB CHALLENGE | THE JUDGES

Innovative and impactful solutions that have the potential to shape the future of sustainable construction



Dave RobertsCoventry University



Joanne Bridges
Bridges Communications



Samantha Ferneley
Vista Insurance



Keith Blanshard BUILDOFFSITE

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Innovative and impactful solutions that have the potential to shape the future of sustainable construction

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