Welcome

THE BENEFITS OF EARLY MMC COLLABORATION

PCE Ltd
Est.1973

Curtins
Building a better future

KIER

Cast


Cast

We have a range of perspectives on modernised construction...

Influence

Industry leadership

We work with Government and industry bodies to shape the future of our sector:

- Authored UK Government MMC definition framework
- Established PMV as solution-agnostic success measure
- Shaped Homes England & GLA funding strategies for MMC
- Partnered WMCA to create industry-leading Homes of the Future Standard

International reach

Our work outside of the UK enables us to stay at the forefront of international trends and issues

Modernisation advisory to leading housebuilder

Sharing lessons learned and shaping future strategy

Collaborative DfMA and procurement advisory for new schools

Industrialised construction insight for residential design guide

Insight

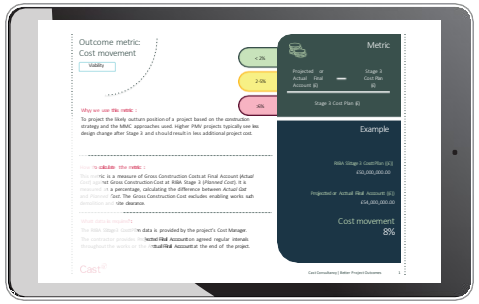
MMC Market

325+

Direct supplier relationships mapped against capability and experience

Supplier and project benchmarking

Industry leading performance benchmarking using established metrics and data capture methods



Impact

Convening partnerships

Advisory, facilitation and implementation for leading aggregators of demand

Delivering at scale

Procurement, commercial, project and contract management on major high-PMV projects

Smith's Garden Birmingham

- Europe's largest BtR project to use Category 1 MMC
- 550 homes, 30% embodied carbon reduction

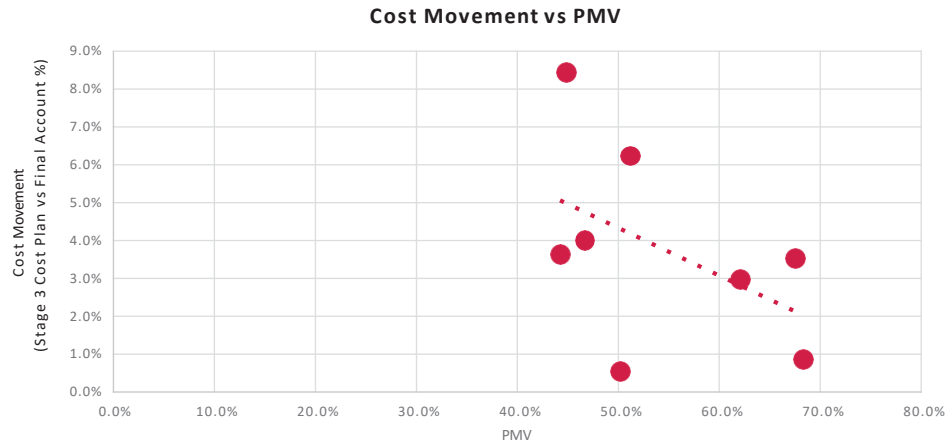
College Road, Croydon

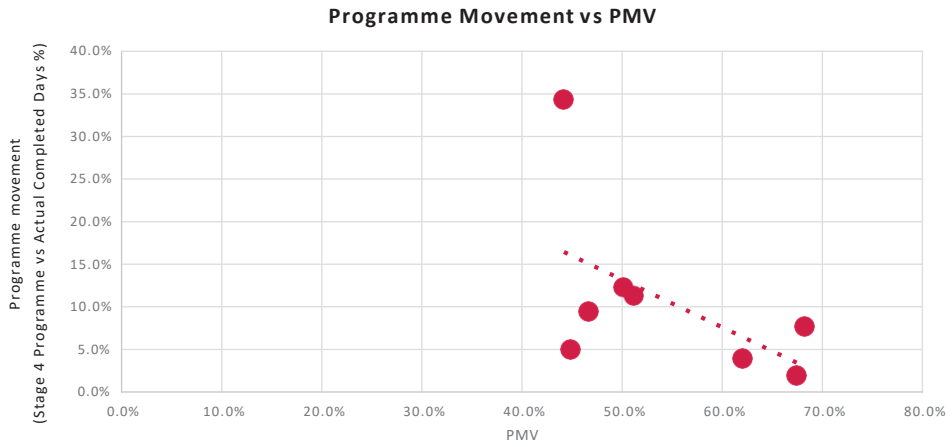
- World's tallest Category 1 MMC tower
- 817 co-living apartments 40% embodied carbon reduction

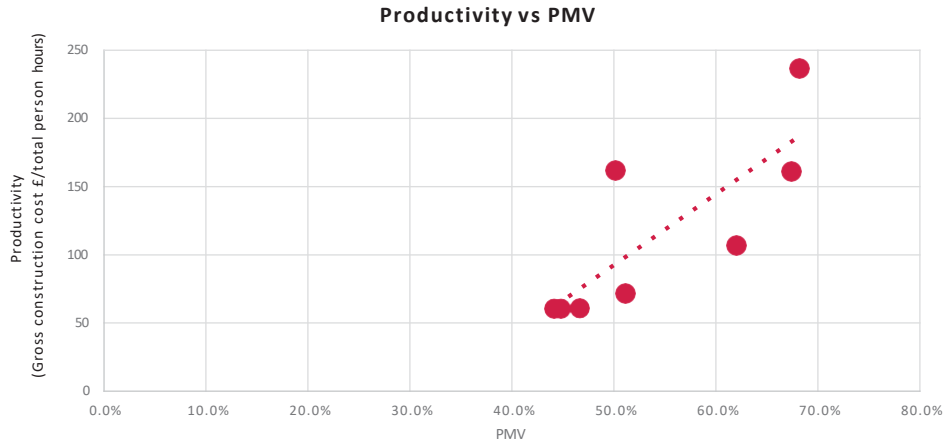
Cast

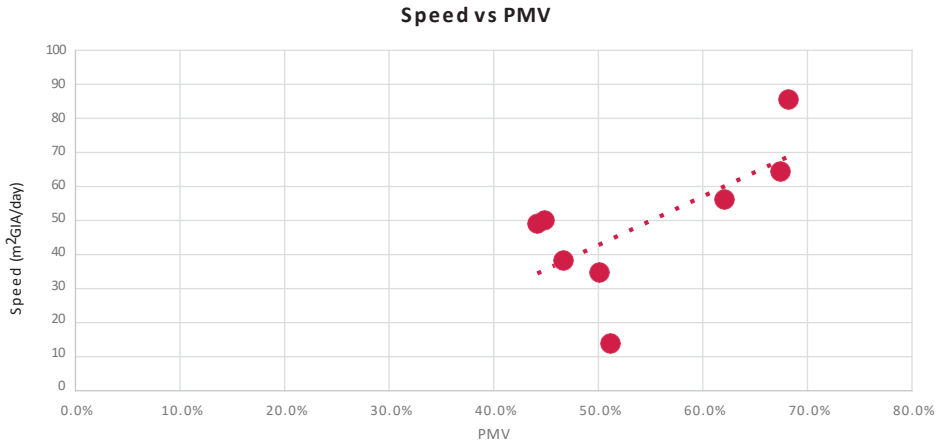
Our evidence shows that increasing PMV can drive better outcomes

Embedding a DfMA approach and engaging early with stakeholders can lead to better results from manufactured solutions, as demonstrated across our outcome metrics









The challenge is convincing clients to engage early enough to realise these better outcomes

Historically clients seek to keep options open and secure planning before deciding how to deliver the scheme, eroding some opportunities for different solutions.

Introduction of the BSA gateways process presents the opportunity to drive greater engagement earlier in the design process.

We need to prove the value of MMC and PMV to allow earlier commitment

MMC is a means to an end.

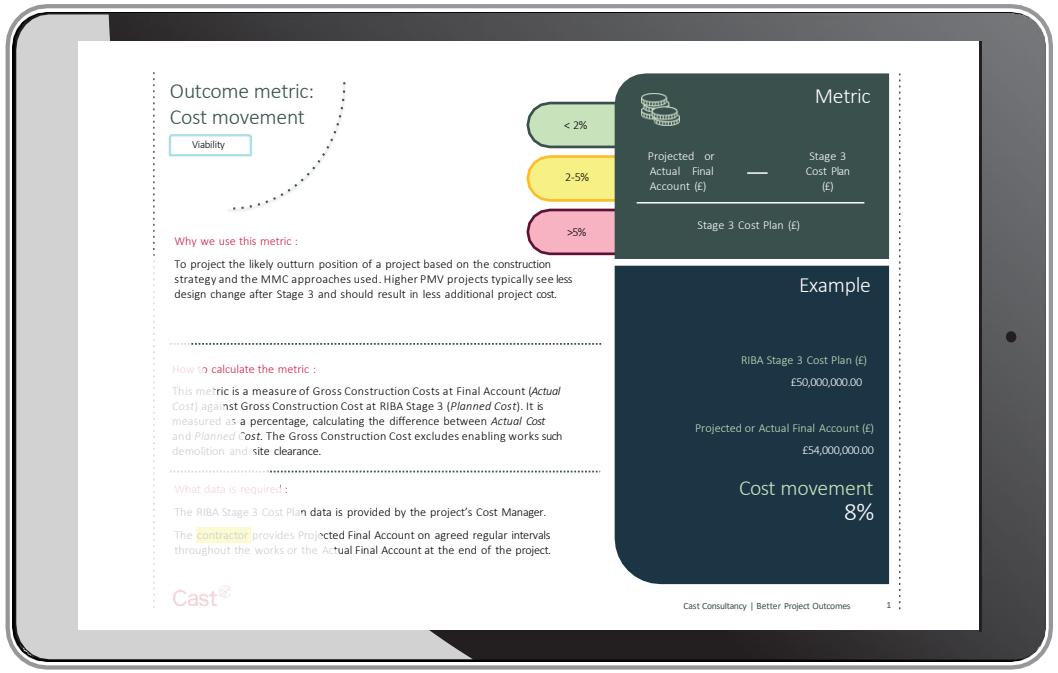
To measure and demonstrate the value of using MMC and increasing PMV, we have established a set of core outcome metrics.

For each we have defined the calculation methodology in detail, established the data sources, and have established an approach to capturing data on every project Cast delivers.

By using these measures, we can quantify the benefit that MMC is delivering in terms that clients understand and that respond to their key drivers.

Cast

Example outcome metric definition

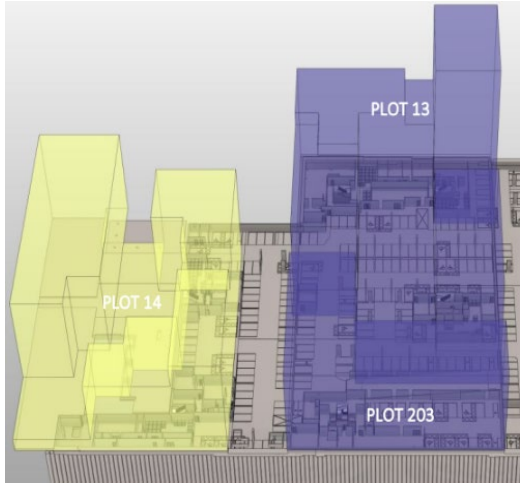


Full suite of outcome metrics

- Cost movement between design and completion
- Productivity of workers on site
- Waste generation
- Community disruption
- Pre-manufactured value
- Programme movement between design and completion
- Speed of construction
- Defects and ratifications
- Health and safety incidents
- Whole-life and up-front embodied carbon

Data capture on projects demonstrates the translation of the theory into real benefits for clients

Brent Cross Town



Brent Cross Town – Plot 13

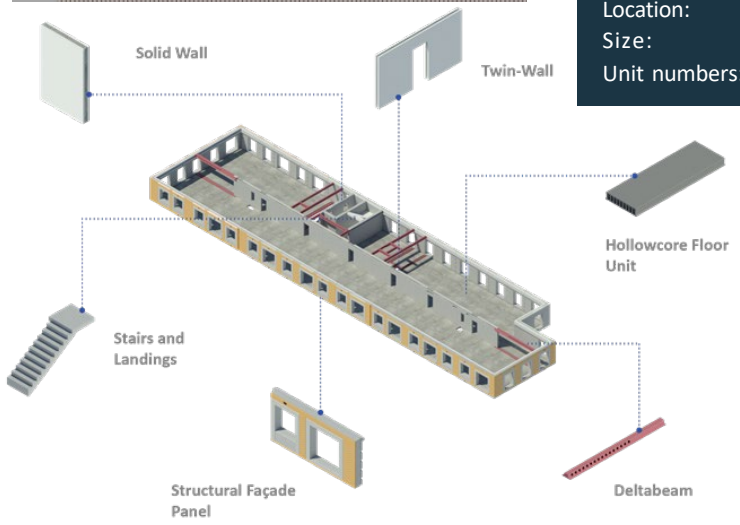
Project details

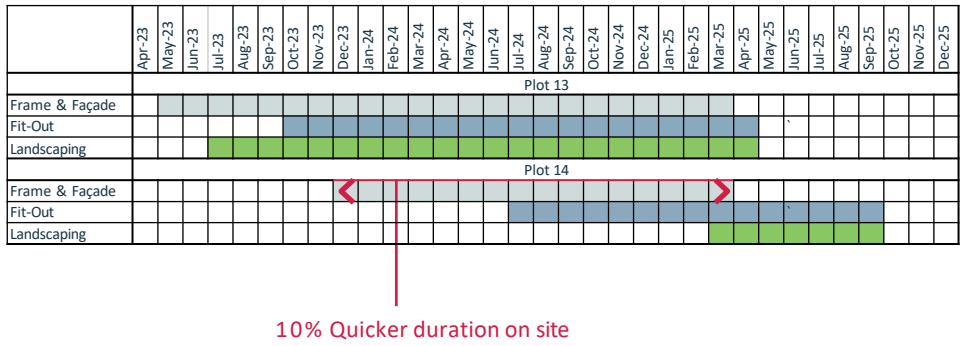
Client:	Related Argent
Location:	Brent Cross, Greater London
Size:	(GIA) 273,500 ft²
Unit numbers:	249

Brent Cross Town – Plot 14

Project details

Client:	Related Argent
Location:	Brent Cross, Greater London
Size:	(GIA) 288,000 ft²
Unit numbers:	286





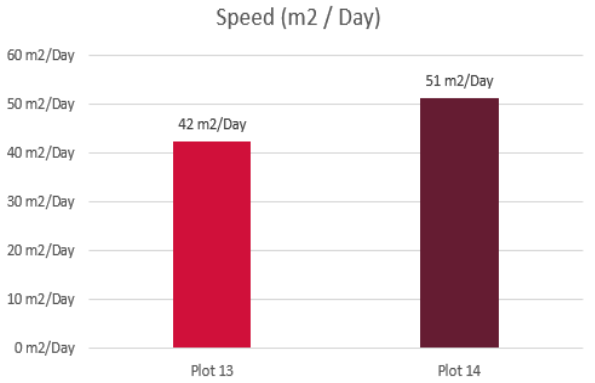
10% Quicker duration on site

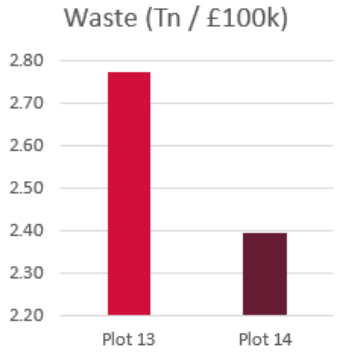
Cast

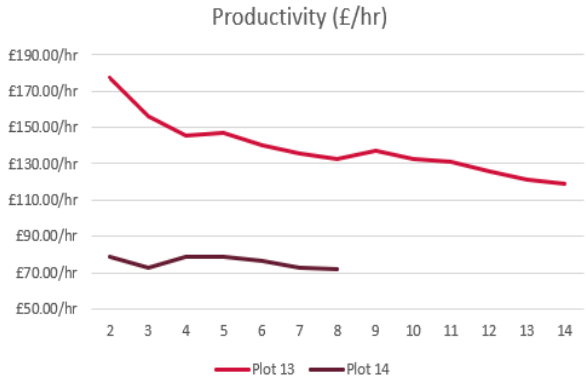
Data capture on projects demonstrates the translation of the theory into real benefits for clients

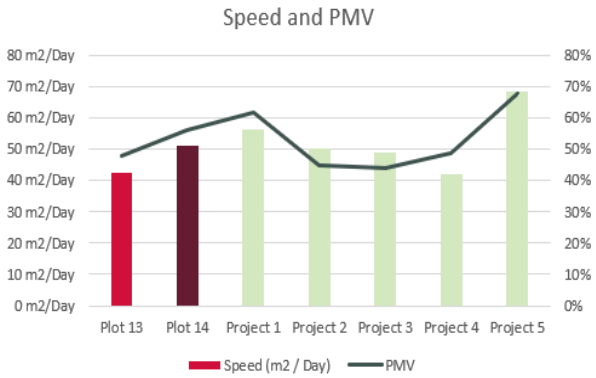
Brent Cross Town

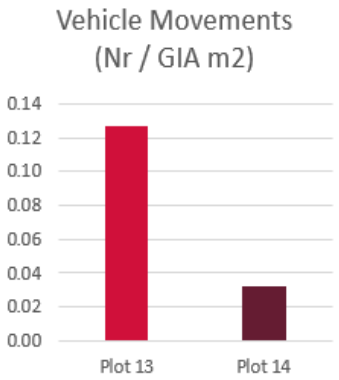
The data we are capturing allows us to identify the real benefits being delivered and probe other areas for further interrogation.

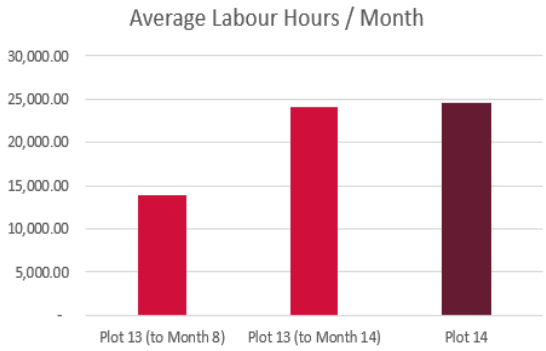












Cast

Data capture on projects demonstrates the translation of the theory into real benefits for clients

Traditional vs Mace Tech at East Village

Project specific kit of parts

Pre-cast concrete floor slabs

Pre-cast concrete columns

Pre-cast concrete shear / core walls

Pre-cast concrete stairs

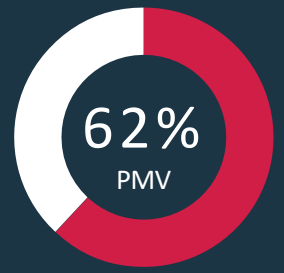
Unitised façade

Bathroom pods

Utility pods

Riser and service

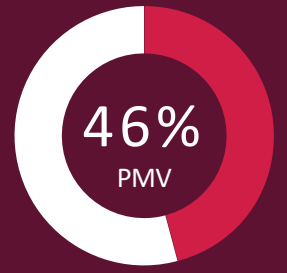
Comparing **high** and **low** PMV methodology



10 floors:

Structure	Complete
Façade	Complete
Service distribution	Complete
Bathroom pods	All installed
Utility cupboards	All installed

52 operatives



10 floors:

Structure	Complete
Façade	To level 1
Service distribution	None
Bathroom pods	To level 6
Utility cupboards	To level 6

120 operatives

Data capture on projects demonstrates the translation of the theory into real benefits for clients

COMMERCIAL

PROGRAMME

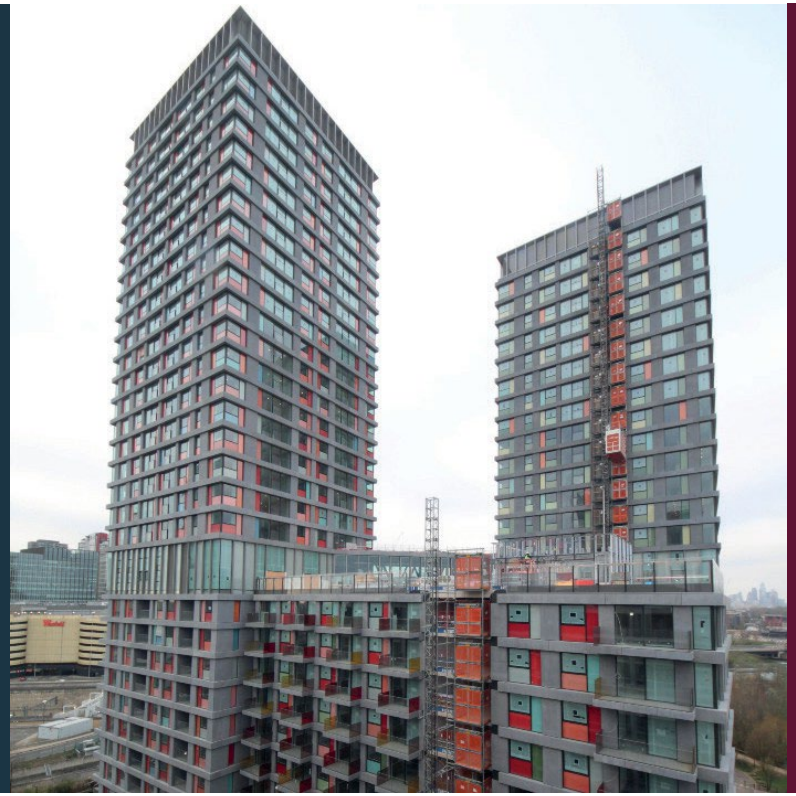
30% faster to start fit-out
18 weeks benefit

PRODUCTIVITY – GVA

£170/hour – Mace Tech
£60/hour – Trad frame

RESOURCES/FLOOR

52 – Mace Tech
120 – Trad frame



QUALITY

WASTE ON SITE

75% reduction for offsite activities

VEHICLE MOVEMENTS

40% reduction in HGV
80% reduction in LCV

EMBODIED ENERGY

15% reduction through concrete mix design

A Collaborative Approach to Advancing MMC

Curtins | PCE Ltd

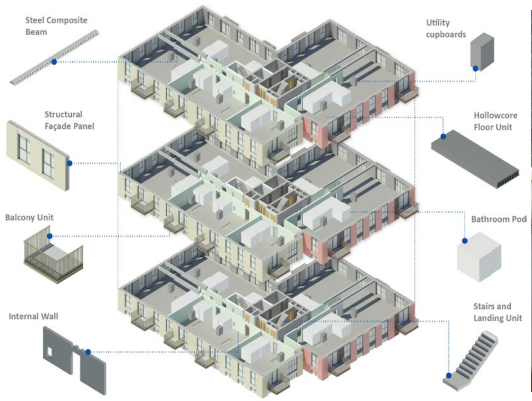
PCE Ltd
Est.1973

DfMA

FREEDOM & FLEXIBILITY

COLLABORATION

HYBRID DfMA



SYSTEM BUILDS

OFFSITE

OWNERSHIP

Curtins

Building a
better future

2 x Consultancy of the Year 2024

Purpose Driven

Our Values

- Curiosity
- Being Human
- Integrity
- Impact

7

SEVEN SPECIALISMS

CIVILS | STRUCTURES
TRANSPORT PLANNING
ENVIRONMENTAL
INFRASTRUCTURE | GEOTECHNICAL
CONSERVATION & HERITAGE

15% Embodied Carbon Reduction Target by **2030**

14

LOCATIONS

PROJECTS

2014

HMP Featherstone, Staffordshire
Client: Ministry of Justice
Value £250m

2015

2016

2017

Broadmoor Hospital, Berkshire
Client: West London Mental Health NHS Trust
Value: £150m

2018

Birchin Way Custody Suite, Grimsby
Client: Humberside Police Force
Value: £14m

Dakota Hotel, Manchester
Client: Evans Property Group
Value: £60m

2019

Jeffery Cheah Biomedical Centre
Client: University of Cambridge
Value: £96m

Interdisciplinary Biomedical Research Building
Client: University of Warwick
Value: £54.3m

2020

HMP Five Wells, Wellingborough
Client: Ministry of Justice
Value: £253m

Chapel Wharf, Manchester
Client: Dandara
Value: £130m

Middlemoor Police Station Custody Suite, Exeter
Client: Devon and Cornwall Police
Value: £26m

2021

Mount Oswald
Client: Durham University
Value: £80m

2022

Sir William Henry Bragg Building
Client: University of Leeds
Value: £96m

2023

Golden Jubilee National Hospital, Surgical Centre, Glasgow
Client: NHS Scotland
Value: £43.5m

HMP Glen Parva / Fosse Way, Leicestershire
Client: Ministry of Justice
Value: £286m

2024

HMP Millsike, York
Client: Ministry of Justice
Value: £400m

Birmingham East Side Locks
Client: Alumno
Value: £35m

2025

Brent Cross Plot 1, North London
Client: Related Argent
Value: £100m

Brent Cross Plot 14, North London
Client: Related Argent
Value: £85m

ONGOING

HMP Glasgow
Client: Ministry of Justice
Value: £400m

Orchard Wharf, London
Client: Regal London
Value: £500m

HMP Gartree, Leicestershire
Client: Ministry of Justice
Value: £440m

hyTower® projects
Award winning projects

SERVING ALL BUILD SECTORS

RESIDENTIAL
3 PROJECTS
£685m

EDUCATION
3 PROJECTS
£250m

LIVING
3 PROJECTS
£250m

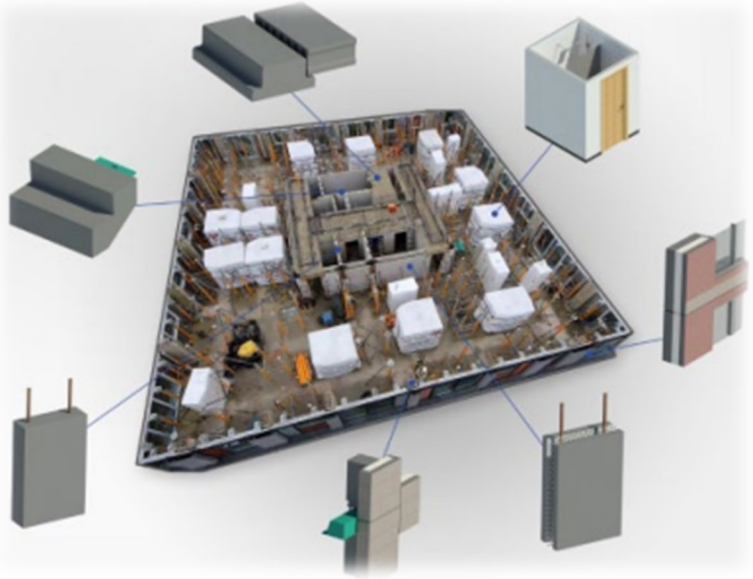
COMMERCIAL
1 PROJECT
£100m

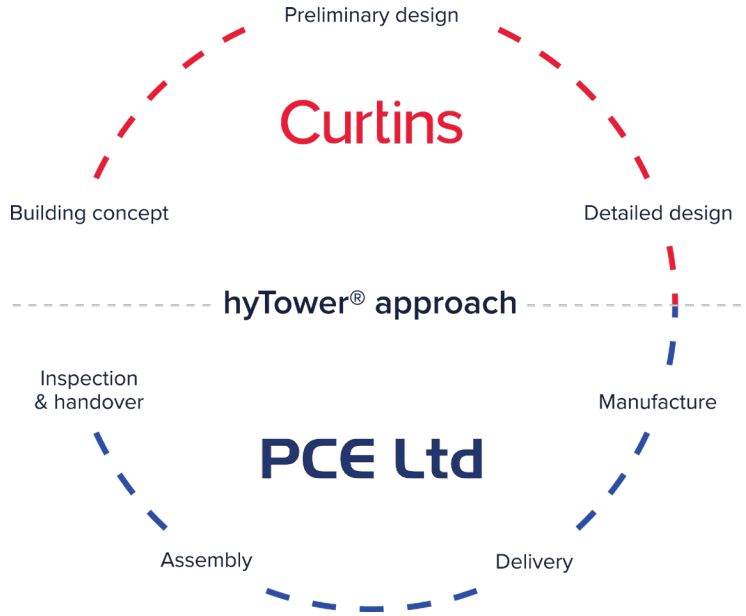
HEALTHCARE
2 PROJECTS
£195m

PRISON
8 PROJECTS
£2bn

EARLY ENGAGEMENT
BENEFITS

- **OPTIMAL** DESIGN CONFIGURATION
- HYBRID STRUCTURAL MATERIAL **FLEXIBILITY**
- EFFECTIVE **VALUE** ENGINEERING
- IMPROVED **COORDINATION** OF M&E, SERVICES, AND FITOUT
- FULLY **INTEGRATED** OFFSITE SOLUTION AND **REDUCED** ON-SITE WORKS
- **FASTER** AND MORE ASSURED PROJECT DELIVERY
- GREATER COST **CERTAINTY**
- MORE **SUSTAINABLE** CONSTRUCTION SOLUTIONS
- OPTIMAL SUPPLY CHAIN **ENGAGEMENT**

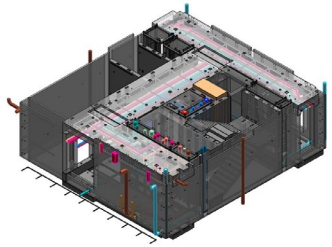




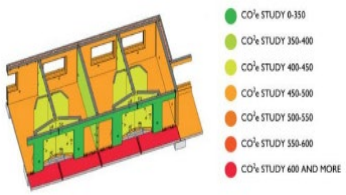
DfMA

FREEDOM & FLEXIBILITY

REDUCED **CONSTRAINTS** | INCREASED **OPPORTUNITIES**



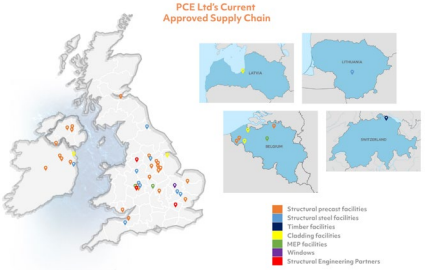
DETAILED
DESIGN
COORDINATION



REDUCED
EMBODIED
CARBON

OPTIMISED
PROGRAMME

HYBRID
MATERIALS &
PRODUCTS



VERSATILE
SUPPLY CHAIN

INTEGRATION

CURRENT ENGAGEMENT

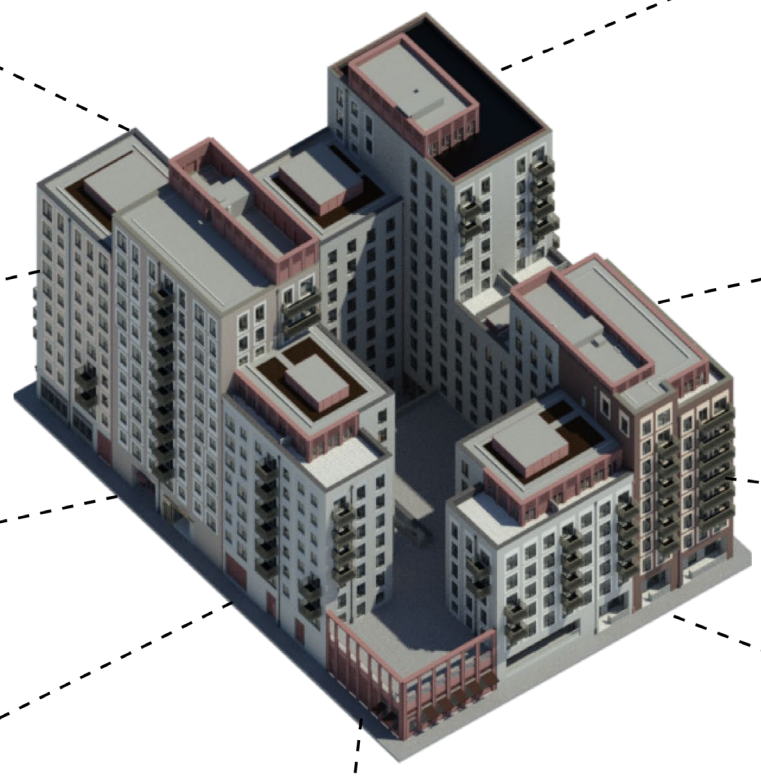
Stage 3 Spatial Coordination

4 Technical Design

Architectural and engineering information **Spatially Coordinated**
All design information required to manufacture and construct the project completed

Site and Logistics

Engineering



Procurement Model & Timeline

Architectural Design

M&E Strategy

Programmes

Cost Plan

Mindset

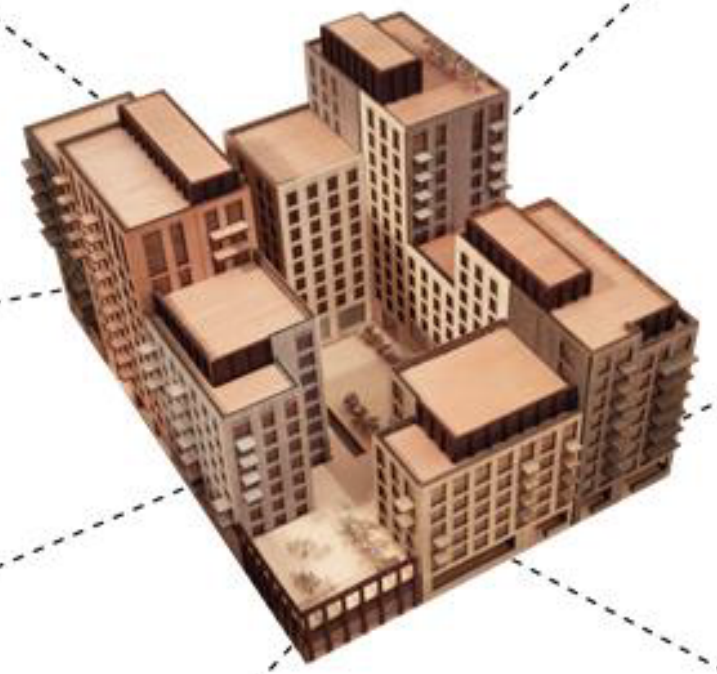
Missed Opportunities

EARLY ENGAGEMENT

Stage 2

Concept Design

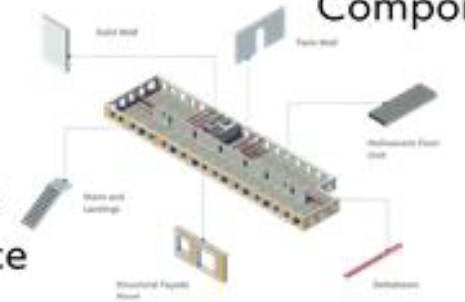
Architectural Concept approved by the client and aligned to the **Project Brief**



Site Logistics
- Coordinated Approach
- Risk Reduction

Structural Grid

Different Components



KoP Choice

MMC Aggregation
- Opportunities Analysis
- Optimisation

Architectural Intent
- Façade Modularisation
- Finishes Strategy
- Fenestration
- Spacial Coordination

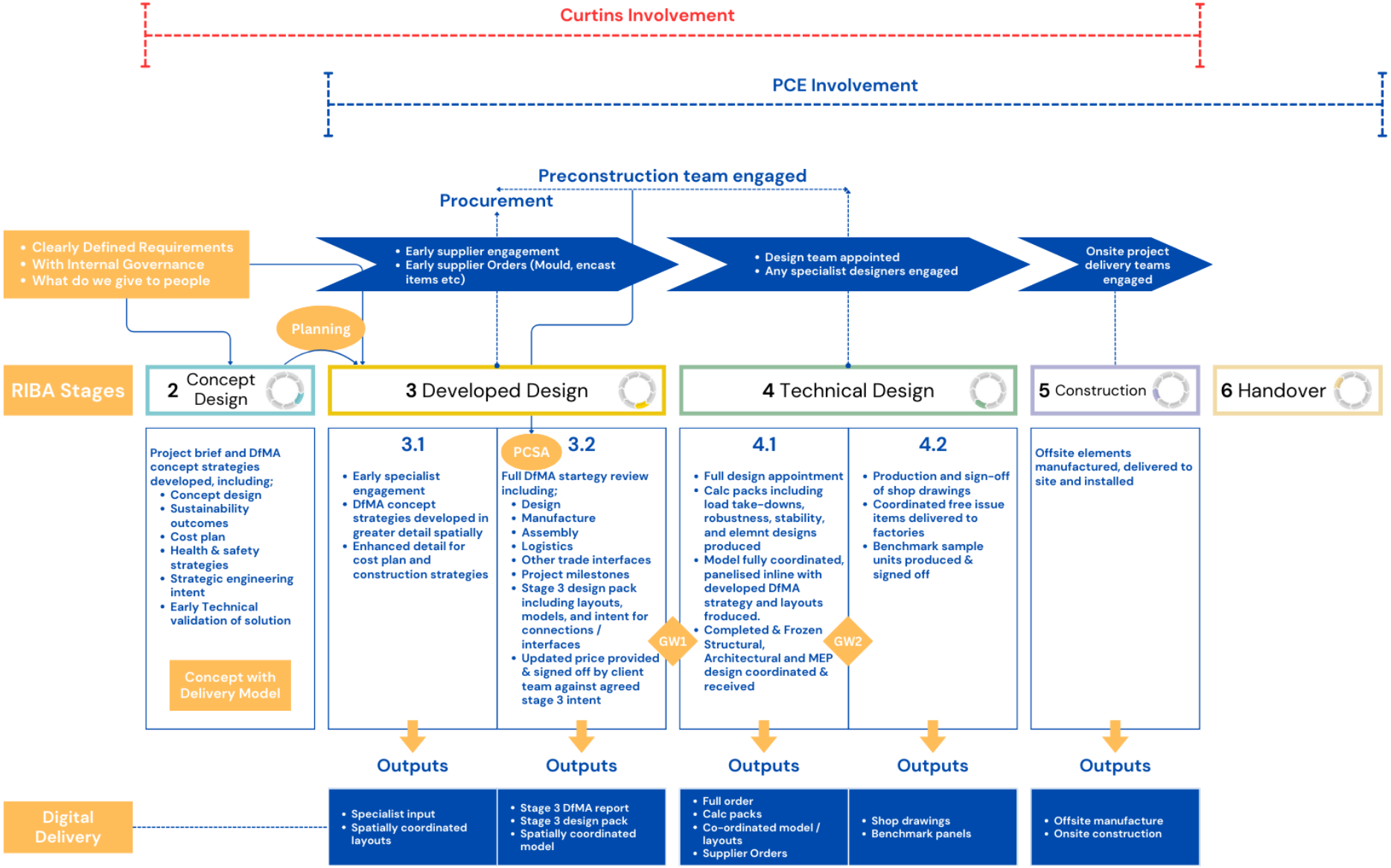
Cost Plan
- Alignment
- Value vs Cost

Programme
- Alignment
- Optimisation
- Transparency
- Streamlined Delivery

M&E
- Structural Zones
- Distribution Strategy

RIBA

DfMA OVERLAY



DfMA & EARLY ENGAGEMENT

OPPORTUNITIES

OPTIMISED PROGRAMME

REDUCED LEAD-IN AND ONSITE PERIODS

DESIGN EFFICIENCY

BSA AND GOLDEN THREAD COMPLIANCE

COST, PROGRAMME, SAFETY, AND QUALITY CERTAINTY

REMOVAL OF DUPLICATION AND RISK

INCREASED FREEDOM AND FLEXIBILITY

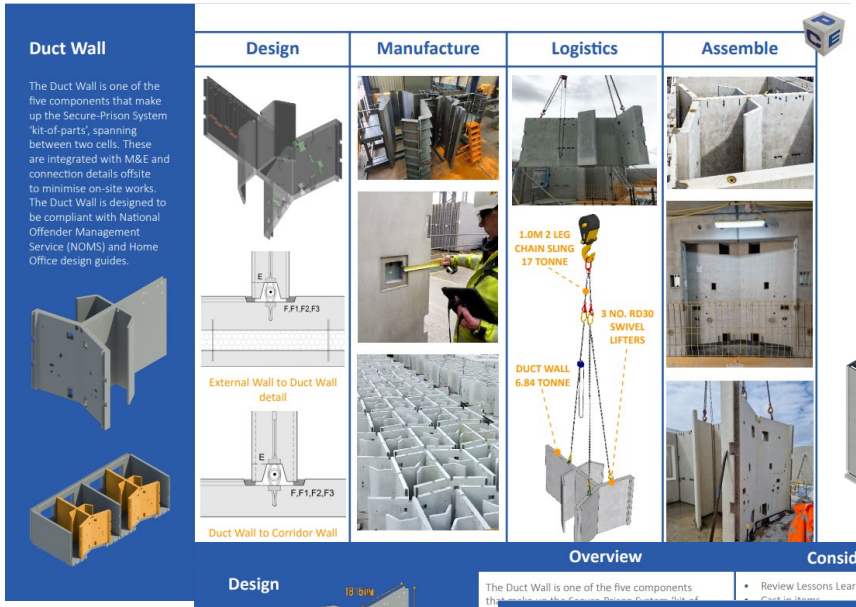
AGGREGATION OF DfMA OPPORTUNITIES AND BENEFITS

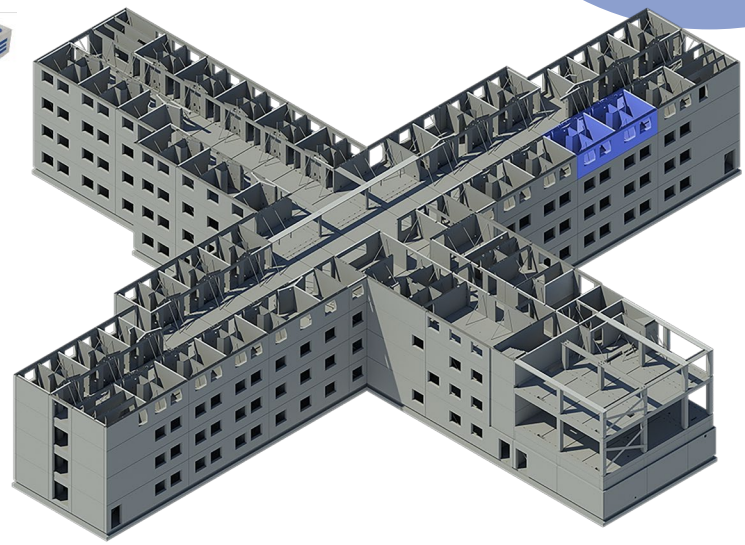
CUSTODIAL
PLAYBOOK

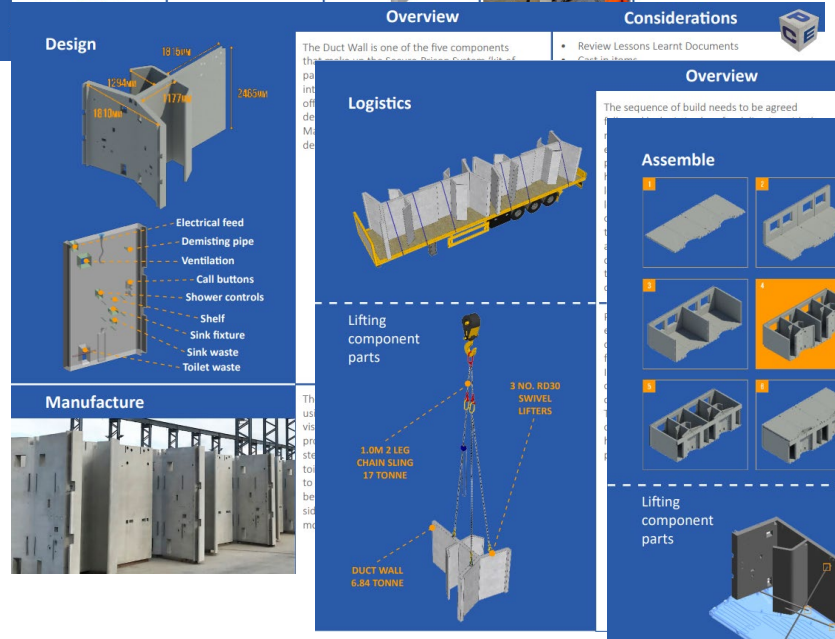
EARLY **DESIGN**

COMPLETE **BUILD SYSTEM** PLAYBOOK FROM EARLY **DESIGN** TO STRUCTURAL **HANDOVER**

HANDOVER **DELIVERY**







A SYSTEM FOR SUCCESS

8,000+ CELLS DELIVERED

55,000+ FABRICATED COMPONENTS

5 REPEATABLE COMPONENTS

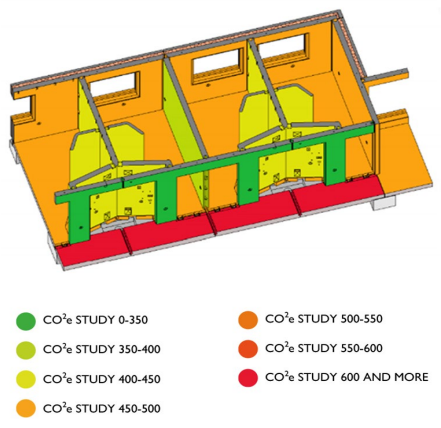
EMBODIED CARBON SAVING **12 - 15%**

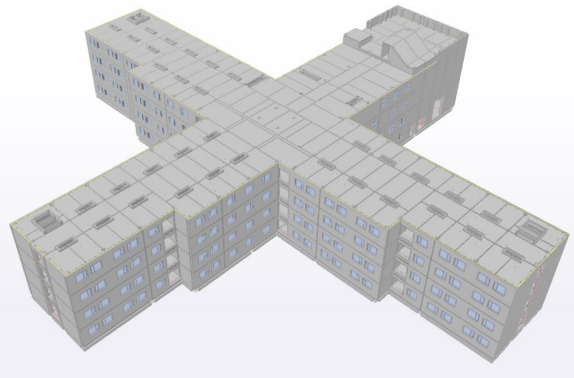
AVERAGE ASSEMBLY **45** CELLS PER WEEK

1000 TONNES INSTALLED DAILY

300,000+ OFFSITE INTEGRATIONS

6.75 LABOUR WEEKS SAVED PER CELL



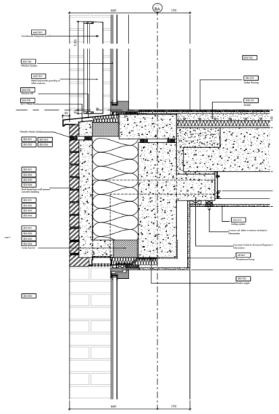


HybriDfMA
hyTower®

- OFFSITE INTEGRATION
- WEATHERPROOFED ASSEMBLY
- CONCURRENT CONSTRUCTION
- FLEXIBLE GRID
- NO SCAFFOLDING/BACK-PROPPING
- EXCELLENT THERMAL, ACOUSTIC, AIR TIGHTNESS, VIBRATION, AND FIRE PROPERTIES
- UP TO:
  - 50% FASTER
  - 80% LESS DELIVERIES
  - 80% LESS REQUIRED OPERATIVES
  - 90% LESS WASTE
  - 32% LESS CARBON

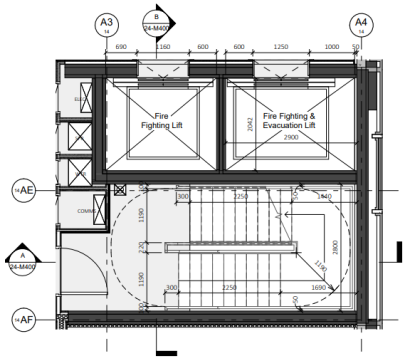
ART OF THE POSSIBLE

RESIDENTIAL SYSTEM DELIVERY



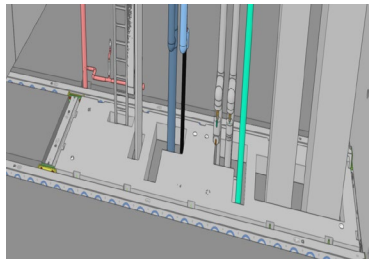
STANDARDISED WINDOW INTERFACES

STANDARDISED M&E INTEGRATIONS

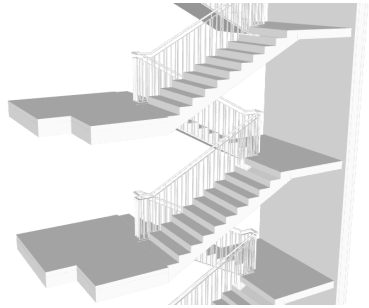


Core A - Typical Stair Plan (Levels 2 to 11)

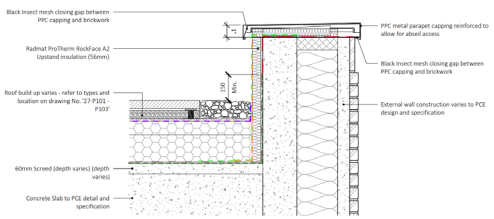
STANDARDISED CORE ARRANGEMENTS



STANDARDISED CORE INTERFACES



STANDARDISED BALUSTRADES



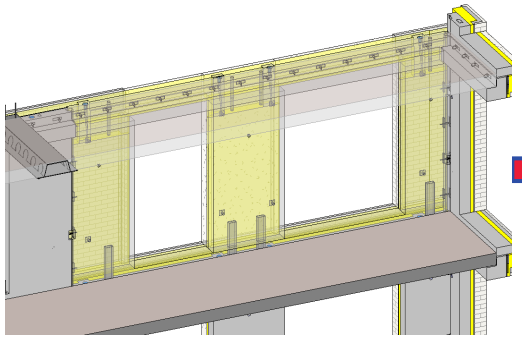
3 Typical Parapet Detail (Plant Areas)

STANDARDISED ROOF INTERFACES

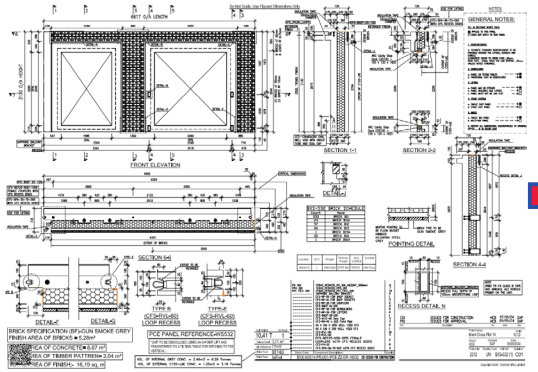
DfMA JOURNEY

COLLABORATIVE **APPROACH** | COORDINATED **DELIVERY**

CONCEPT DESIGN



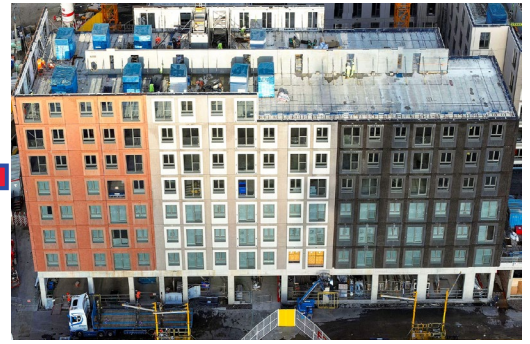
DETAILED DESIGN



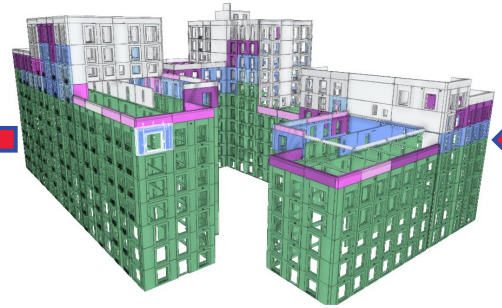
CONSTRUCTION DESIGN

OFFSITE MANUFACTURE

LOGISTICS



LIFTING AND ASSEMBLY



HANDOVERS

- SAFETY
- QUALITY
- SPEED
- VALUE
- COORDINATION
- LOWER RISK
- SUSTAINABILITY
- CERTAINTY

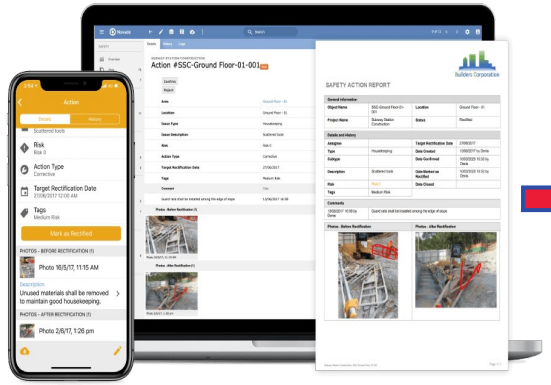
DIGITAL

DIGITAL
JOURNEY

API INTEGRATION

DESIGN

DATA CAPTURE



DATA MANAGEMENT

DIGITAL TWIN

SINGLE SOURCE
OF TRUTH

COMPONENT
LIFECYCLE

QUALITY
ASSURANCE

EXAMPLE

PROJECTS & BENEFITS

PROJECT: CAPELLA
SECTOR: EDUCATION
SCALE: 17,00m²

- 17 MONTH PROGRAMME
- VIBRATION PERFORMANCE
- 28,000 ACCIDENT-FREE HOURS
- 3,500t CONCRETE SAVINGS
- 2,500 OPERATIVE WEEKS SAVED

PROJECT: IBRB
SECTOR: EDUCATION
SCALE: 7000m²

- 13 MONTH PROGRAMME
- 850t CONCRETE SAVING
- 23,000 ACCIDENT-FREE HOURS
- EXPOSED STRUCTURE
- 150 LESS DELIVERIES

PROJECT: ICEPS
SECTOR: EDUCATION
SCALE: 16,200m²

- 32 WEEK ASSEMBLY
- VIBRATION PERFORMANCE
- 28,000 ACCIDENT-FREE HOURS
- WORKFORCE REDUCED BY 75%

PROJECT: PLOT 1
SECTOR: COMMERCIAL
SCALE: 22,200m²

- BREEAM 'OUTSTANDING'
- 22% LESS EMBODIED CARBON
- TALLEST PRECAST/TIMBER HYBRID IN EUROPE

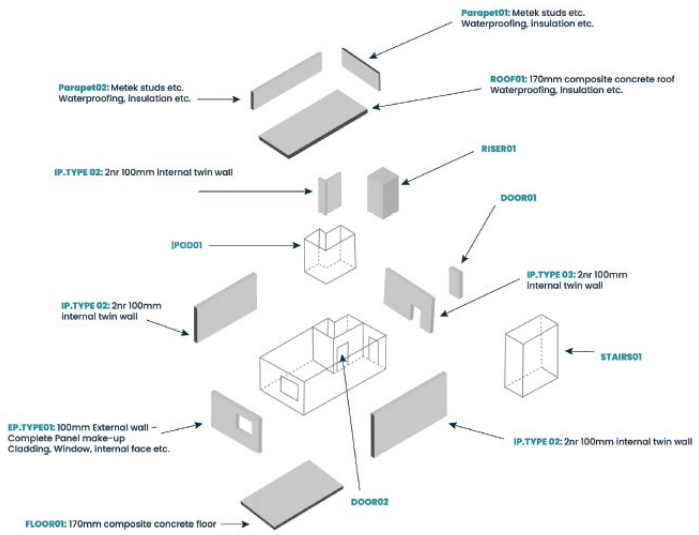
PROJECT: PLOT 14
SECTOR: RESIDENTIAL
SCALE: 25,000m²

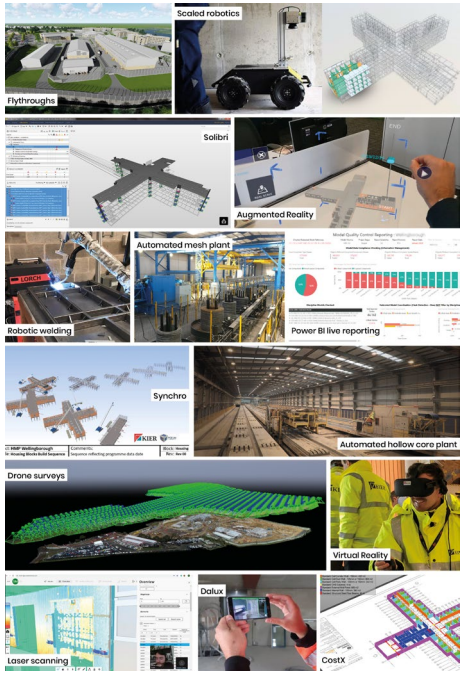
- 44 WEEK ASSEMBLY
- 23 SITE OPERATIVES
- NHBC WARRANTED
- LOWER CARBON CONCRETE
- 100t INSTALLED DAILY
- 7 DAY CYCLE TIME

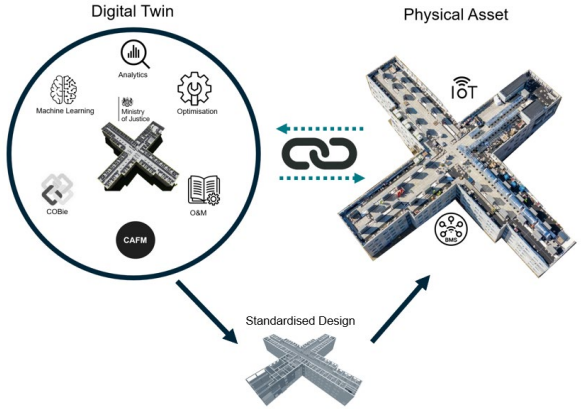

KIER

Kier's approach to MMC and Industrialised Construction

1. Repeatable Solutions
2. THE *Choice* FACTORY®
3. Digital by Default™
4. SMART Outcomes™







MoJ Collaboration

Previously

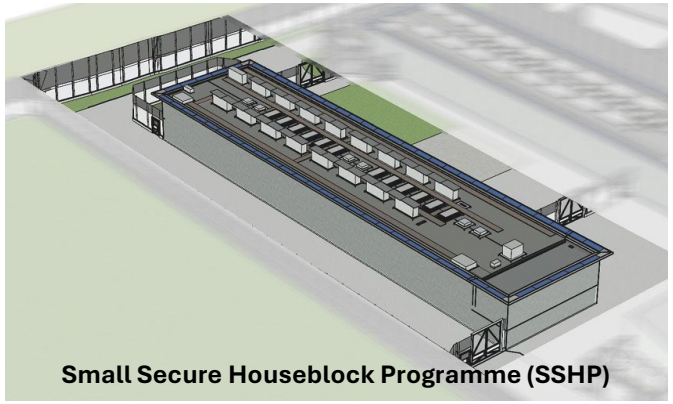

HMP Oakwood – complete 2012


HMP Five Wells – complete 2021

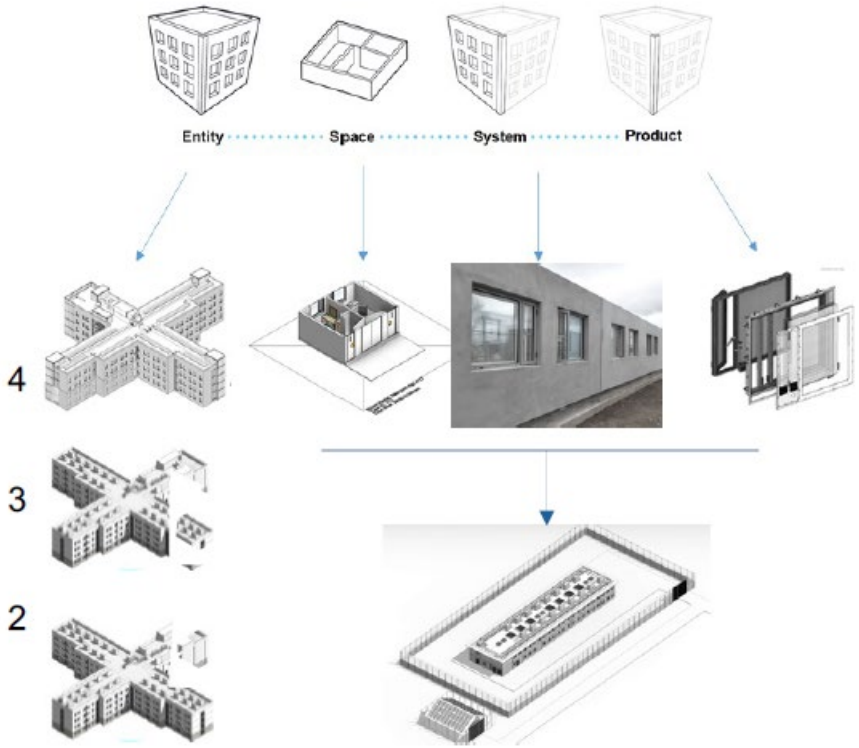
Currently and going forwards

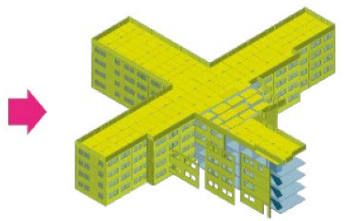

HMP Millsike – due to complete 2025

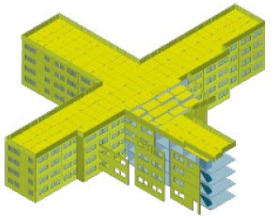

Accelerated Houseblocks Delivery Programme (AHDP)


Small Secure Houseblock Programme (SSHP)

Platform Approach and Industrialisation







127 weeks construction

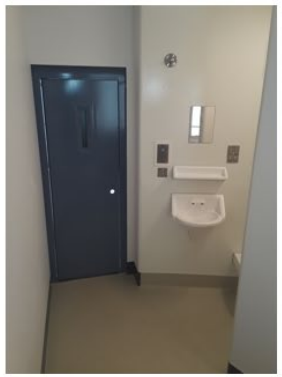
Use of precast with some cast-in components; four-storey risers; cast-in windows

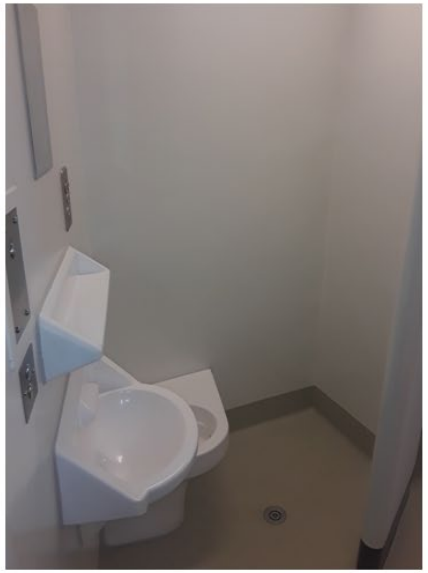
122 weeks construction

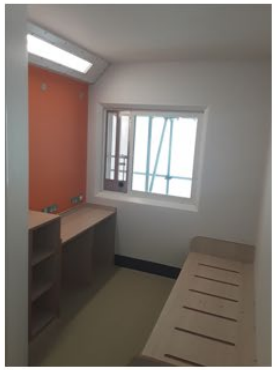
Use of offsite logistics hubs; digital productivity & quality capture; digital & physical prototyping

116 weeks construction

Increased install rate; increased cast-in items; further MMC; mature Integrator model; 4D & quality embedded in programme





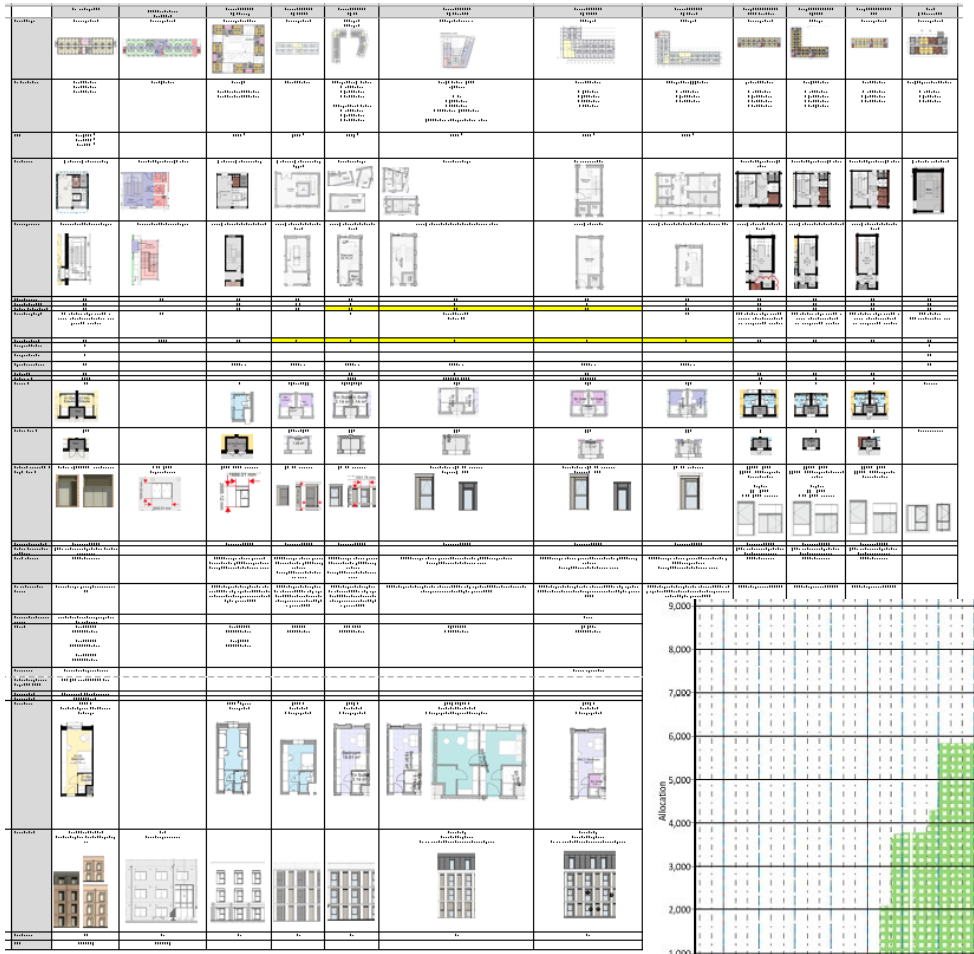


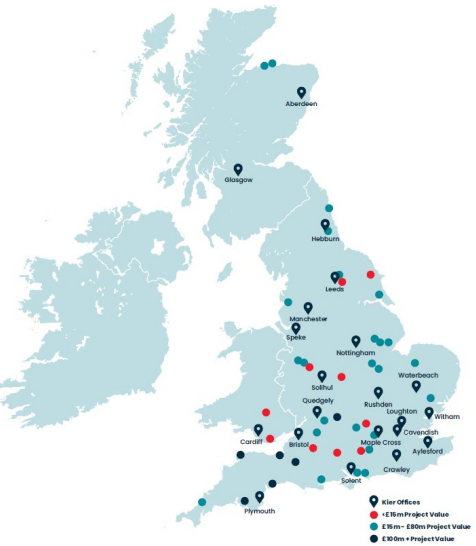
Ministry of Defence

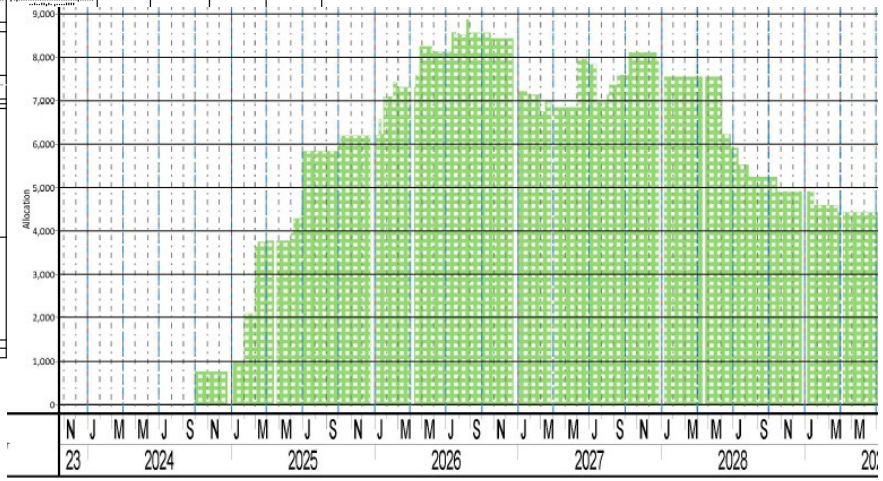
Defence – Single Living Accommodation (SLA)

Previously + Currently

Going Forwards







KIER

247 Tottenham Court Road (The Fitzrovia)

247 Tottenham Court Road (Fitzrovia)

Summary of Alternative Structural Proposal

Workshopped with AKT II and Stiff & Trevillion

A slim floor structure with integrated fireproofing, proprietary option of the AKT II superstructure design

Over £1m Works Value Saving Cost

Simpler façade connections

Options for Steel or Pre-Cast Concrete Columns, to optimise the solution

19KG CO^2/m^2 Carbon Saved

Previous experience working with AKT II

Removes requirement for perimeter steel fire boarding, simplifying programme sequencing

3 to 4-week Programme Saving

Proven high-quality exposed finishes

360 tonnes less steel reduces cost risk in volatile steel market

THANK YOU

THE BENEFITS OF EARLY MMC COLLABORATION

PCE Ltd
Est.1973

Curtins
Building a better future

KIER

Cast