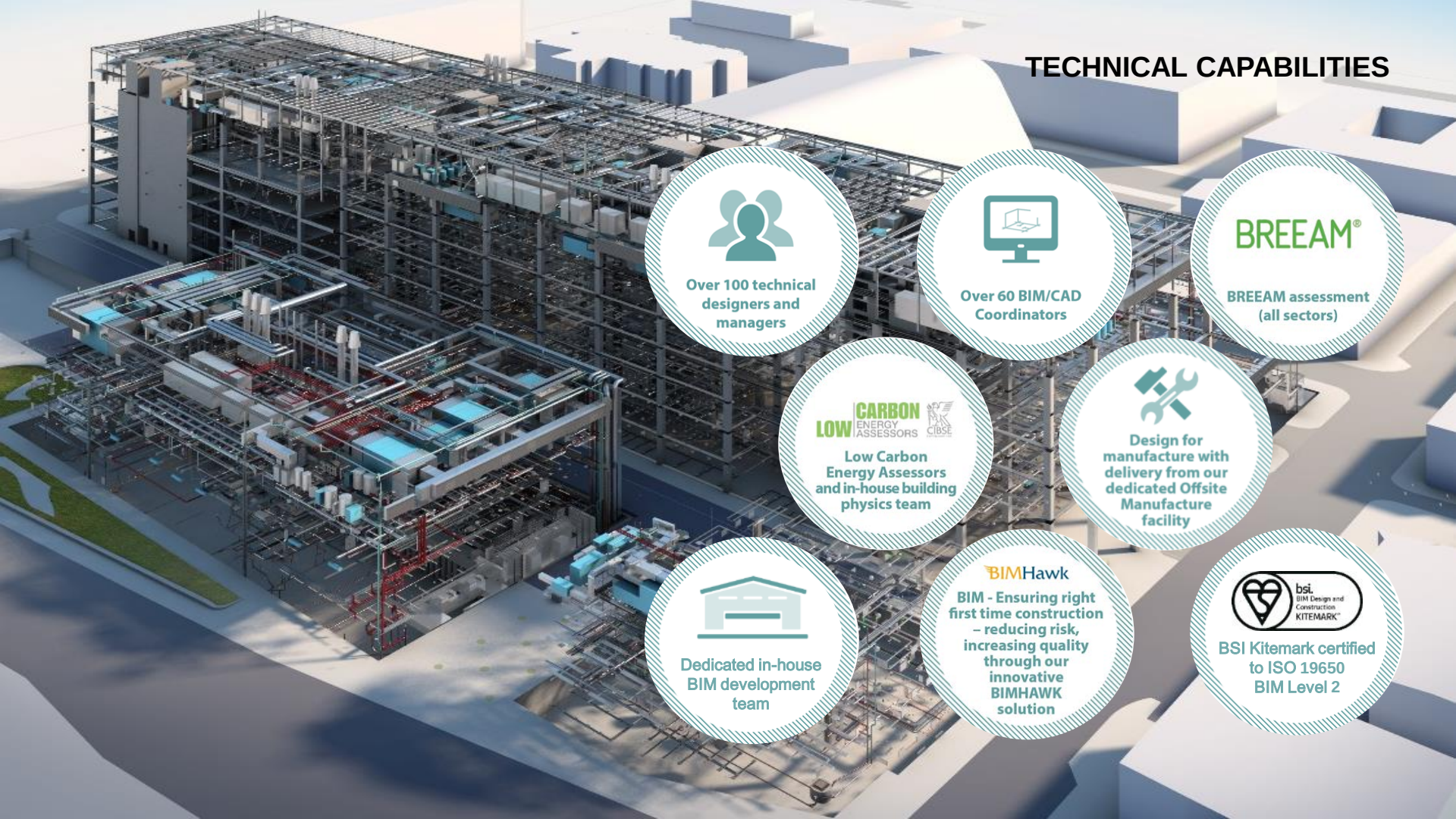
INTEGRATING MEP MODULARISATION

DECEMBER 2020

KEY DRIVERS

- ✓ Innovation - Standardisation,
  - DfMA ‘kit of parts’ approach
- ✓ Exceptional team to deliver strategy
- ✓ Experienced offsite contractor
- ✓ Demonstrable capability and capacity

TECHNICAL CAPABILITIES



Over 100 technical designers and managers

Over 60 BIM/CAD Coordinators

BREEAM®

BREEAM assessment (all sectors)

LOW CARBON ENERGY ASSESSORS

Low Carbon Energy Assessors and in-house building physics team

Design for manufacture with delivery from our dedicated Offsite Manufacture facility

Dedicated in-house BIM development team

BIMHawk

BIM - Ensuring right first time construction – reducing risk, increasing quality through our innovative BIMHAWK solution

bsi. BIM Design and Construction KITEMARK™

BSI Kitemark certified to ISO 19650 BIM Level 2

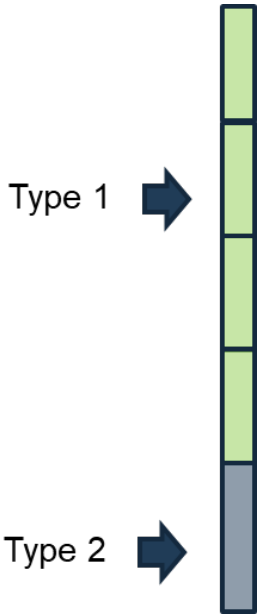
OFFSITE KIT OF PARTS

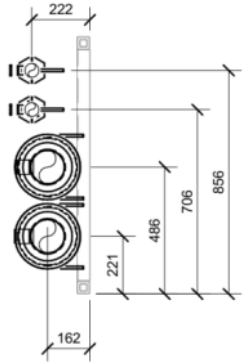
Mechanical riser modules

Horizontal MEP Modules

STANDARDISATION / KIT OF PARTS

- 2-storey flat frame
- 2 catalogue items (serving PHE)
- Standardise pipe sizes – Header arrangement
- Flexible / Future Proof
- Option to be fed from bottom OR top (future buildings)
- Welded stainless steel – lighter, longevity, extrusions, standard sub-assemblies / ‘kit of parts’
- Saving on BIM design
- Standard structural frame design
- Generate Revit family – with configurable parameters
  - Expansion bellows / Anchoring points



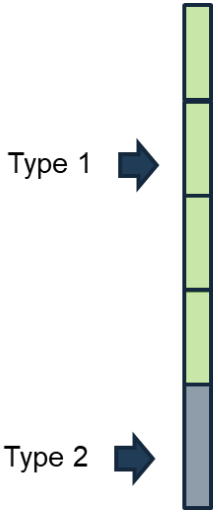


Type 1
- LTHW - ø100 mains + ø50mm BSP branches
- CHW - ø125 mains + ø65mm PN16 branches

Type 2
- LTHW - ø100 mains + ø50mm BSP branches
- CHW - ø125 mains + ø65mm PN16 branches
- Including Flushing and Control circuits

DEVELOPMENT REQUIREMENT

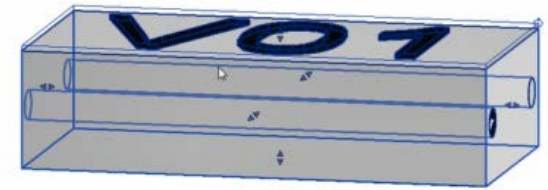
- Optimum pipe sizing working with MEP consultant
- Cost evaluation on standardising pipe sizes
- Cost evaluation of pump efficiency gains
- Industrialisation for manufacture / repetition efficiencies
- Logistics
- Installation methodology
- Fixings to primary structure – eliminate on site drilling
- Interfaces at floor levels
- Fire stopping
- Development of Revit family
- Development of output schedule for manufacture
- Development of manufacturing drawing + sub assemblies + assemblies
- Finished product inspection criteria
  - Pneumatic Testing Offsite
  - SnagR



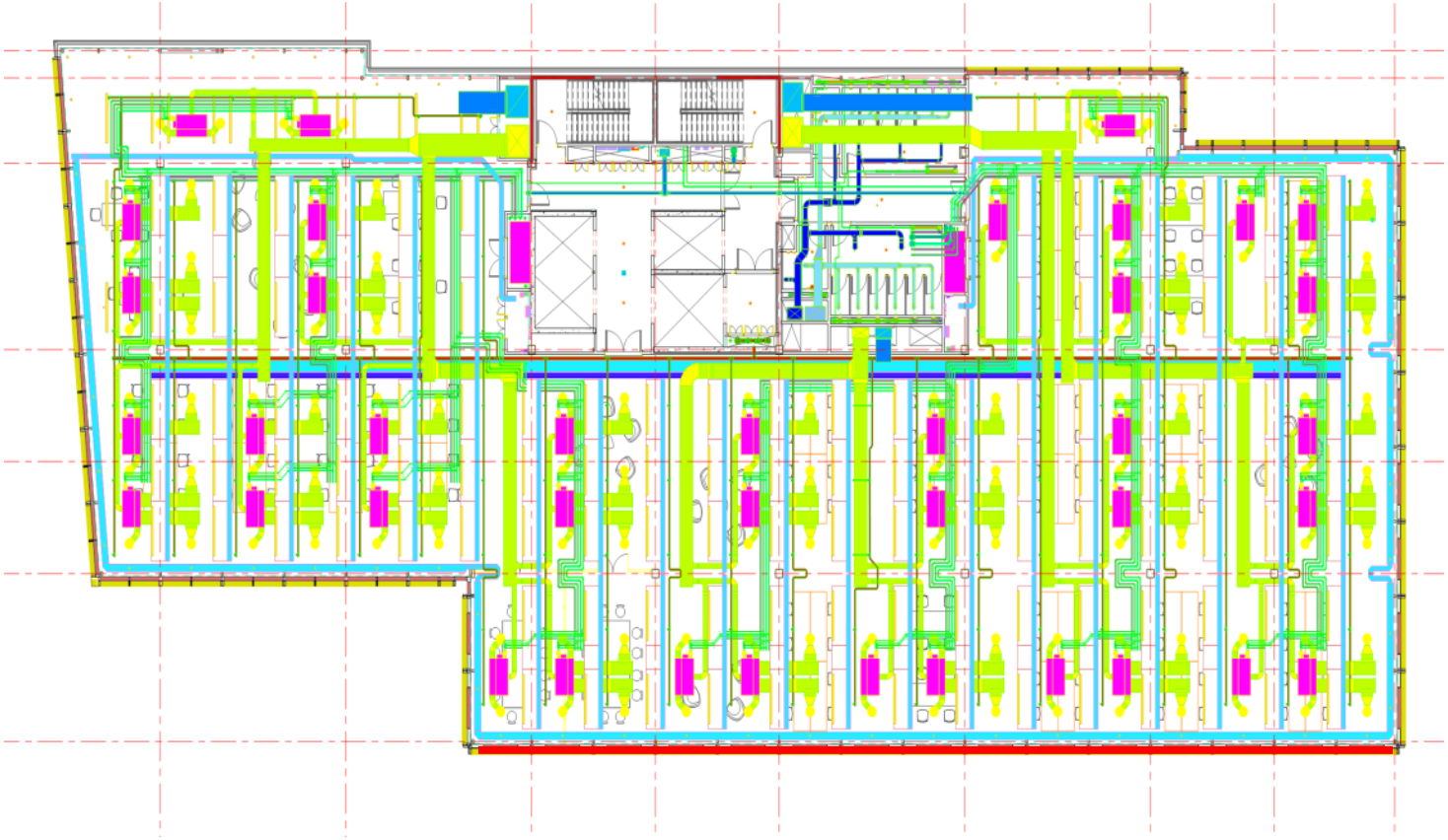
snagR

VALVESETS – CONTROL VALVES

- One family containing the following options:
  - Line sizes 15mm to 54mm
  - 2-port PICV
  - 3-port
  - Optional strainer
  - Valve selection
  - Materials
    - Copper Pressfit
    - Stainless Steel Pressfit
    - Carbon Steel Screwed
- Outputs Cobie data required for the valveset
- Outputs schedule for build configuration
- Allows specific control valve details to be entered
- Simplified view in Revit to allow correct space allocation
- Auto selects valves based on flow rate / pressure drop



HORIZONTAL MEP MODULES: TYPICAL FLOOR PLATE



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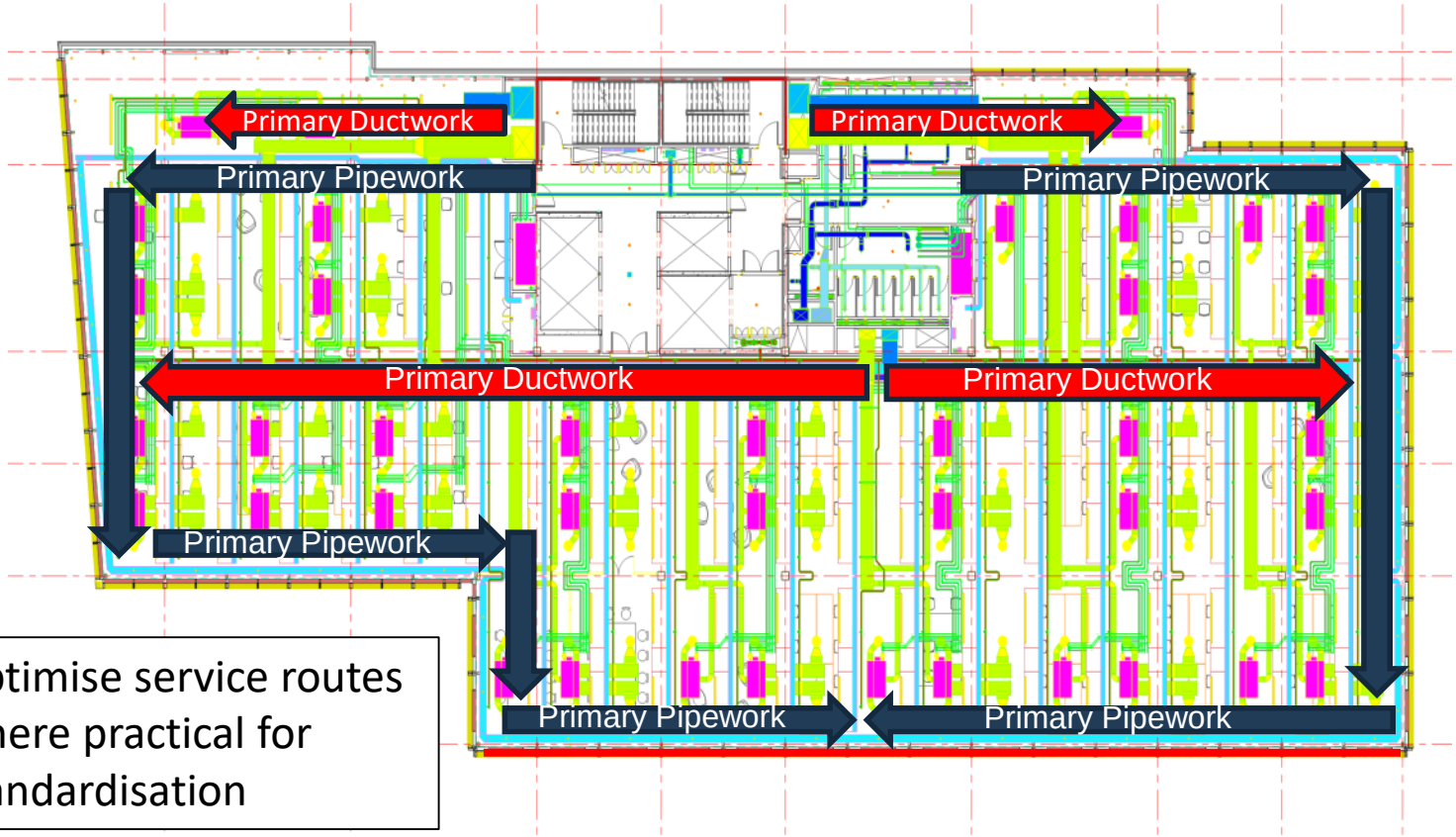
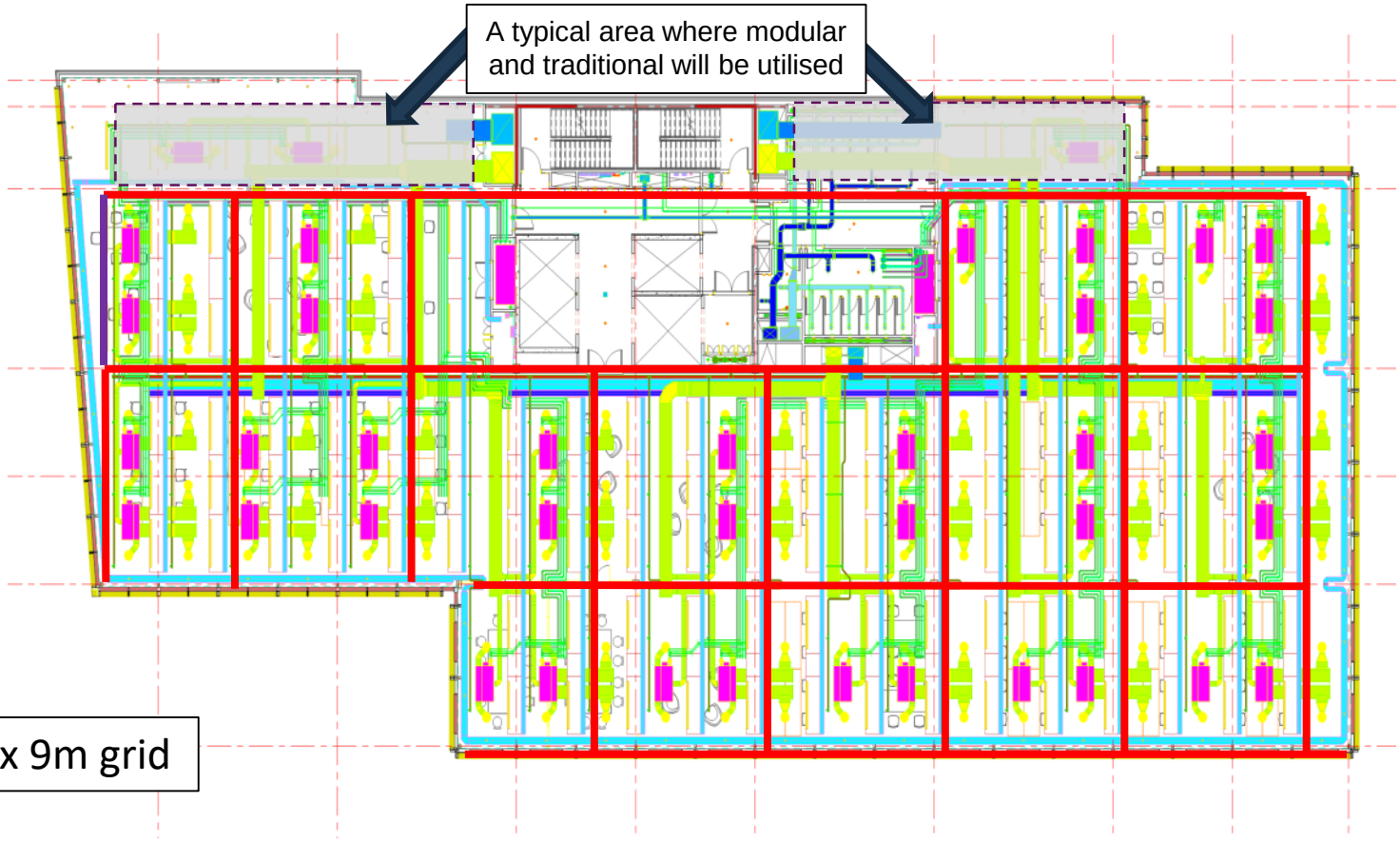


Optimise service routes where practical for standardisation

HORIZONTAL MEP MODULES: TYPICAL FLOOR PLATE



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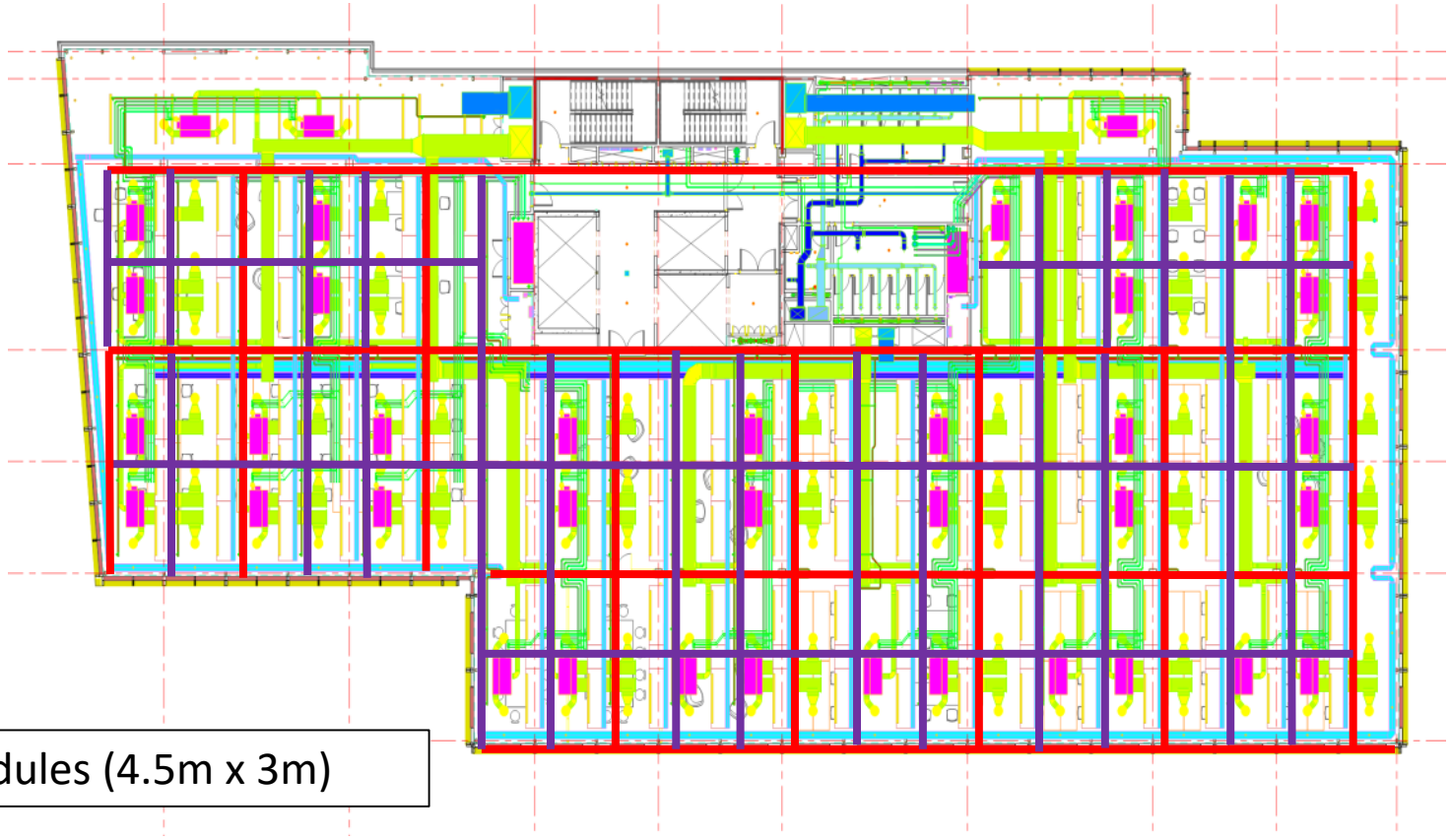


92 modules (4.5m x 3m)

HORIZONTAL MEP MODULES:

36 FCU modules

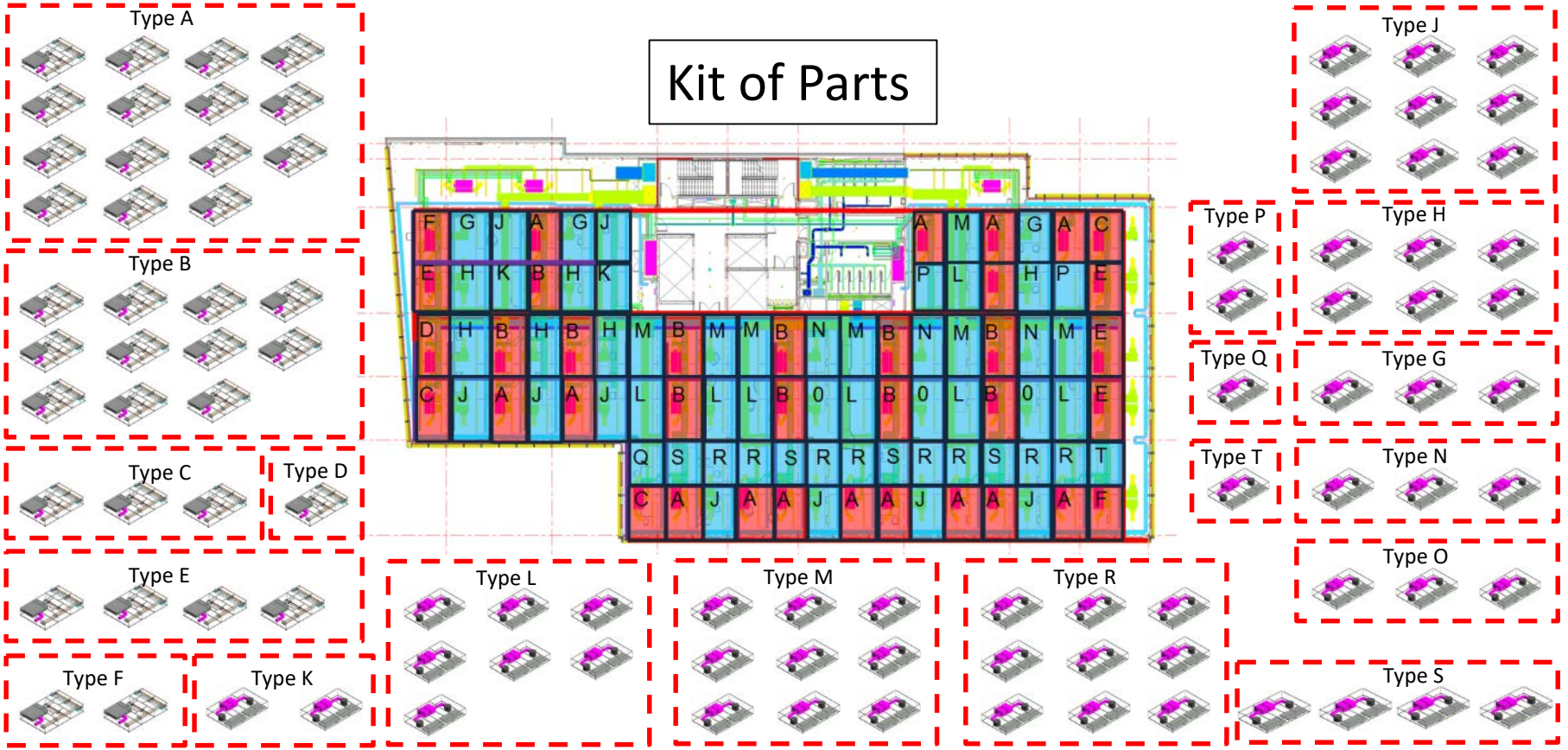
6 Catalogue items

HORIZONTAL MEP MODULES:

56 non FCU modules

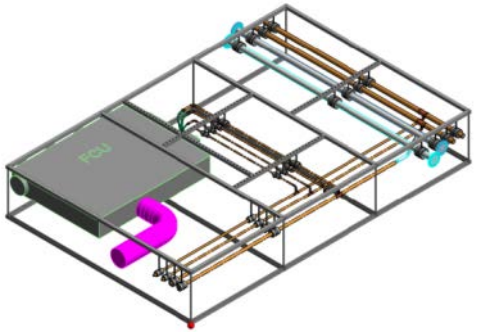
13 Catalogue items

HORIZONTAL MEP MODULES: TYPICAL FLOOR PLATE

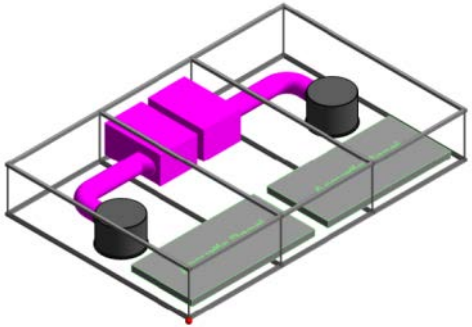


STANDARDISATION / KIT OF PARTS

- 2-tier light weight frame (4.5m x 3m)
- Unistrut or similar
- Standard fixing strategy
- Saving on BIM design
- Standard frame designs
- Pressfit pipework and valves
- Generate Revit family – with configurable parameters
  - Expansion bellows / Anchoring points
  - FCU model



Type A



Type H

Type A

- FCU
- LTHW and CHW pipework
- Valve-sets
- Insulated Ductwork
- Elec Containment (modular wiring)

Type H

- Ductwork to grille
- Acoustic Panel
- Elec Containment (modular wiring)

DEVELOPMENT REQUIREMENT

- Optimum pipe sizing and coordination to minimise number of catalogue items
- Cost evaluation on standardising pipe sizes
- Selection of FCU Manufacture and model
- Valveset fitted on drip tray
- Condensate consideration
- Industrialisation for manufacture
- Option for removable bottom section and return for reuse
- Logistics / Installation methodology
- Fixings to primary structure – eliminate on site drilling
- Development of Revit family
- Development of output schedule for manufacture
- Development of manufacturing drawing
- Finished product inspection criteria
  - SnagR
  - QC requirements

IN SUMMARY

Innovative design capability: Design for Manufacture approach

Experts in modularisation with a market leading reputation

Over £20m bsi.

World class manufacturing facility in West Yorkshire with BSI accreditation

Health & Safety: 1 million+ hours worked RIDDOR free

OFFSITE AWARDS HIGHLY COMMENDED BEST USE OF MEP & POD TECHNOLOGY

CONSTRUCTING EXCELLENCE IN THE NORTH EAST AWARDS 2018 WINNER

FACTORY QUALITY

REDUCED PROGRAMME

- ✓ Innovation - Standardisation,
  - DfMA ‘kit of parts’ approach
- ✓ Exceptional team to deliver strategy
- ✓ Experienced offsite contractor
- ✓ Demonstrable capability and capacity
- ✓ Extensive support network
- ✓ ‘Game Changer’ opportunity for construction

Video Links to Offsite Projects

https://youtu.be/GEk-7e9Jmqw
Nightingale projects (Health)

https://youtu.be/ZMYMsGRDg8A
New Street CHP (Rail infrastructure)

https://youtu.be/rHQHWnXDpEk
Birmingham New Street Spine (Rail)

https://youtu.be/9dAZtsYkYNQ
IBRB: Warwick University

https://youtu.be/G-U4vHpoJaA
Heathrow T5 (Aviation Modular Building)

https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/2020RIBAPlanofWorktemplatepdf.pdf

RIBA Plan of work