The Use of BIM in Construction Planning Demonstrating Modularisation of Engineering Services

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About the speaker
George Adams

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Leader of CIBSE Resilient Cities group

CIC Green Panel Leader

Director Engineering and Energy SPIE UK

Major Projects: *Heathrow Terminal 5*

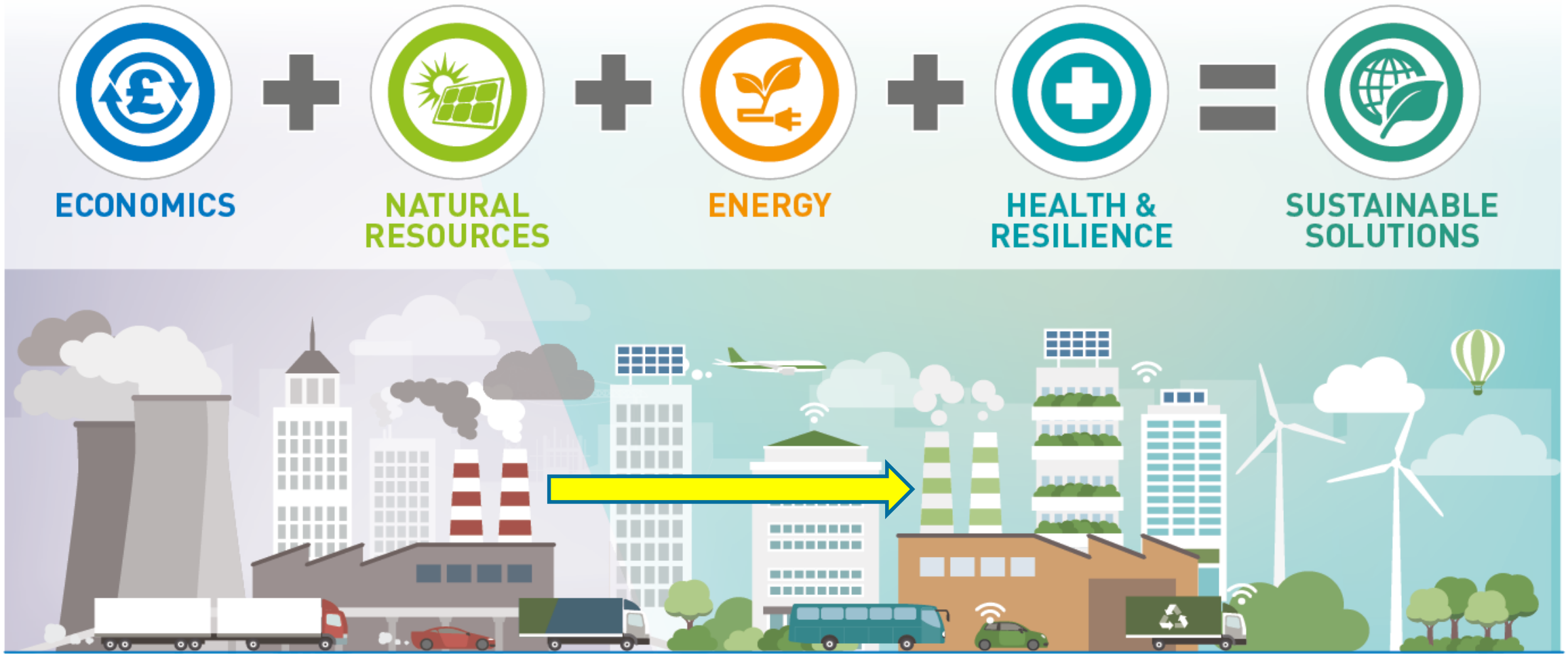
University Collage Hospital

McLaren Automotive

British Telecom London Tunnels

Major Data Centers

A New Way of Thinking

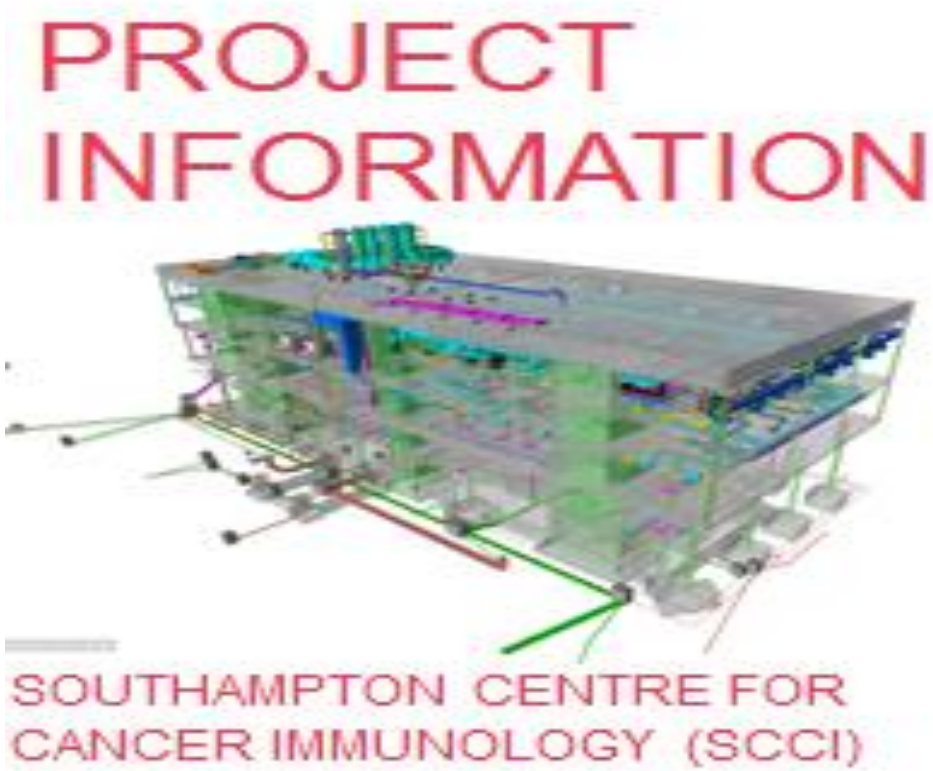


Planning

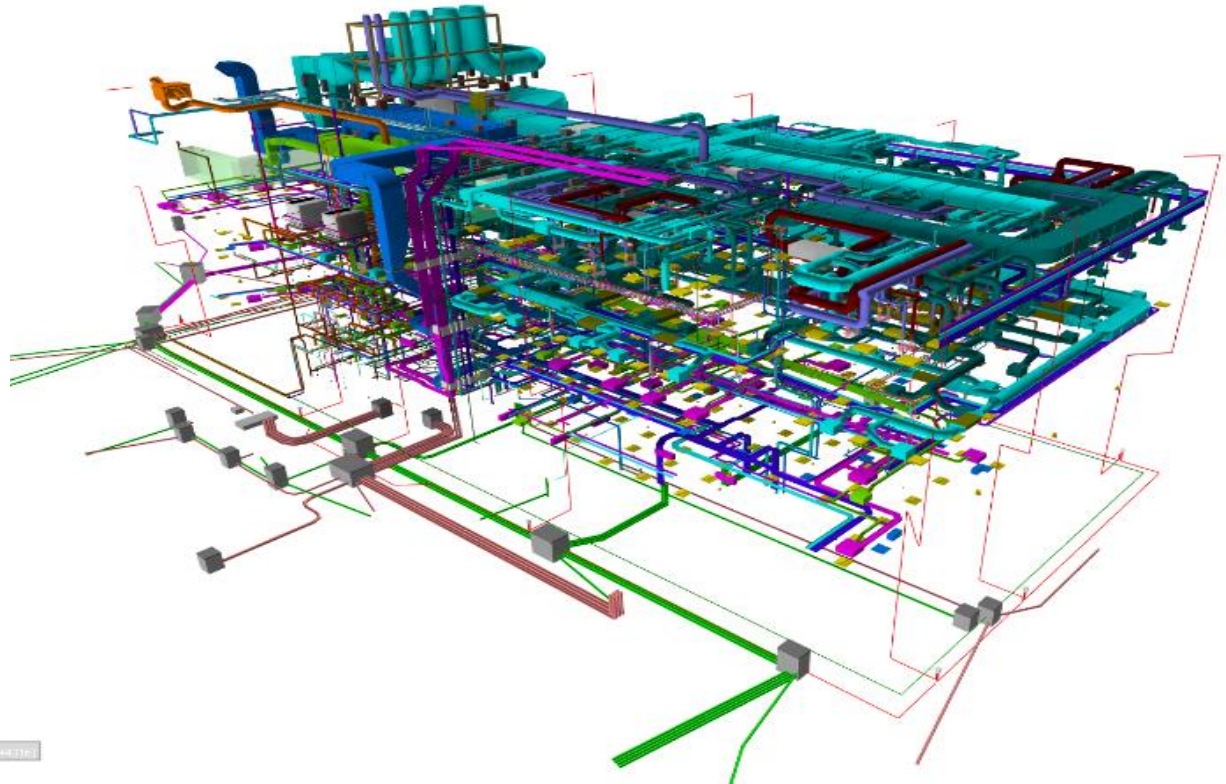
UK GOVERNMENT TARGETS



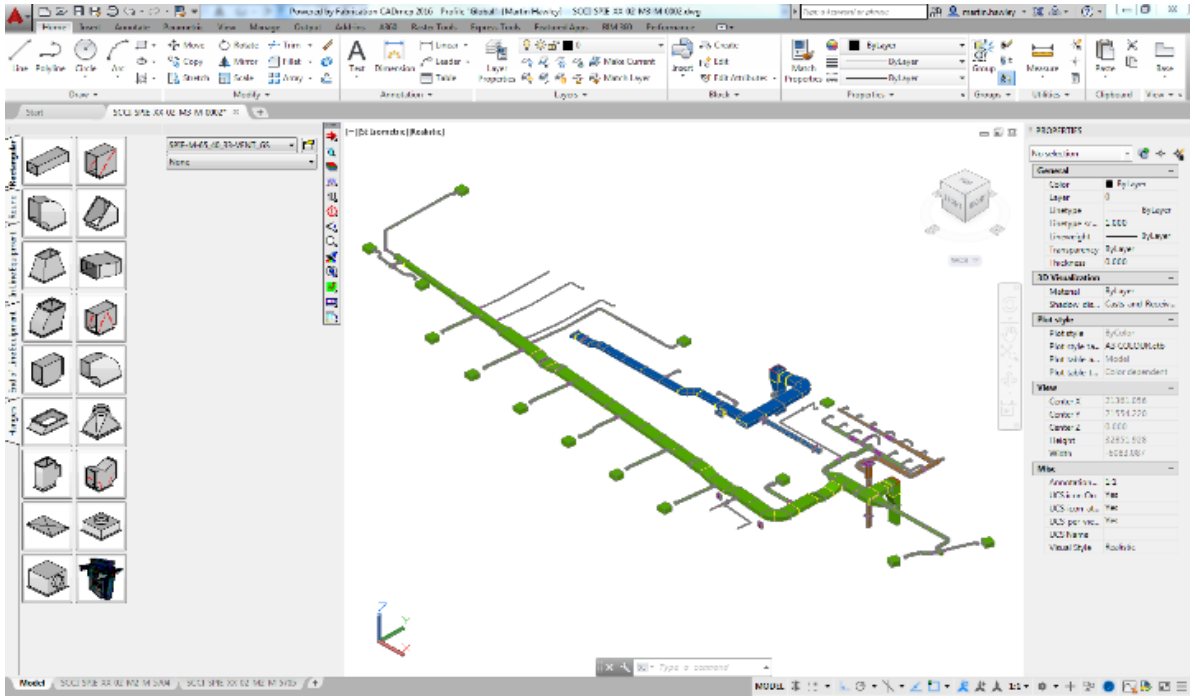
Project Information



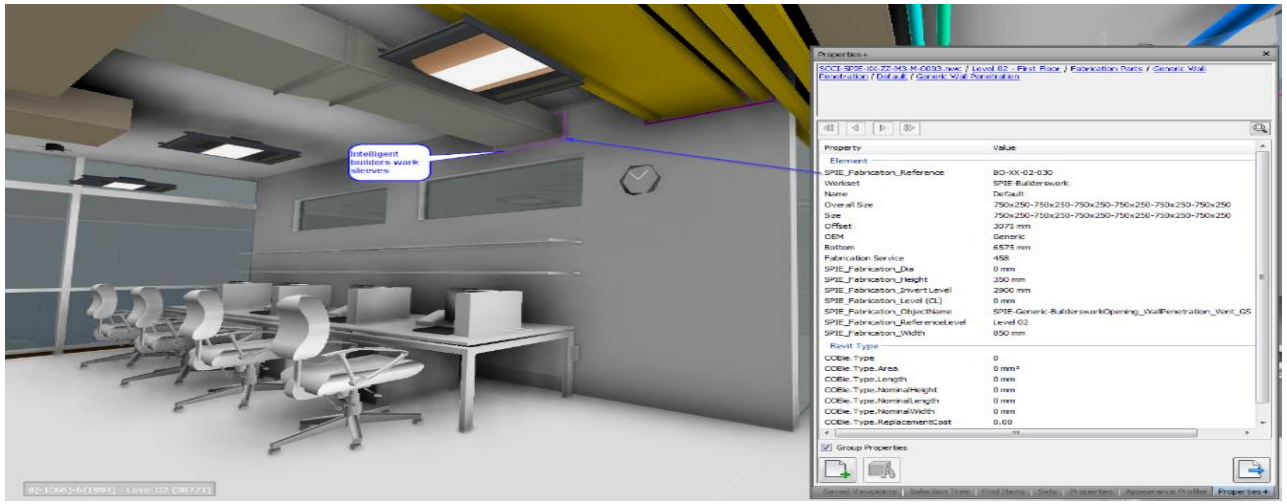
MEP services modelled into the building layout



THE BIM PROCESS



Autodesk Revit is exported to Fabrication CADmep. Parts can effectively be manufactured from the base model – improving speed and accuracy



Modelling of the builders' work sleeves (above), which has been scheduled from Revit and included on the drawings, has assisted the site installation of the ductwork and also the construction of the partition walls, reducing potential waste.



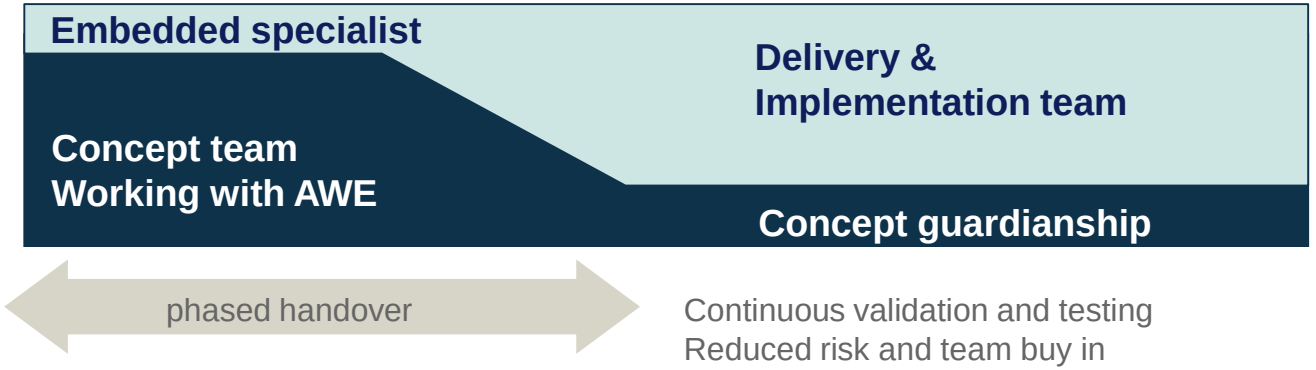
On-site installation (inset, above) as per the model (main image, above left).

Relationships – the critical tipping point

The inherited design – Disjointed working Traditional



The embedded team design – Integrated working with AWE



PROCUREMENT

A COLLABORATIVE TOOL

SPIE adapts procurement process for better integrated asset management.

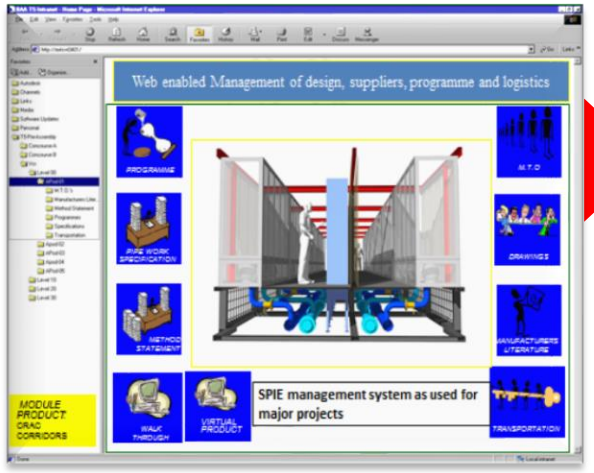
INPUT

BIM designs

Schedule

Spec

BIM 2 BUILD WEBSITE



OUTPUT

Multiple module assembly locations

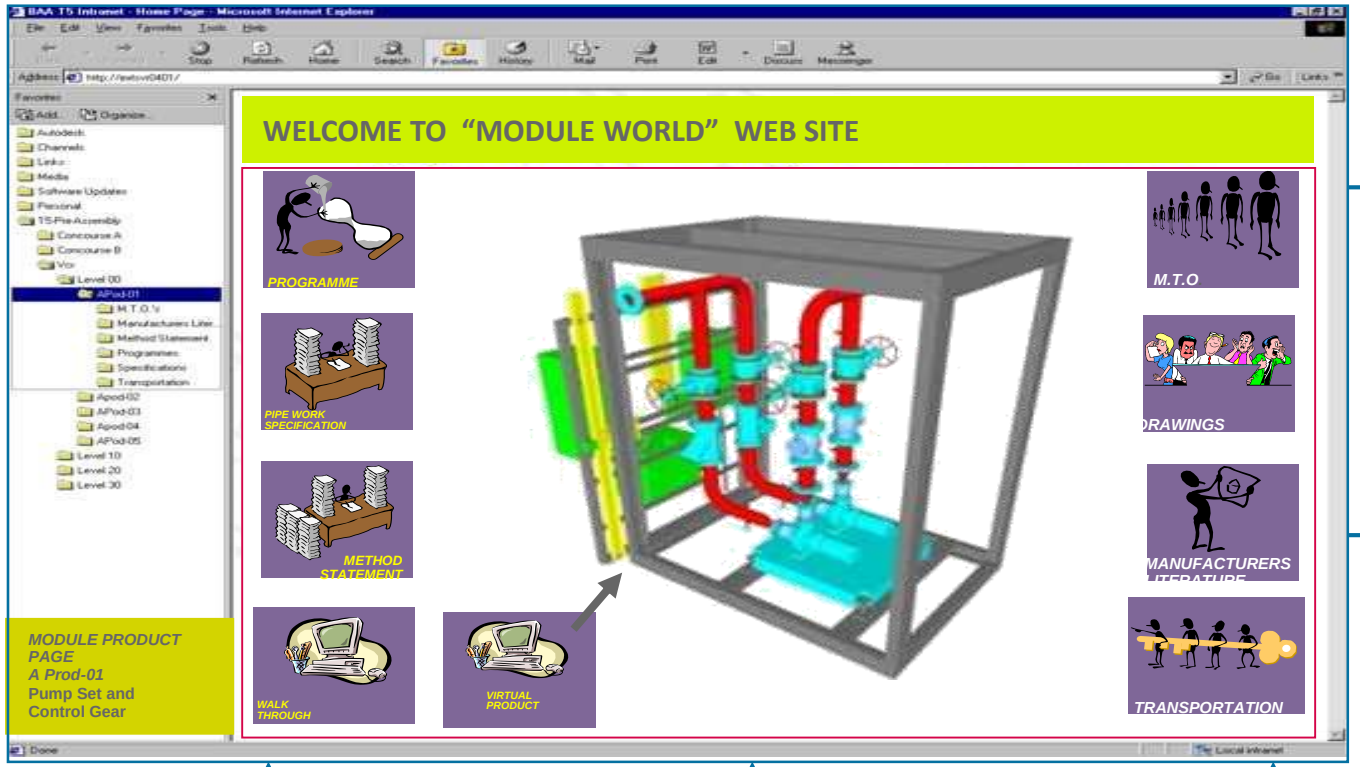
Generic Overview

- Create asset codes
- Embed the attributes into the 3D mode

SPIE's Approach

- Create a BIM website
- Produce a product structure
- Allocate products to supply chain

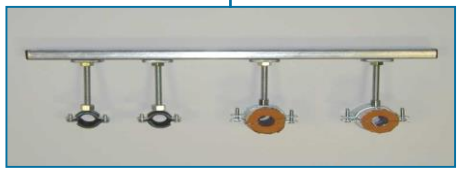
SPIE BIM 2 BUILD 2 MAITAIN

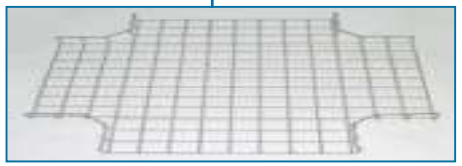


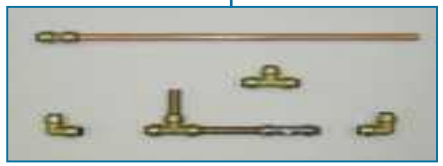




Multiple module assembly locations - OUTPUT

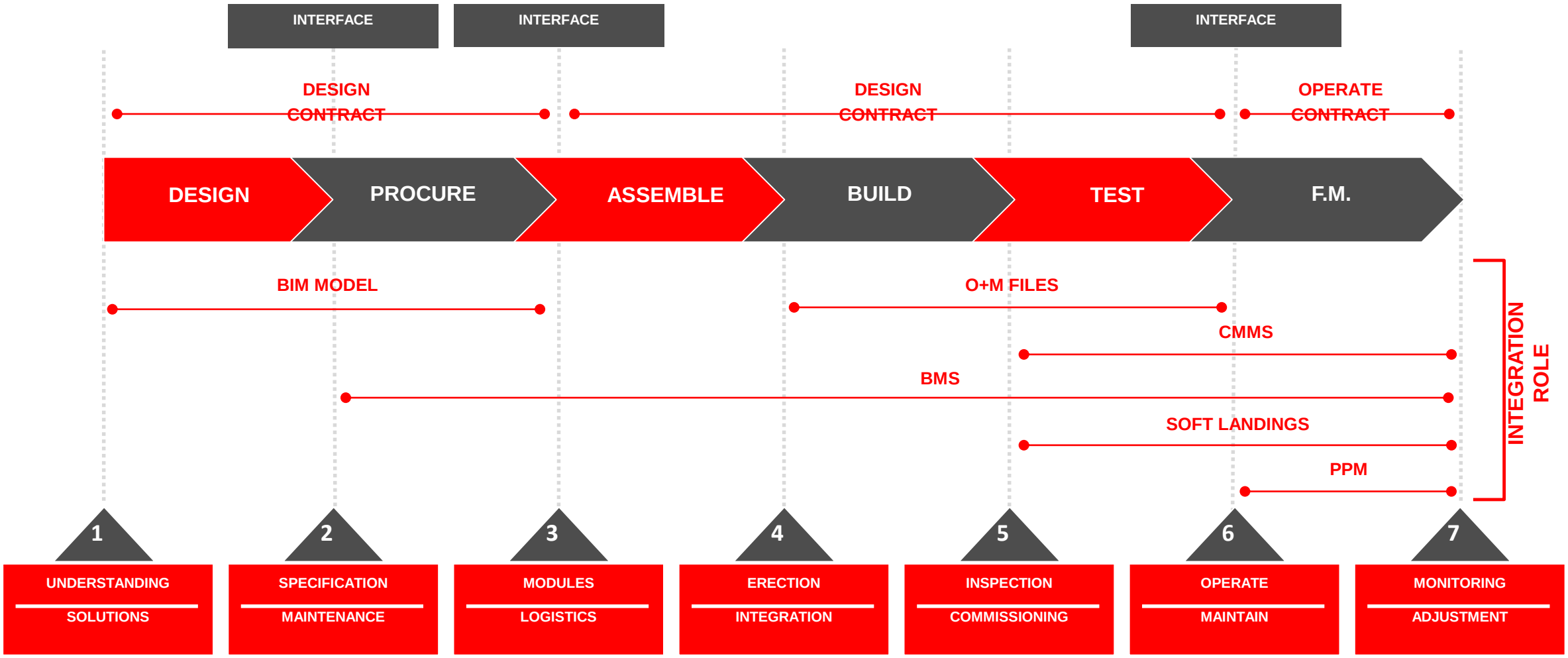






Parallel product supply chain streams - INPUT

CONNECTED DELIVERY



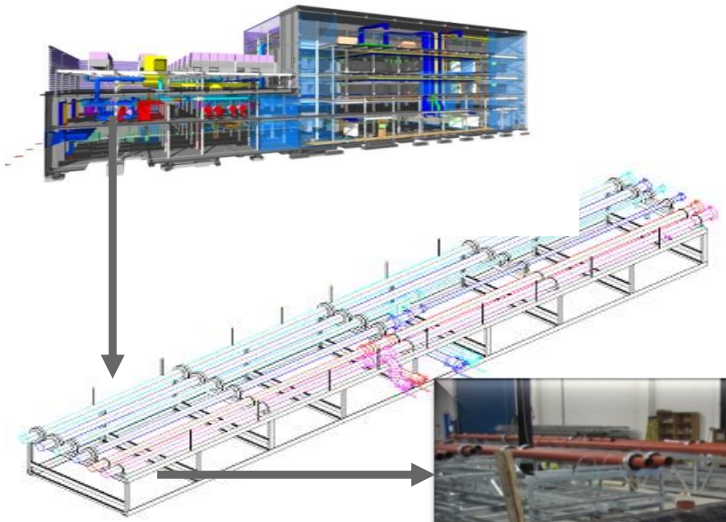
SPIE Design to assembly single point responsibility





SPIE Design to assembly single point responsibility

Design



Transport



Assembly

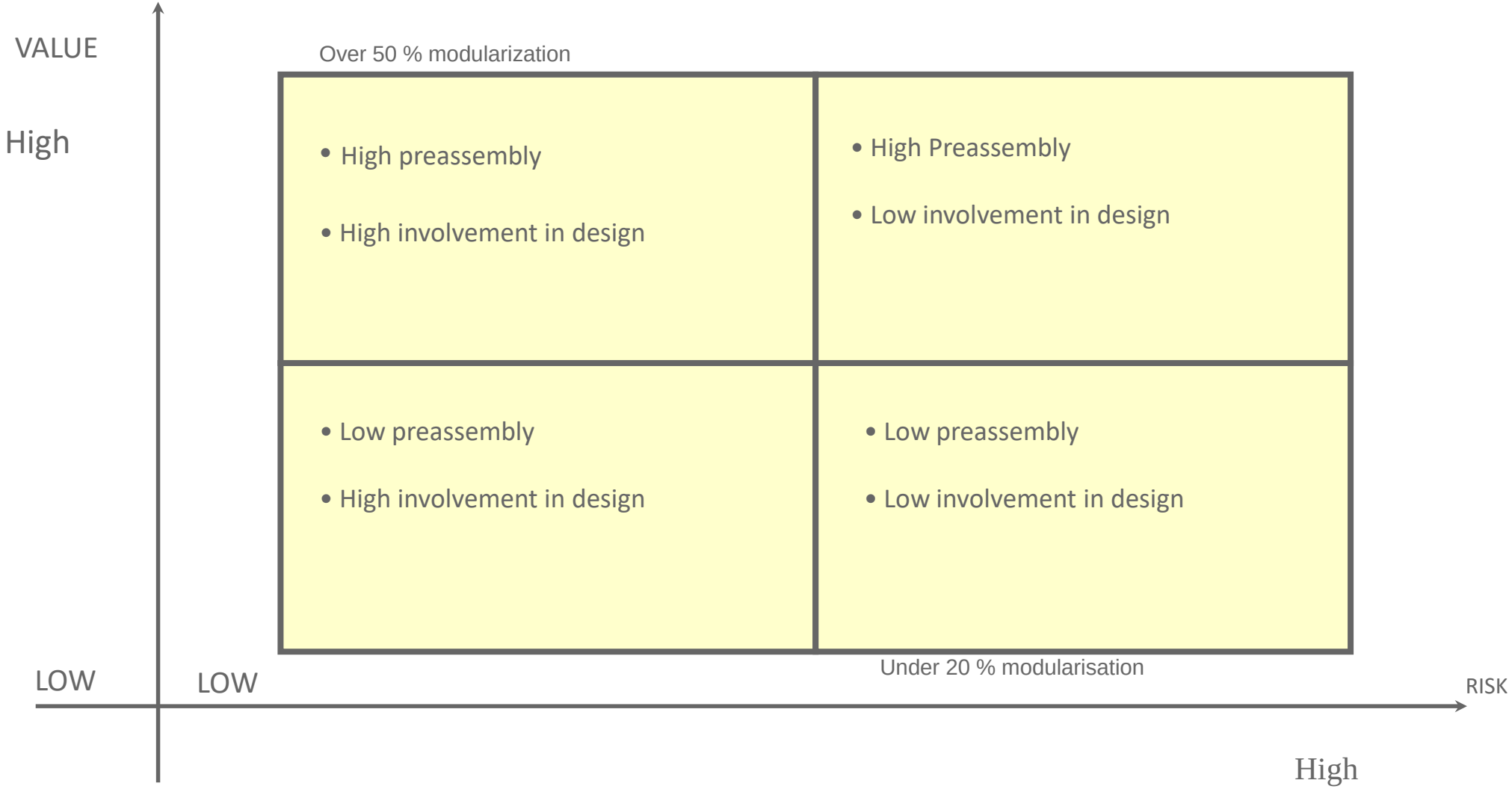




Manufacture



Strategic benefits



Holistic performance based capability

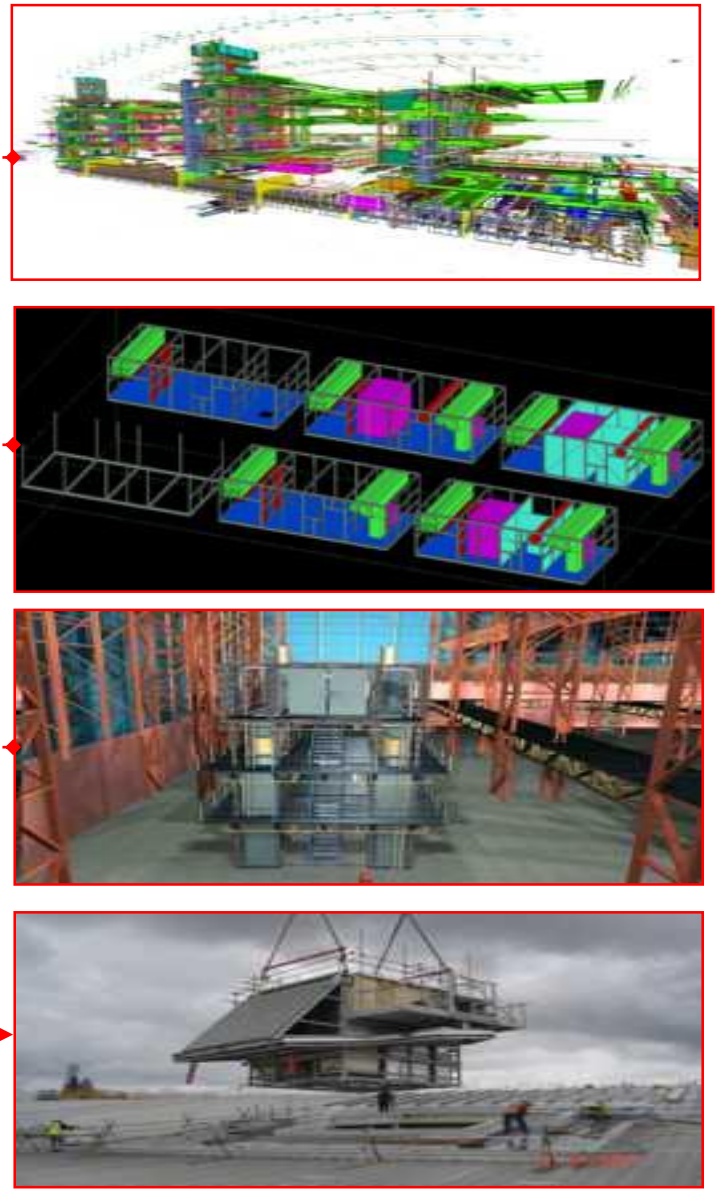


Complete 30 m module train lifted into position from floor by Strand-jacks in one operation

- EXAMPLE
- Services and Structure using common beams
- Programme reduction to critical path of 4 months
- Saving of 360 m of main structural steelwork
- Mezzanine floor of modules reduced build area by 30%for like for like programmes

LEAN MANAUFACTURING

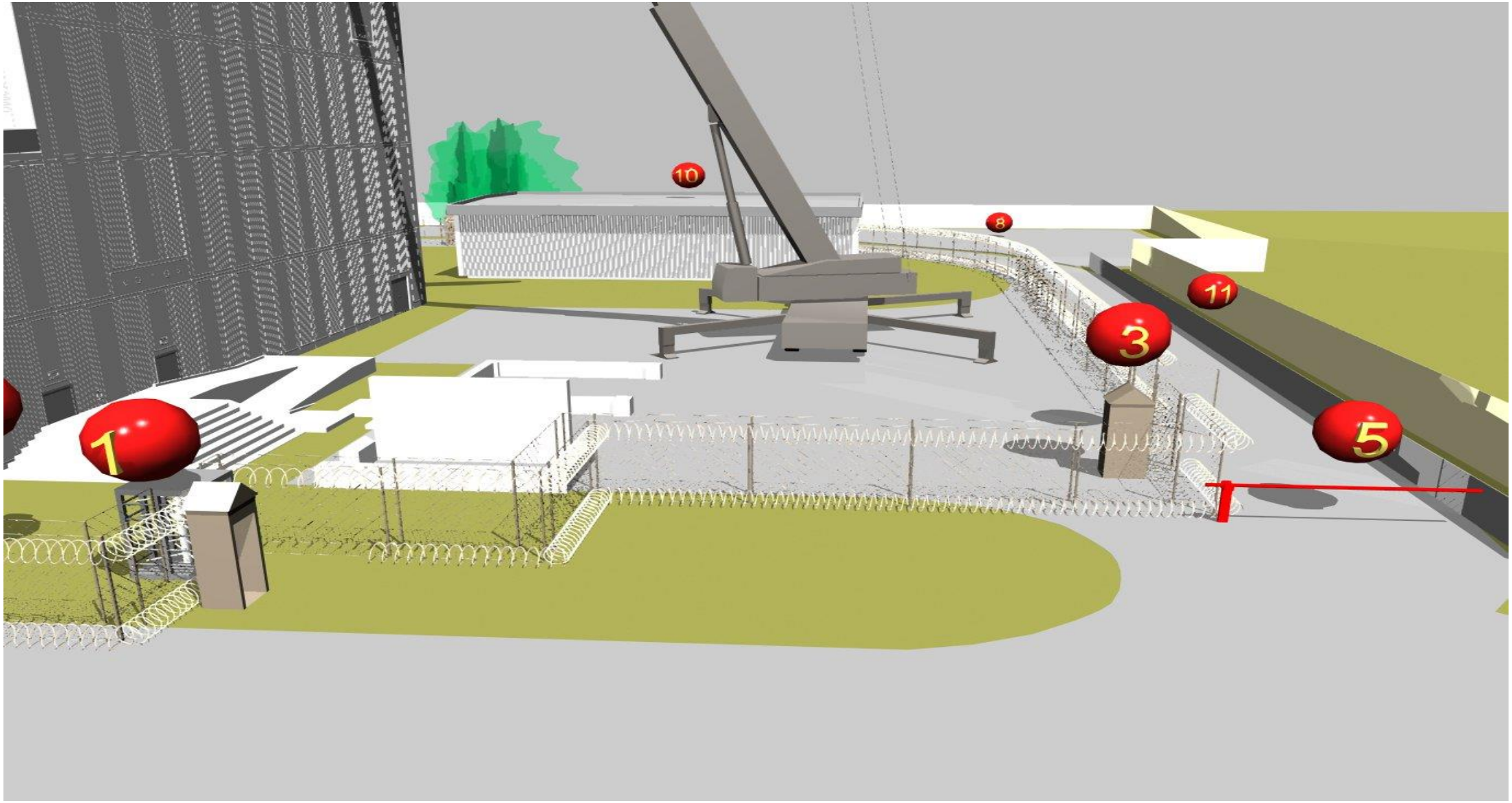
- 3D DESIGN AND INTEGRATION
- PARALLEL MANUFACTURING MULTIPLE WORK STREAMS
- VIRTUAL MANUFACTURING
- REDUCTION IN TRADDITIONAL INTERFACES



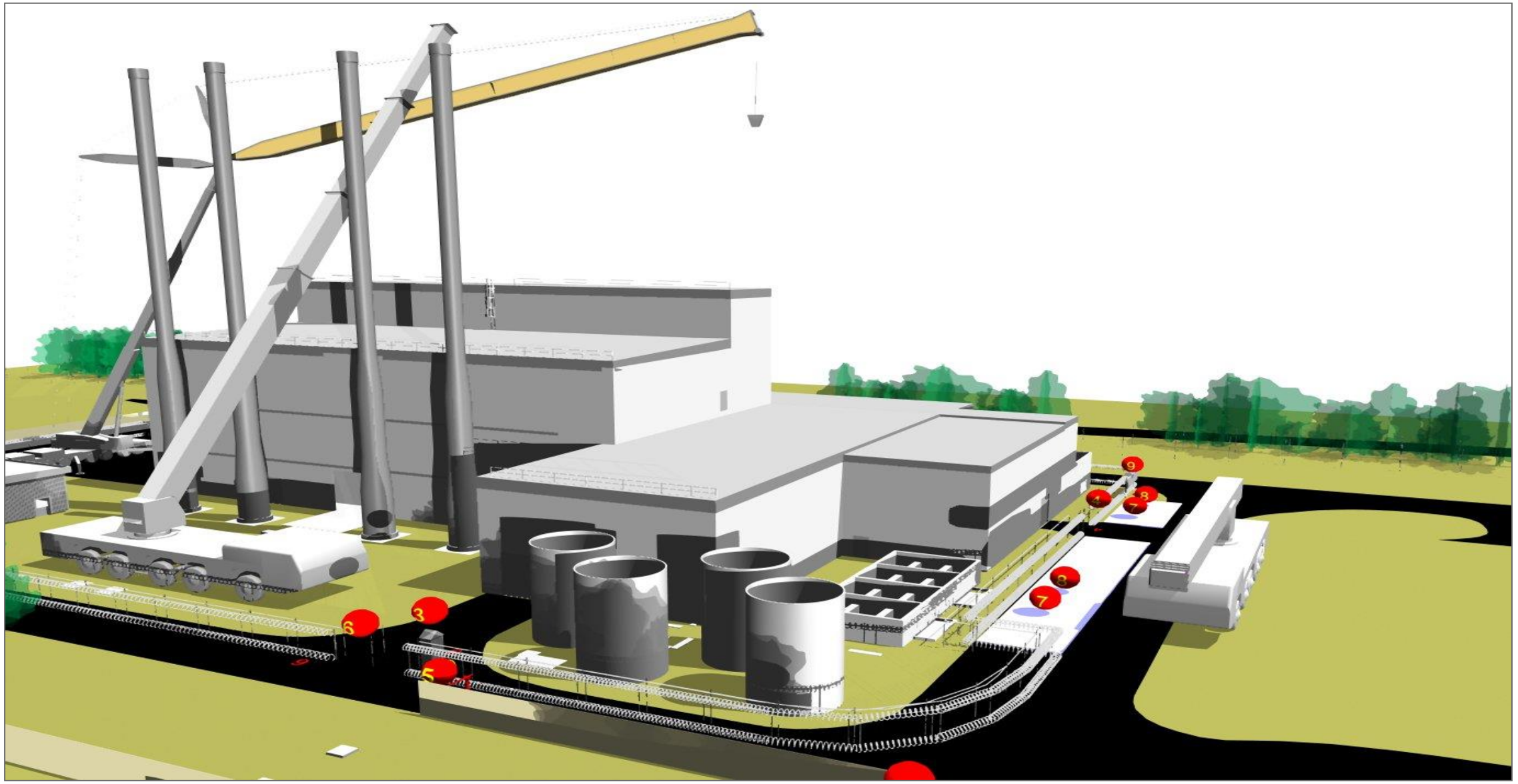
Original building



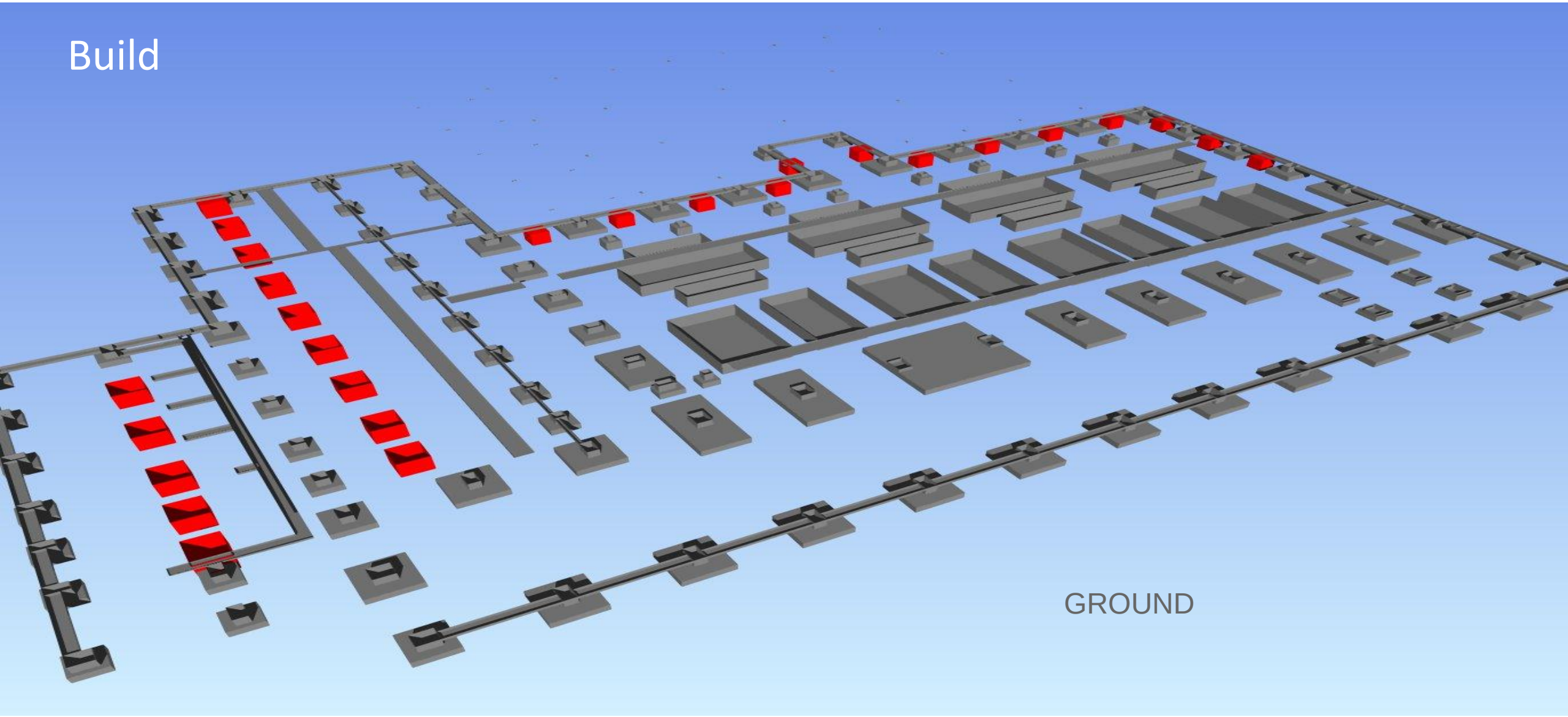
Site set up – Fencing – access – crane for dismantling phase



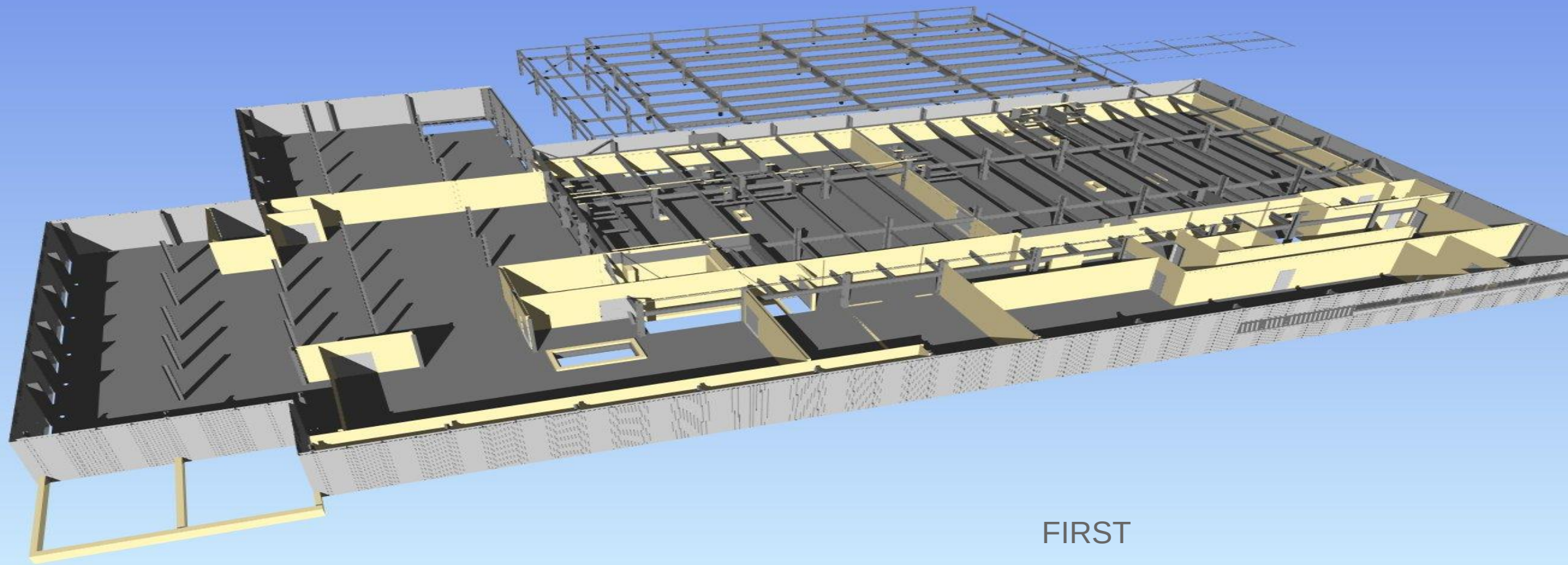
Site set up - Dismantling of existing in progress



Build



Build



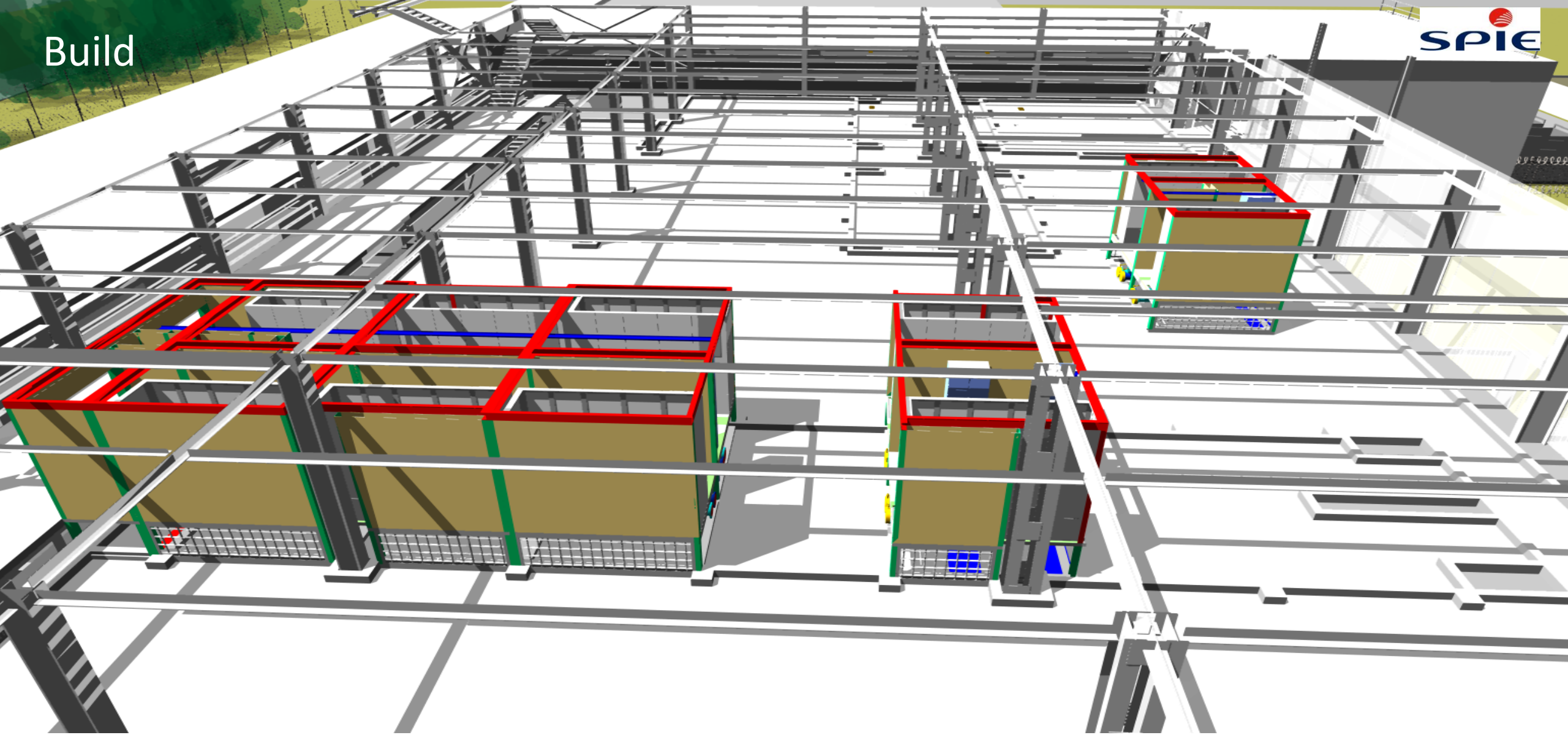
FIRST

Build



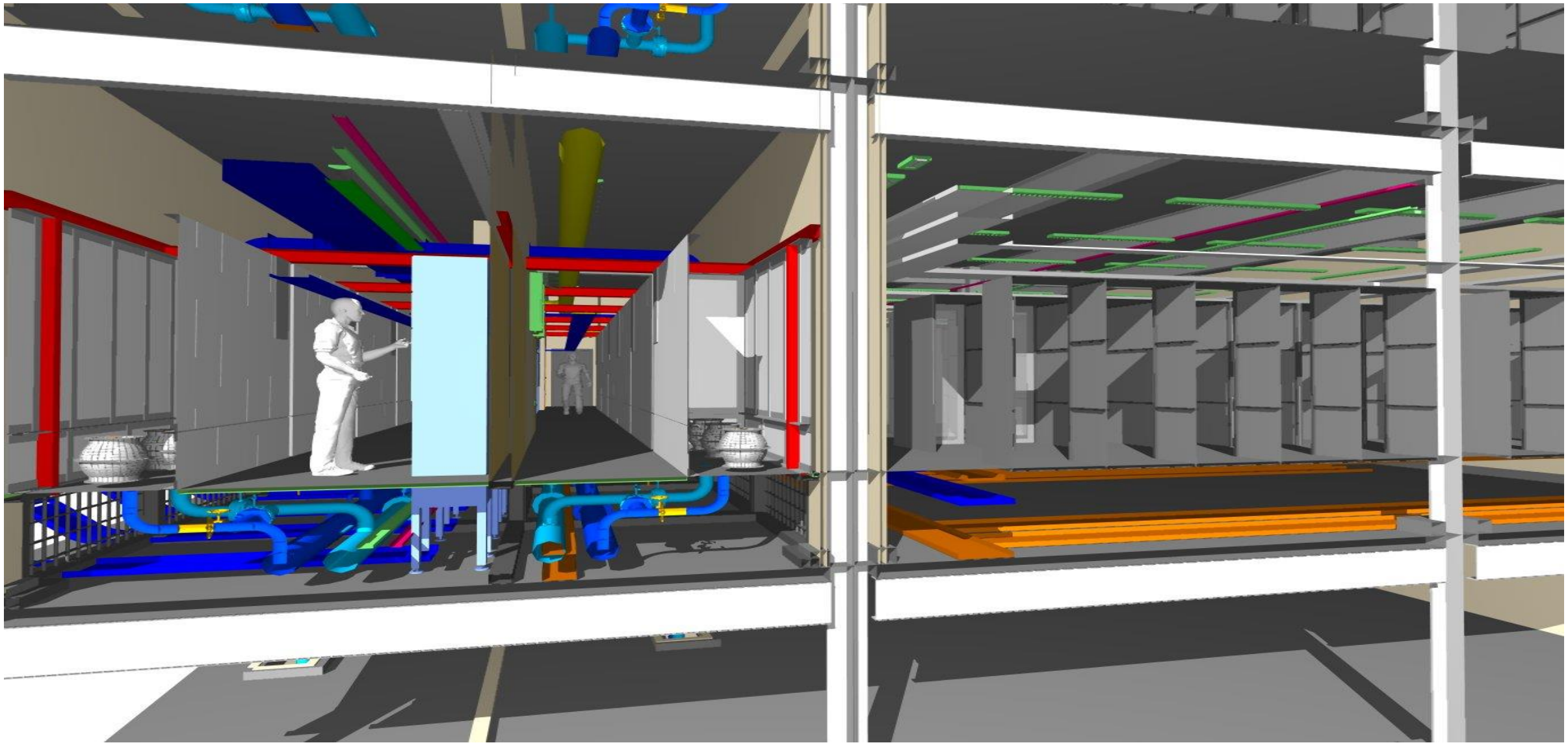
Shows – landing platform for plant

Build

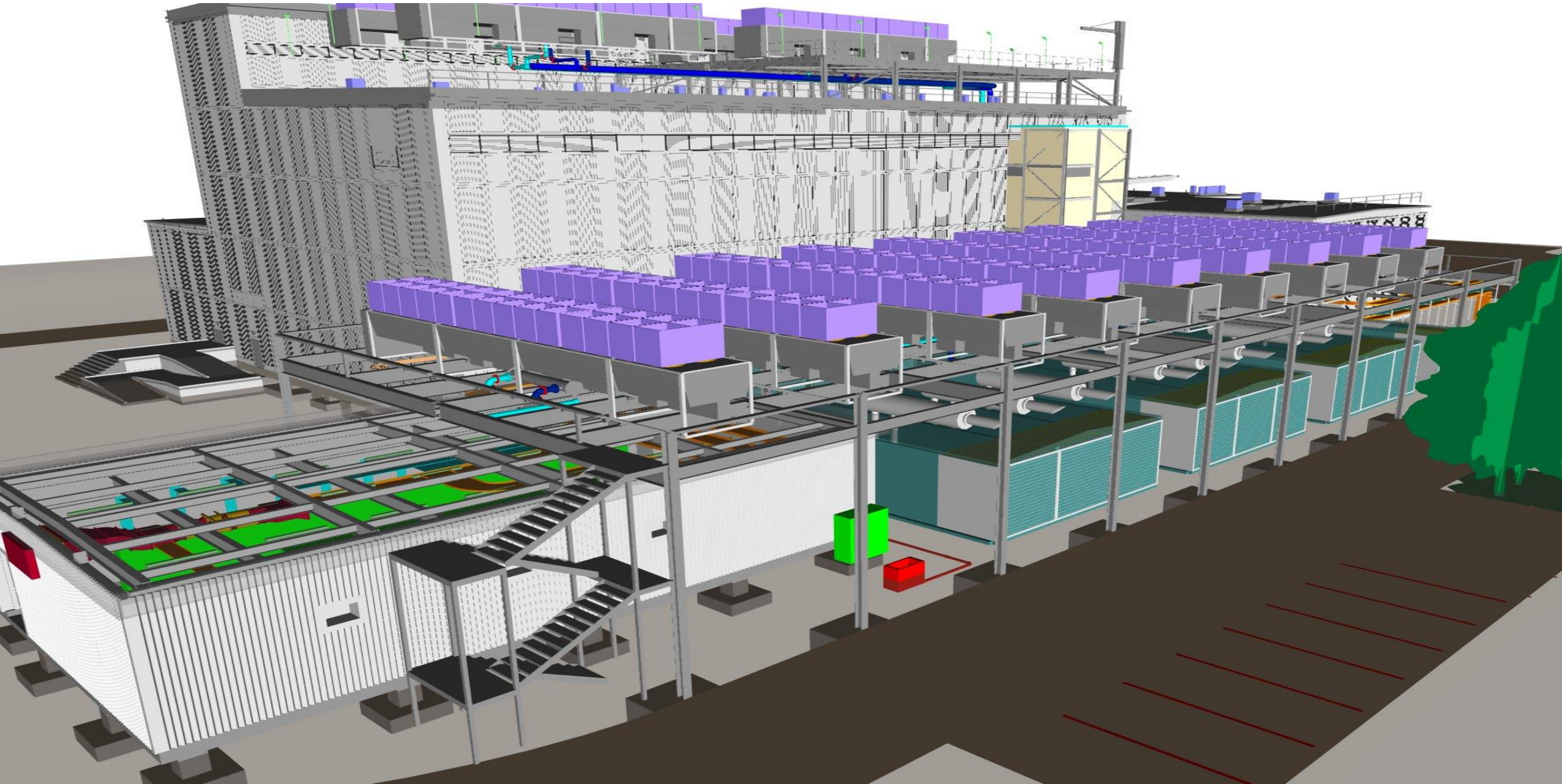


Shows – loading out the floors with plant modules inside new structure

Shows – Fit out of services and adjacent data hall



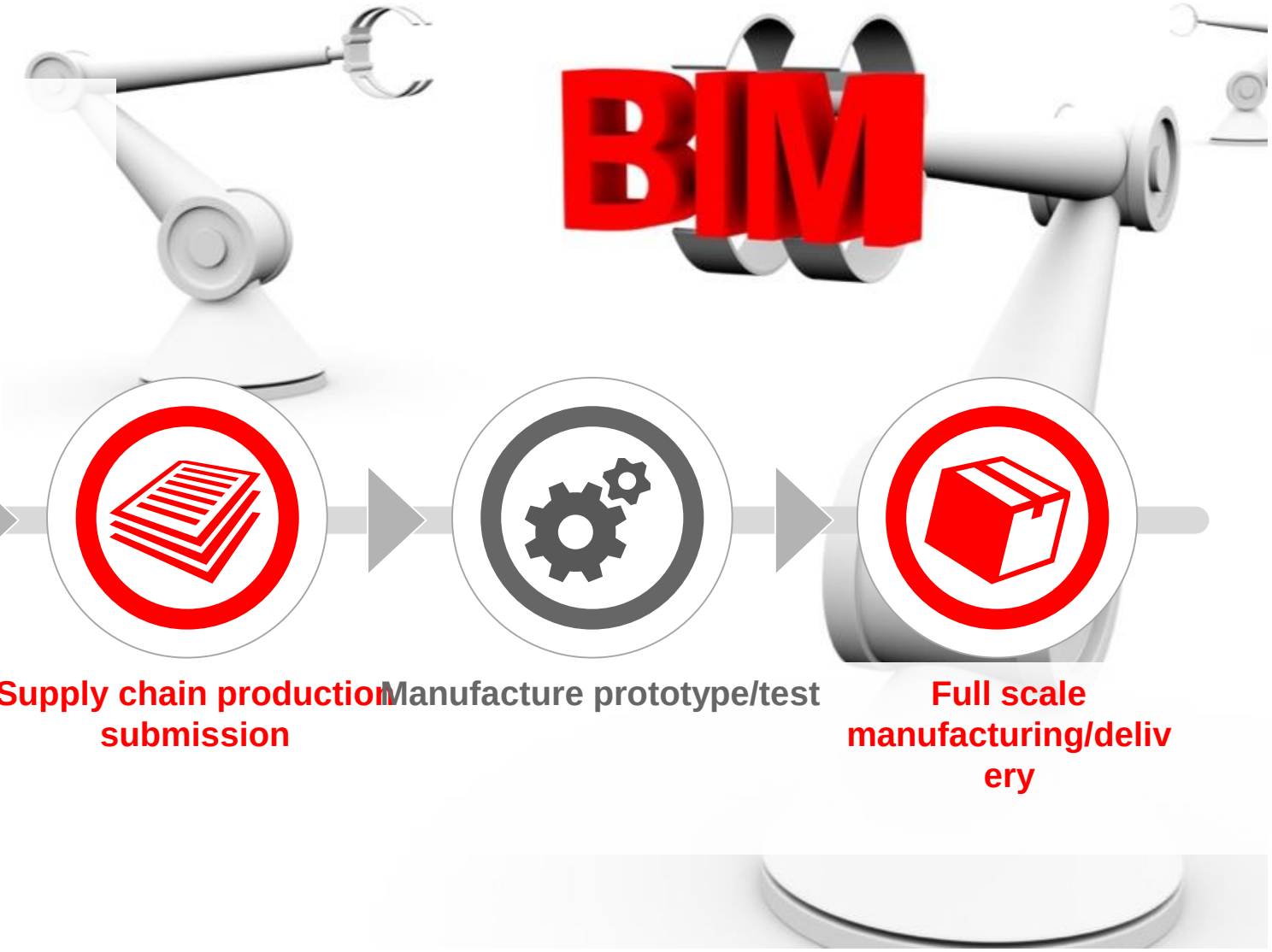
Completed facility with all the plant on the roof



OFF-SITE BUILD

IMPROVED PROJECT DELIVERY

SPIE incorporates offsite solutions early in the project delivery process



Establish supply chain options

Select manufacturing process

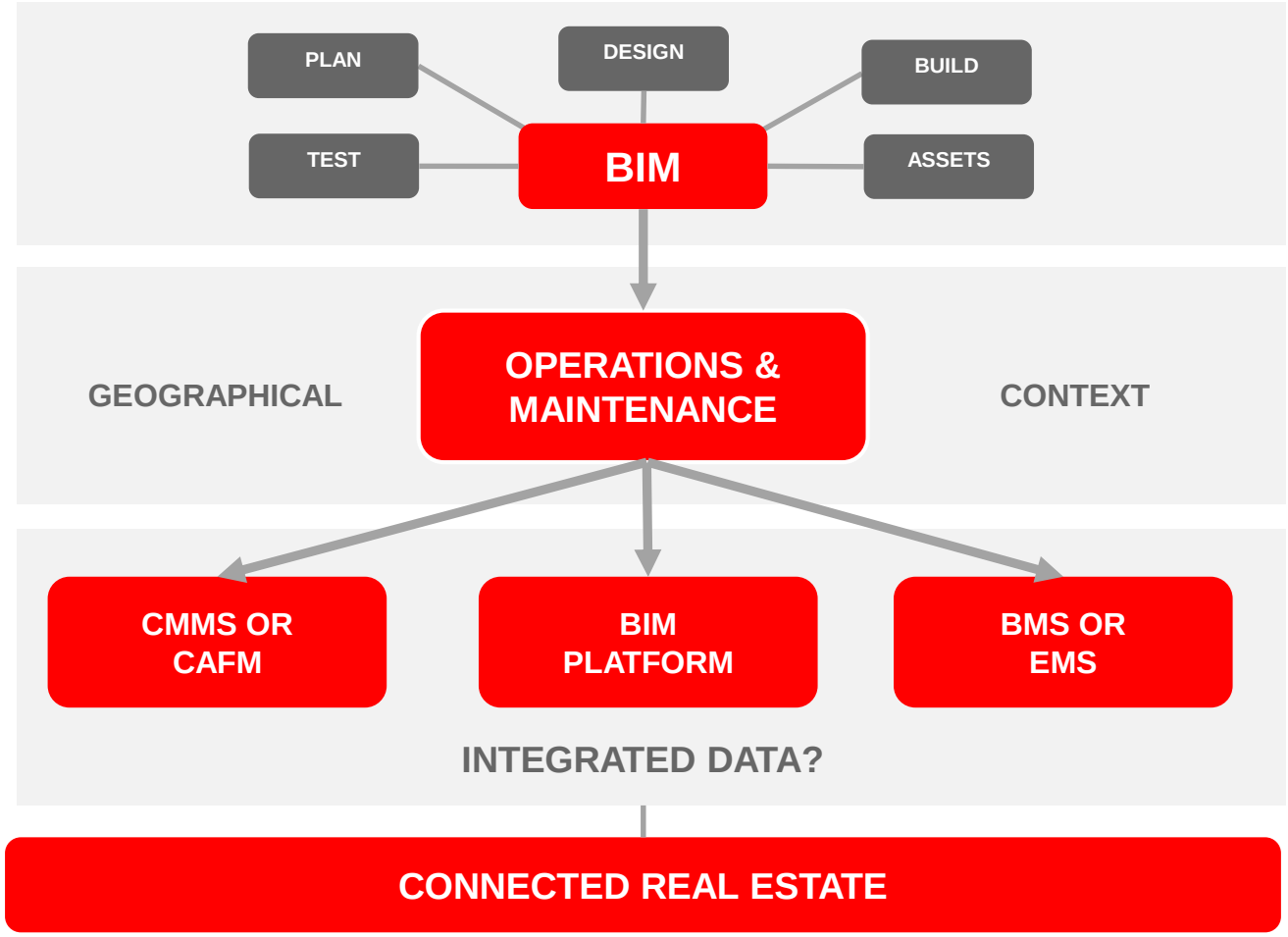
Supply chain production submission

Manufacture prototype/test

Full scale manufacturing/delivery

INNOVATION: JOIN UP BIM, CMMS & BMS

BE THE INTEGRATOR



CHALLENGES

- Offer real time building data integration
- Integrating the BMS information into the BIM format
- The iteration of BMS, CMMS and BIM into a unified building model



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