

# A Digitally Enabled Circular Economy

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FICE, FCI0B, FRICS, FInstCES

## The UK: A need for construction sector reform

*“Improve the efficiency of the construction sector through procurement reform, a more collaborative approach with earlier contractor involvement and better training.”*

*The Simon Report  
1944*

What will make History change now when it has failed before?

***“We believe that an essential step is for suppliers, clients and Government to adopt a new vision for the industry based on the concept of the built environment. This means understanding how value is created over the whole life cycle of an asset, rather than simply looking at the building cost, which is only a part of the total equation.”***

***Never Waste a Good Crisis***

*A Review of Progress since Rethinking Construction and Thoughts of Our Future*



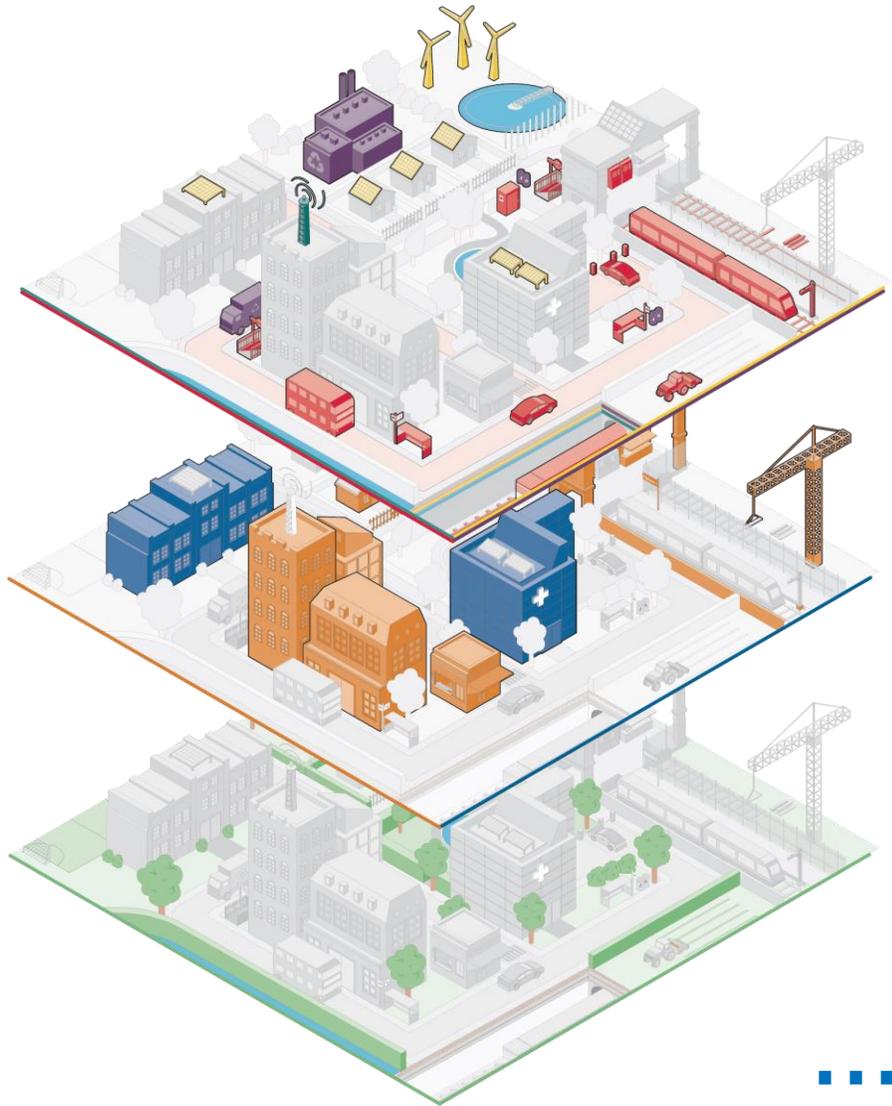
A close-up photograph of Paul Morrel, an older man with white hair and glasses, wearing a blue and white checkered shirt. He is looking slightly to the left and has his right hand raised near his chin, appearing to be in the middle of a speech or presentation. The background is dark and out of focus.

***“The requirement for low carbon construction is probably the biggest change management programme that the industry has faced since Victorian times.”***

***Paul Morrel***

*The UK Government's first Chief Construction Adviser  
(2009 to 2012)*

# Flourishing systems



Economic infrastructure

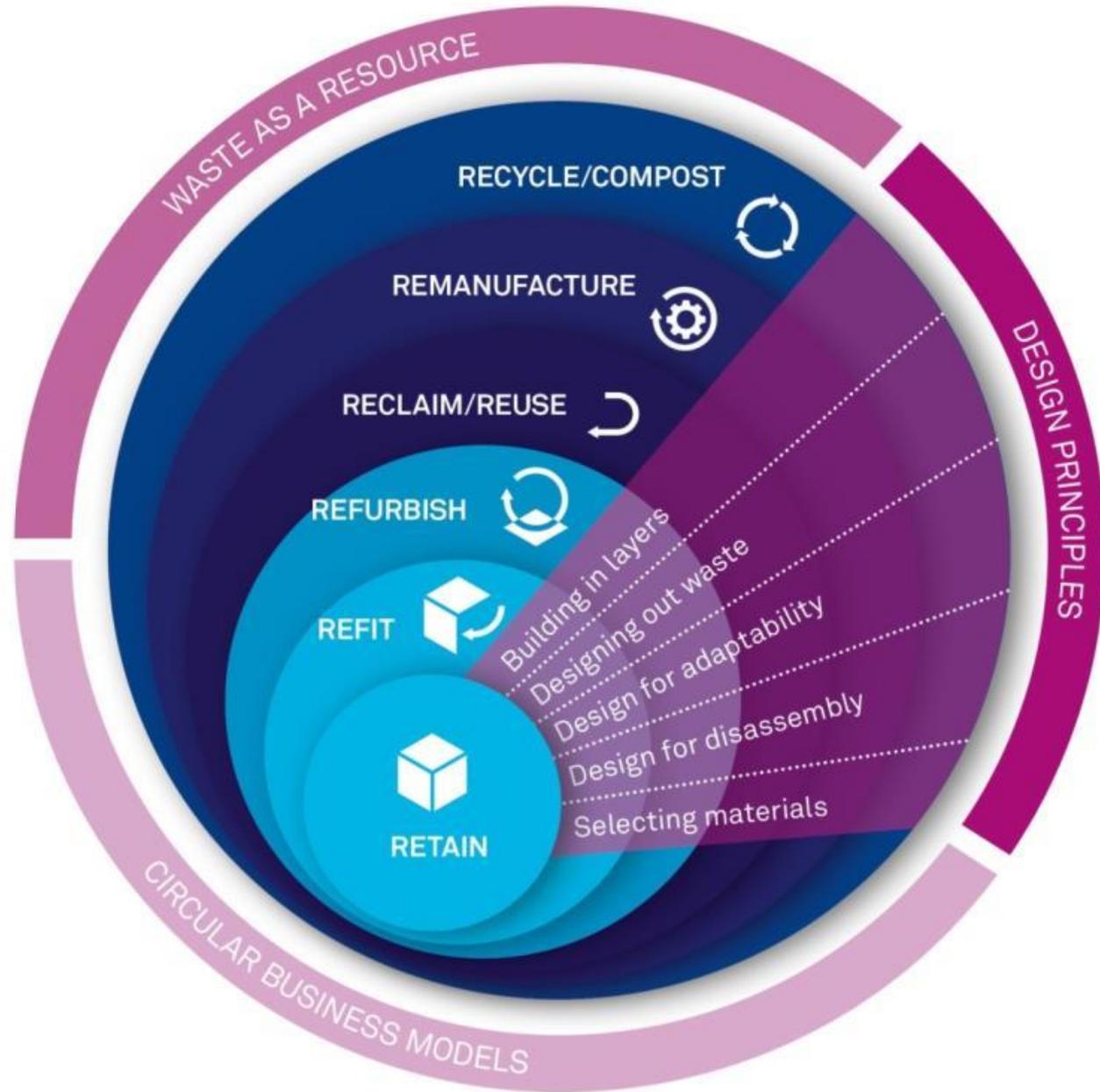
Social infrastructure

Natural environment



Built environment (a interconnected system of systems)

## ... for human flourishing



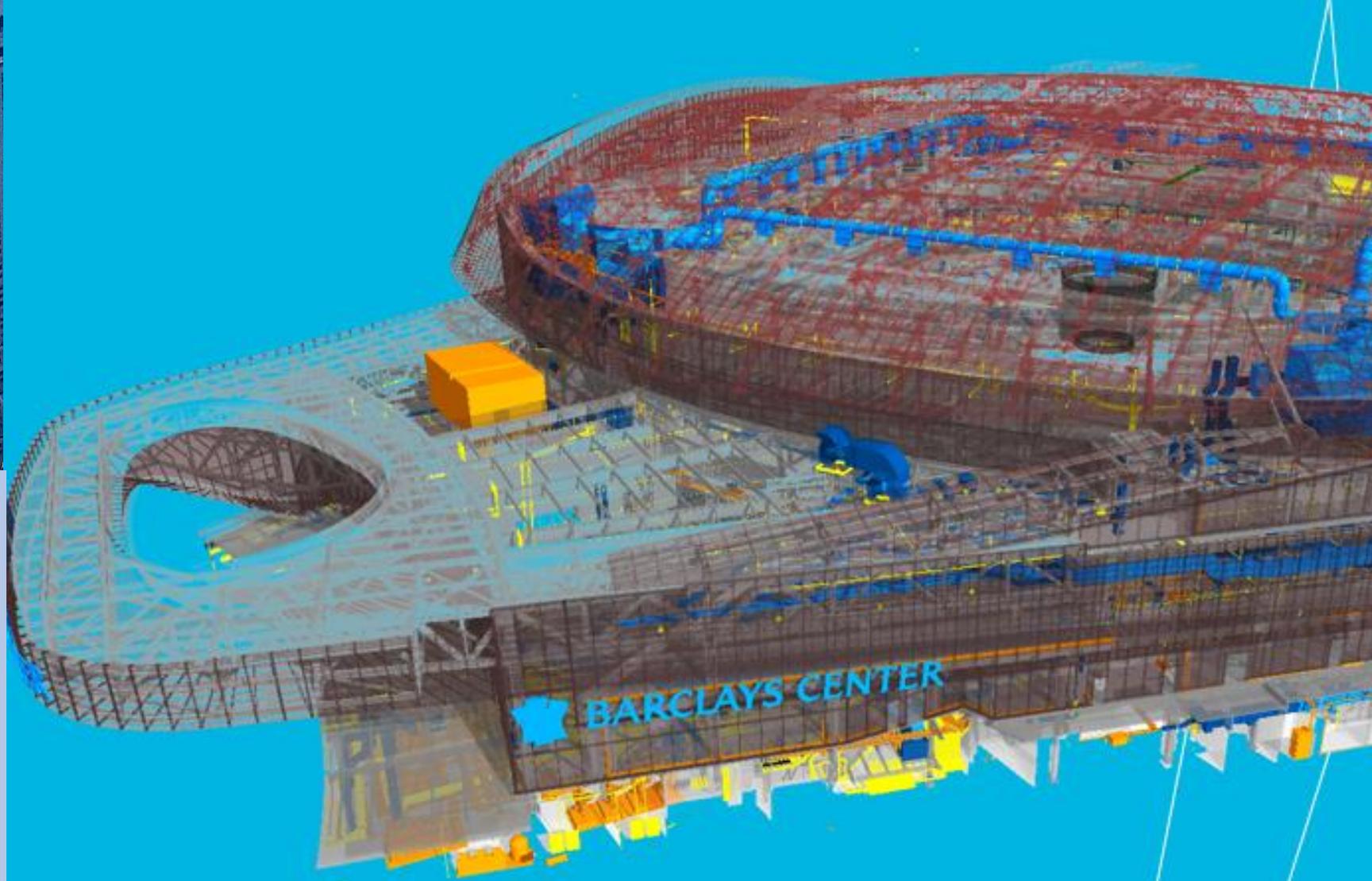
David Cheshire,

**AECOM**



**AECOM**

**THE** DIGITAL  
THREAD  
**OF DATA**



**FRICITIONLESS DATA  
DATA CONTINUITY**



# Lower emissions

# 50%

reduction in greenhouse gas emissions in the built environment

## Building Sustainably

## Policy Alignment

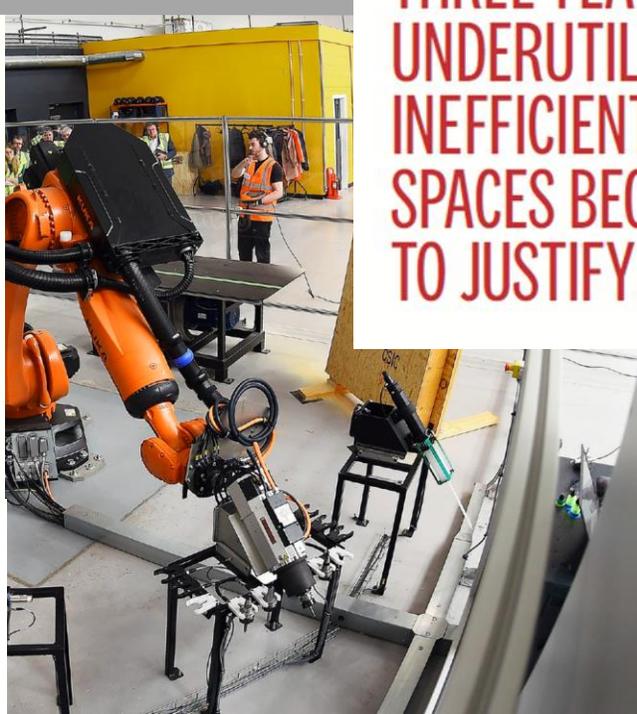
DEMAND FOR SMART BUILDINGS WILL GROW OVER THE NEXT THREE YEARS AS UNDERUTILIZED AND INEFFICIENT WORK SPACES BECOME HARDER TO JUSTIFY FINANCIALLY

# Faster delivery

# 50%

reduction in the overall time, from inception to completion, for newbuild and refurbished assets

## Advancing Industrialisation



# Lower costs

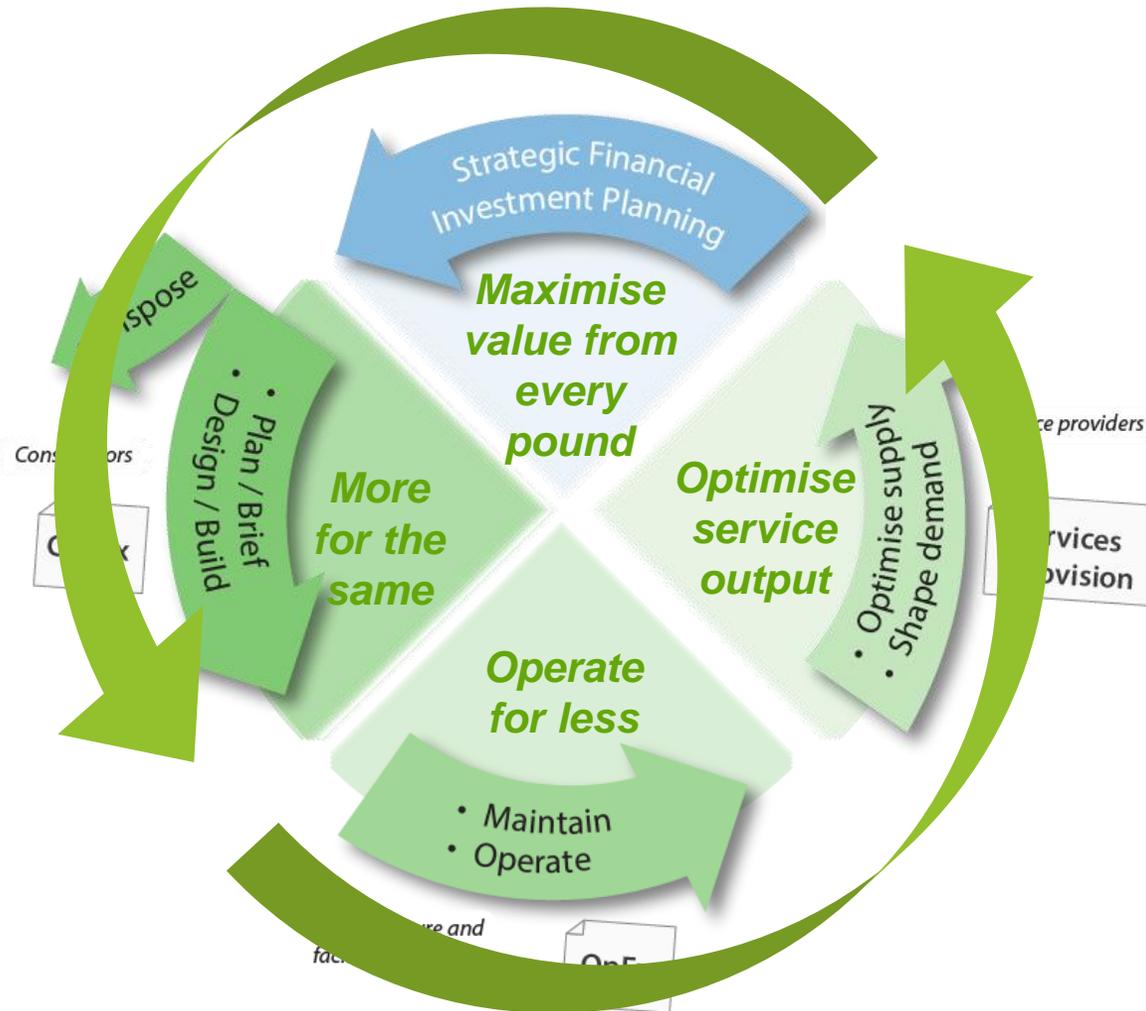
# 33%

reduction in the initial cost of construction and the whole life cost of built assets

## Higher Performing Built Assets

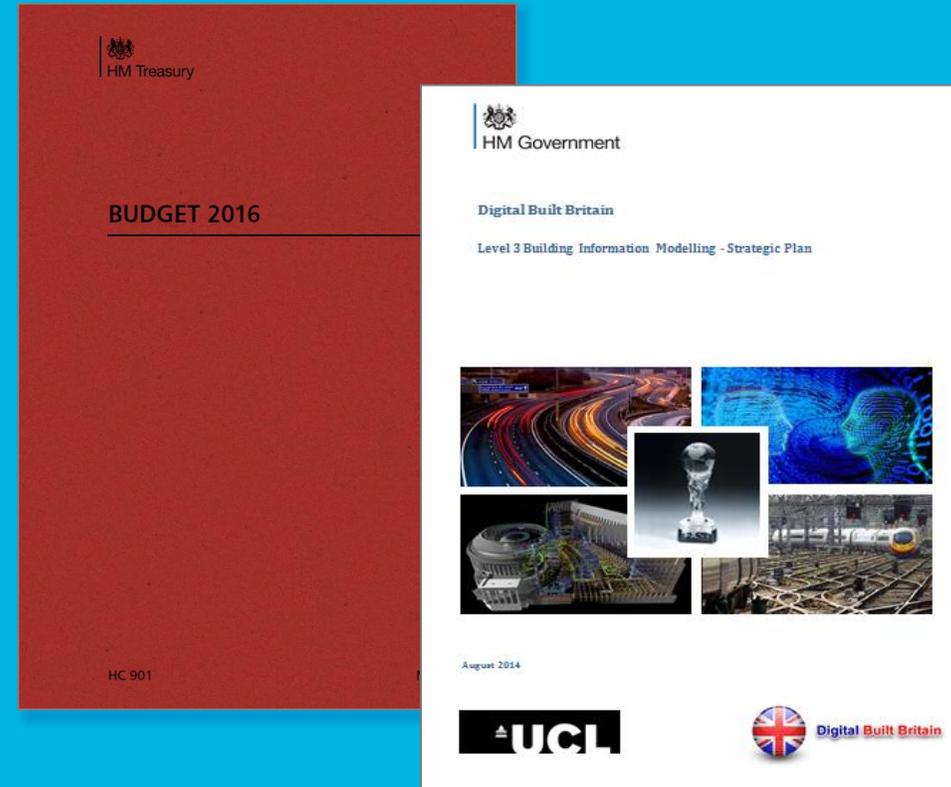
# We are witnessing a shift

UK' move towards sector digitization



## 2.3.22 Digital standards in construction

- The government will develop the next digital standard for the construction sector – Building Information Modelling 3 – to save owners of built assets billions of pounds a year in unnecessary costs, and maintain the UK's global leadership in digital construction.



# Measurement & Feedback

Doing more for less



BIM / IM / CDE  
Smart Assets



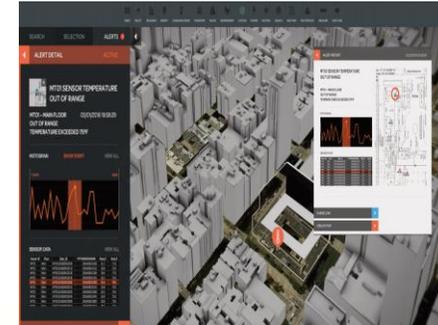
BIM & GIS & PMO



Digital Twin



Digital Estate



Whole life system performance

Whole life asset performance

Doing more with what we already have

Better measurement, insight and investment decision making

Capital efficiency of programmes

Capital efficiency of projects

Maturity



# Aecom launches virtual public consultation tool

Aecom has launched a virtual public consultation tool. Through the new platform, a virtual event can be personalised to show consultation materials, including virtual reality and sound demonstrations, videos, maps, plans and pop-up banners. The tool allows for instant feedback so public reaction can be captured and saved for analysis and accurate reporting.

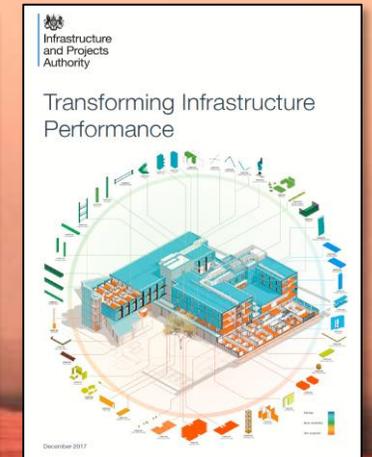
There is also a chat function so on-hand experts can answer questions remotely as visitors look around the materials, similar to what would take place during an in-person event.

The digital engagement tools enable stakeholders and communities to understand proposals, so as to provide an informed response and participate in the consultation process. This tool means that process can reach a wider audience for more widespread buy-in for major infrastructure projects.

# Government Soft Landings (GSL)

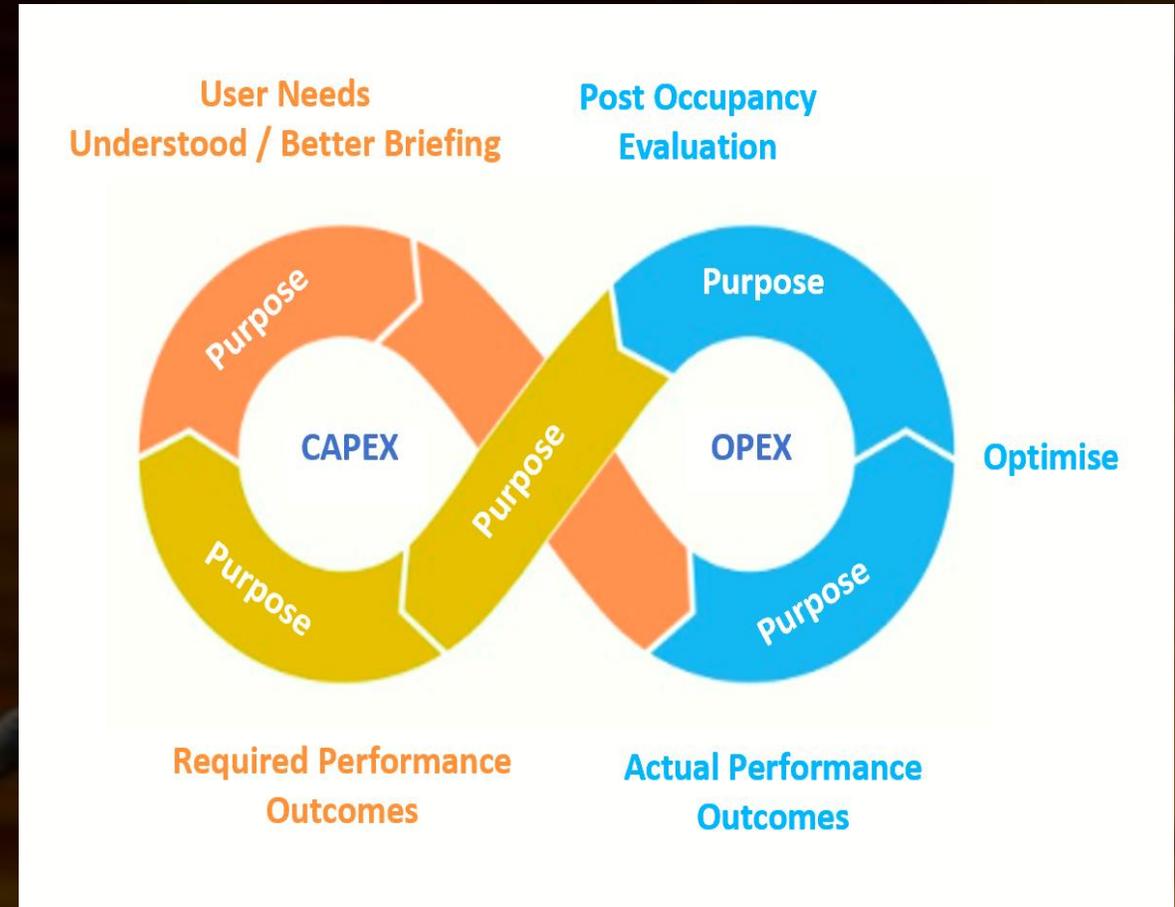
## Background

“ The need to improve the value offered by construction has been a key objective of Government with the specific goal *“to align interests between those who design and construct an asset and those who subsequently use it.”* ”



# HM Government continues to support

*“GSL reminds us that we design and construct to aid the performance of our facilities. This creates the best possible opportunity for outcomes to be delivered. By setting and monitoring performance targets we can ensure that the facilities are productive and deliver value for money for the taxpayer. A framework upon which to build an appropriate pathway to support their operational objectives”*

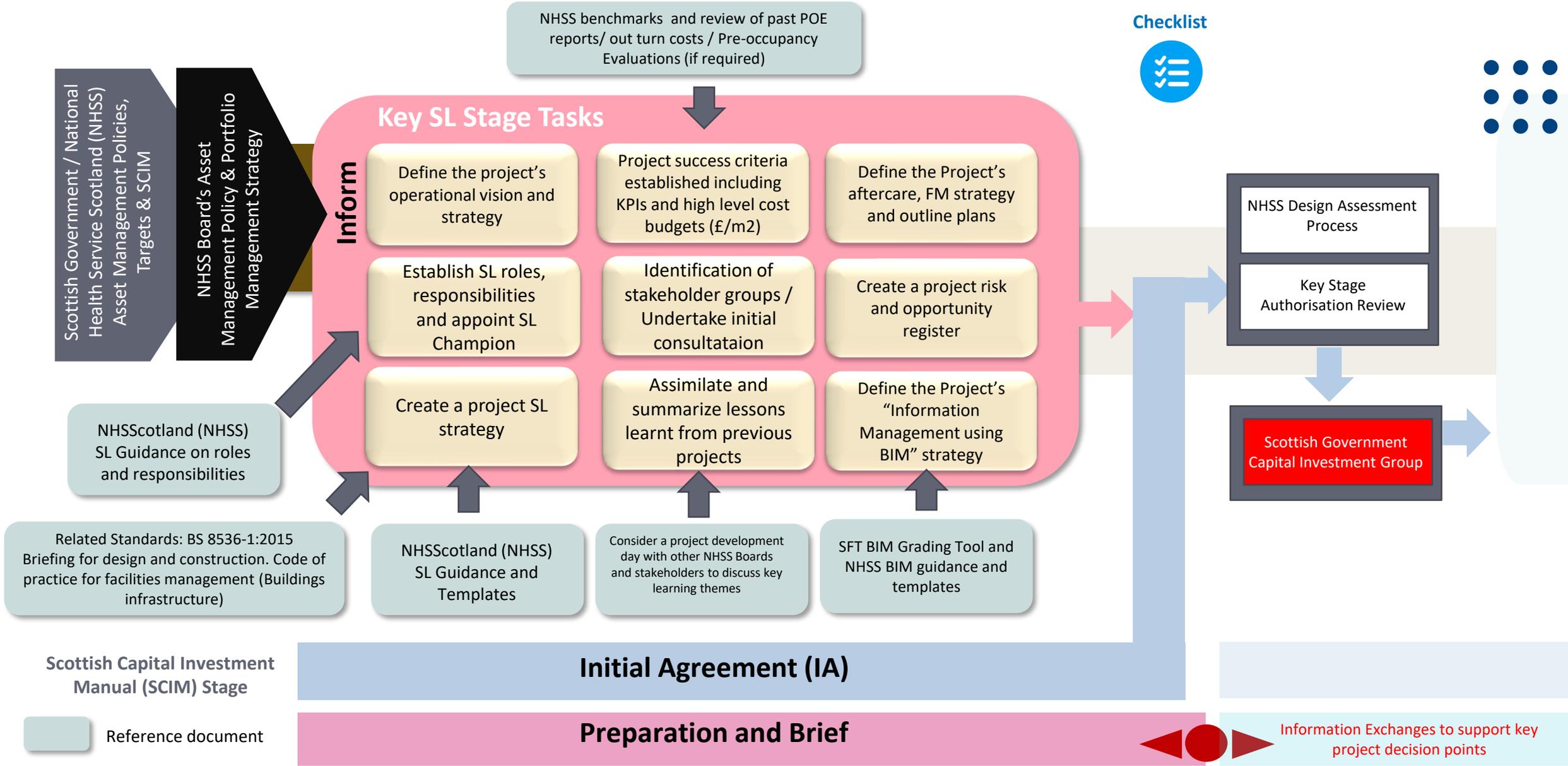


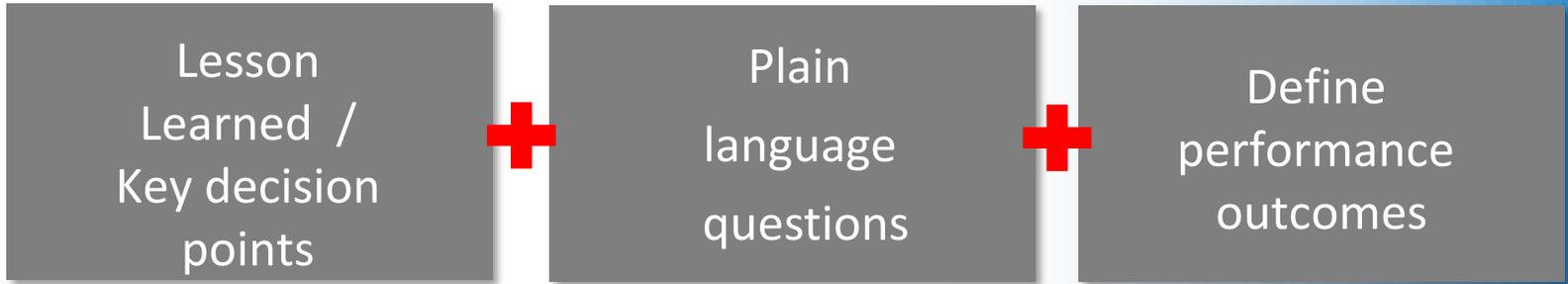
**Dr. David Handcock**

Construction Director

Infrastructure and Projects Authority

Cabinet Office

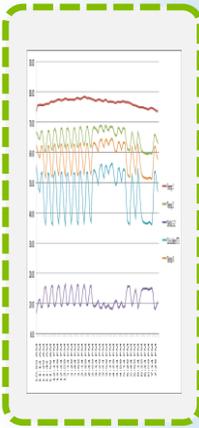
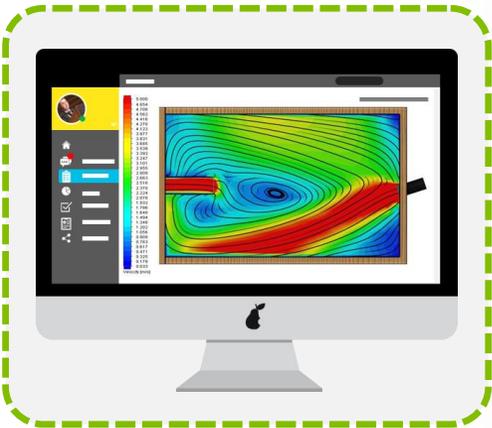




Exchange Information Requirements



Simulate and Analyse  
Proposed Design Versus Target Performance



Compare  
Actual Data  
Logs v Targets



Monitor  
Performance &  
Fine Tune

A convergence of  
BIM and Soft Landings

# The Digital Estate

What is it?

is an information management led approach which facilitates the digitisation, integration and curation of appropriate digital models (unifying existing data and records) to enable efficient management of NHSS real-estate portfolios.

The NHSS digital estate can provides an enterprise level source of searchable reliable information about the boards assets supporting joined-up decision making, dynamic insights and ultimately supporting better healthcare outcomes.

A network diagram with various icons representing digital assets and healthcare facilities. The icons include a laptop, a smartphone, a Wi-Fi symbol, a hospital building, a bus, and a server rack. The background is a blurred image of a cityscape at night with a blue and purple color palette.

Getting the most out of existing NHSS assets means improving how Health Boards produce, manage and use data. This is combined with integrated technologies and systems to inform strategic asset management and facilities management.

# Welcome to NHSScotland Digital Estate

Search  
[Advanced Search](#) [Search Tips](#)

### Links

Assets	Bids	Hierarchy	Locations
Map	Saved Searches	My Recent Documents	Help

### My Recent Spaces

- Glasgow Royal Infirmary
  - Surgical Block Refurb
  - NHS Greater Glasgow & Clyde
  - Bo'ness Hospital
- [Show in listing](#)

### My Dashboard

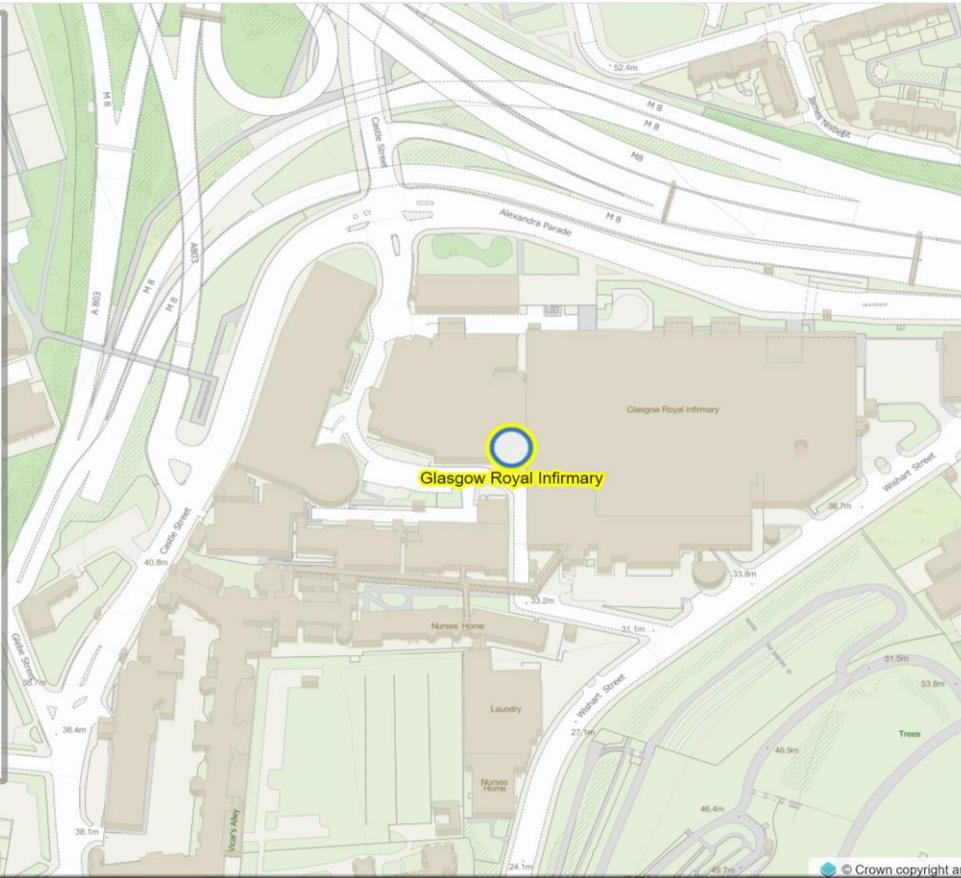


Home

MY SPACES

Filter map by categories:

- NHS Board
  - Ayresshire & Arran
  - Borders
  - Dumfries & Galloway
  - Eileanar Sire Western Isles
  - Fife
  - Forth
  - Grampian
  - Greater Glasgow & Clyde
  - Highland
  - Lanarkshire
  - Lothian
  - Orkney
  - Shetland
  - Tayside



SELECTED (1) CLEAR

- Glasgow Royal Infirmary
  - Asset**
  - Name**  
Glasgow Royal Infirmary
  - Description**  
Glasgow Royal Infirmary
  - Category**  
NHS Board / Greater Glasgow & Clyde
  - Project Code**  
1234
  - Geo Location**  
GPS:55.865189, -4.233482
  - Geo Location Icon**  
null
  - Tenure**  
null
  - Use**  
null
  - Address**  
84 Castle Street
  - Town**  
Glasgow

NHS SCOTLAND powered by bc

Folder in Asset: Glasgow Royal Infirmary

# Health and Safety File

Listing

+ Add Actions Workflow Filter Refresh Cut Copy Paste Download Delete Drop Files Here

### 01. Introduction



- 1.1 Purpose and Use
- 1.2 Description and Diary
- 1.3 Audit Checklist

### 02. Cleaning/Maintenance



- 2.1 Access Strategies
- 2.2 Specialist Requirements
- 2.3 Plant Requirements
- 2.4 PPM Schedules
- 2.5 O&M Manuals Schedule

### 03. As-Built Information



- 3.1 Architectural
- 3.2 Structural
- 3.3 Drainage
- 3.4 Electrical
- 3.5 Mechanical
- 3.6 Sprinklers
- 3.7 Refridgeration
- 3.8 Transportation
- 3.9 Statutory & Utilities
- 3.10 Highways

### 04. Certificates



- 4.1 Architectural
- 4.2 Structural
- 4.3 Drainage
- 4.4 Electrical
- 4.5 Mechanical
- 4.6 Fire System
- 4.7 Refridgeration
- 4.8 Transportation
- 4.9 Miscellaneous

### 05. Residual Hazards



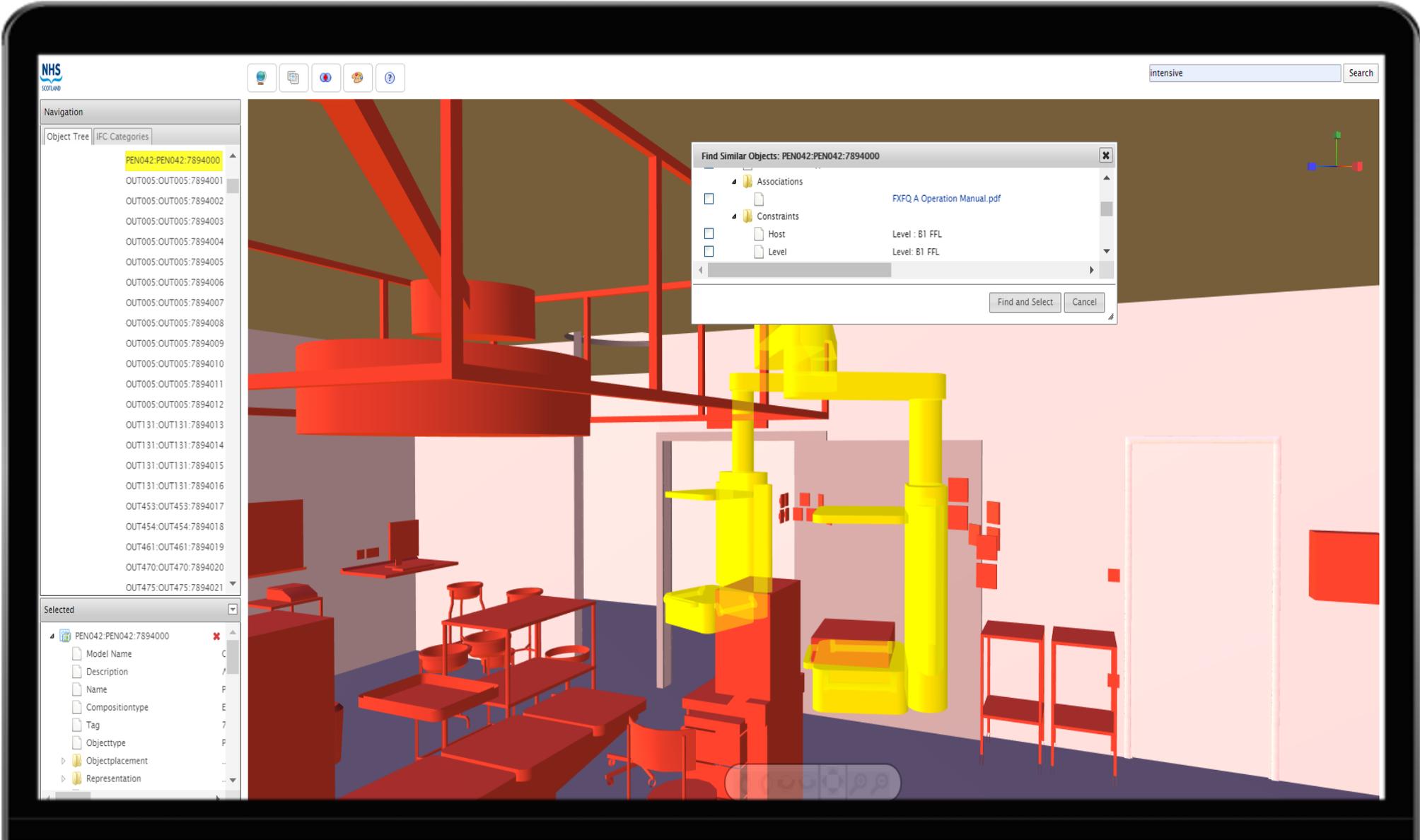
- 5.1 Structural Principals
- 5.2 Buried, Hidden & Overhead Services
- 5.3 Ground Contamination
- 5.4 Water Bearing Strata
- 5.5 Confined Spaces
- 5.6 Fragile Materials
- 5.7 Hazardous Materials
- 5.8 Health Hazards
- 5.9 High Pressure Systems
- 5.10 Restricted Access
- 5.11 Roof Lights
- 5.12 Other Significant Risks

### 06. Survey's/Remediation



- 6.1 Roof Survey
- 6.2 Geotechnical
- 6.3 Geo-environmental
- 6.4 Unexploded Ordnance
- 6.5 Pest Proofing
- 6.6 Acoustic
- 6.7 Radon
- 6.8 Flood Risk
- 6.9 Waste
- 6.10 Asbestos

NHS National Services Scotland



**Digital Twin**

**Frictionless Data Flow**

**Physical Twin**



**Data  
Analytics  
& Simulation**

**Real Time Data Feedback**

**Pervasive  
Sensing  
& Actuation**

# Optimise performance and predictive maintenance

**Digitally / IoT Supported Service Delivery Models**

Status Based Maintenance

Predictive Maintenance

Indoor air quality & ventilation

Lighting & Daylighting

Biophilia & Views

Thermal Comfort

Noise & acoustics

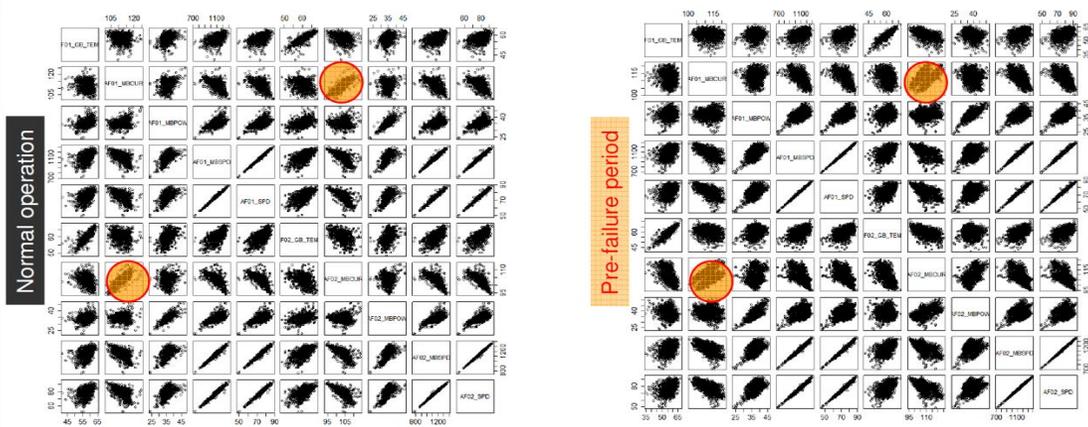
Interior layout & active design

Location & access to amenities

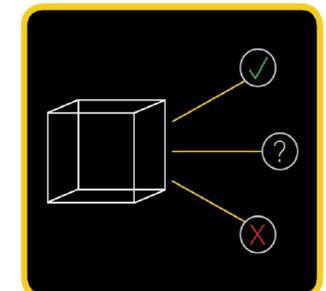
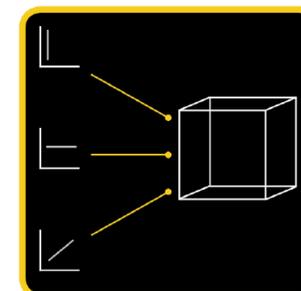
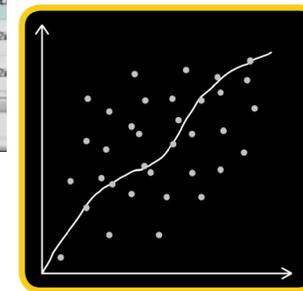
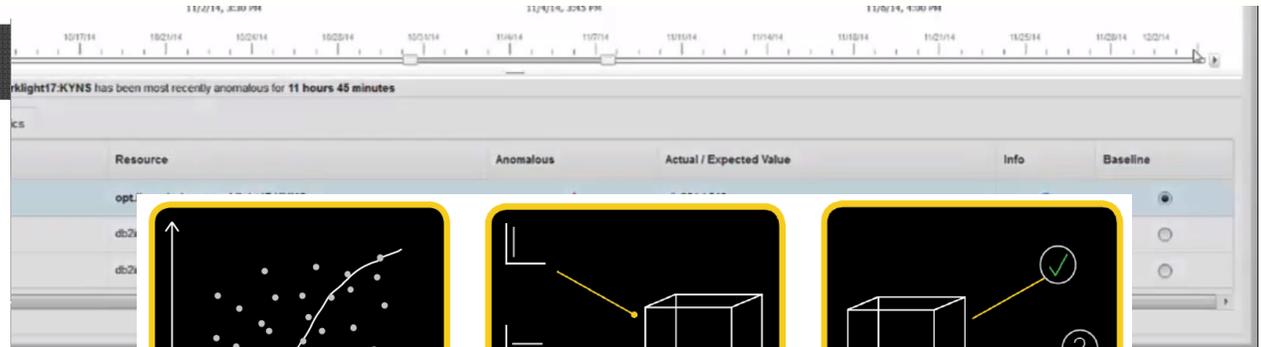


Example – pattern change on synchronous motor

AECOM IBM



Towards Cognitive Automation of Data Science



Data Patterns

Patterns models

Predictions

An aerial photograph of a city skyline at sunset. The sun is low on the horizon, casting a warm, golden glow over the city. The sky is filled with soft, wispy clouds. In the foreground, several tall skyscrapers are visible, including one with the AECOM logo on its roof. The overall scene is a mix of urban architecture and natural beauty.

**AECOM**

Imagine it.  
Delivered.

Thank You For Listening

David Philp - AECOM