



UK Government – Building A New World

Digital Built Britain – Programme Overview

Dr Mark Bew MBE



Introduction

The productivity opportunity in construction

Construction matters for the world economy ... but has a long record of poor productivity

Construction-related spending accounts for **13%** of the world's GDP ...but the sector's annual productivity growth has only increased **1%** over the past 20 years

\$1.6 trillion of additional value added could be created through higher productivity, meeting half the world's infrastructure need

Construction is a sector of two halves

Fragmented specialized trades drag down the productivity of the sector as a whole

Construction productivity by subsector (Value added per employee, indexed total sector=100, 2013)

Subsector	% of construction value added
Total	100
Building	23
Civil	21
Industrial	4
Specialized	52

Action in seven areas can boost sector productivity by 50-60%

- Reshape regulation
- Rewire contracts
- Rethink design
- Improve procurement and supply chain
- Improve onsite execution
- Infuse technology and innovation
- Reskill workers

5-10x productivity boost possible for some parts of the industry by moving to a manufacturing-style production system

MCKINSEY GLOBAL INSTITUTE | McKinsey&Company

"This Government's four year strategy for BIM implementation will change the dynamics and behaviours of the construction supply chain, unlocking new, more efficient and collaborative ways of working. This whole sector adoption of BIM will put us at the vanguard of a new digital construction era and position the UK to become the world leaders in BIM."

Francis Maude
Minister for the Cabinet Office



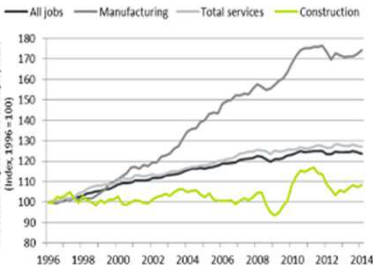
Lower costs
33%
reduction in the initial cost of construction and the whole life cost of built assets

Lower emissions
50%
reduction in greenhouse gas emissions in the built environment

Faster delivery
50%
reduction in the overall time, from inception to completion, to rebuild and refurbished assets

Improvement in exports
50%
reduction in the trade gap between total exports and total imports for construction products and materials

— All jobs — Manufacturing — Total services — Construction



2.9m people employed

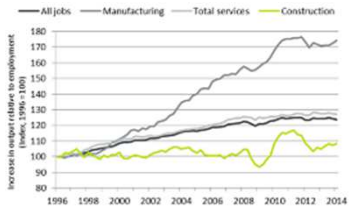
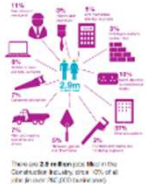
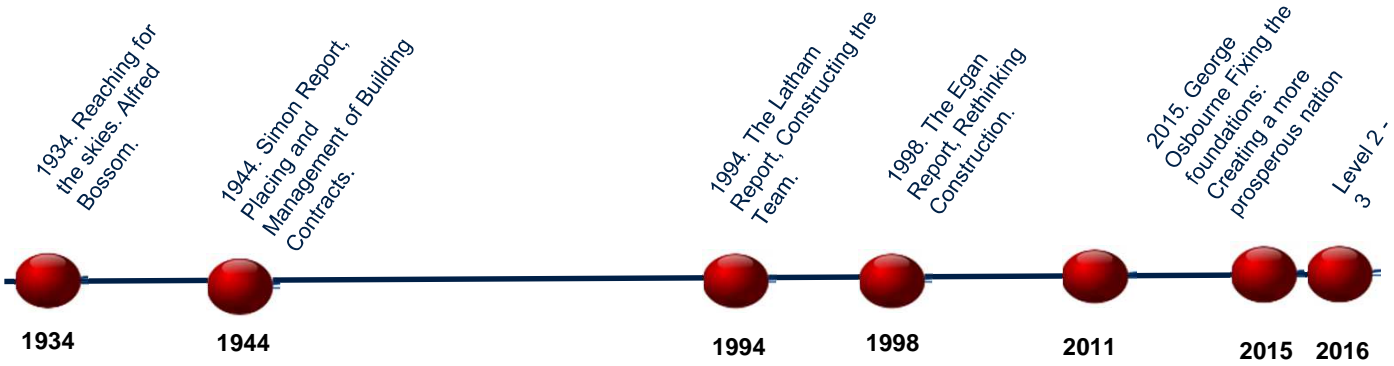
- 11% Executive and managers
- 3% Planners and coordinators
- 5% Civil, mechanical, electrical engineers
- 3% Brokers, masons, roofer, fitter
- 10% Metal, electrical and mechanical trades
- 37% Other occupations
- 5% Plumbers and heating and ventilating engineers
- 5% Planners, glaziers and other trades
- 7% Paint and machine operatives and drivers
- 7% Carpenters and joiners
- 6% Architects, town planners, surveyors

90bn

Construction contributes nearly **£90bn** to the UK economy, 6.7% of the total



Introduction

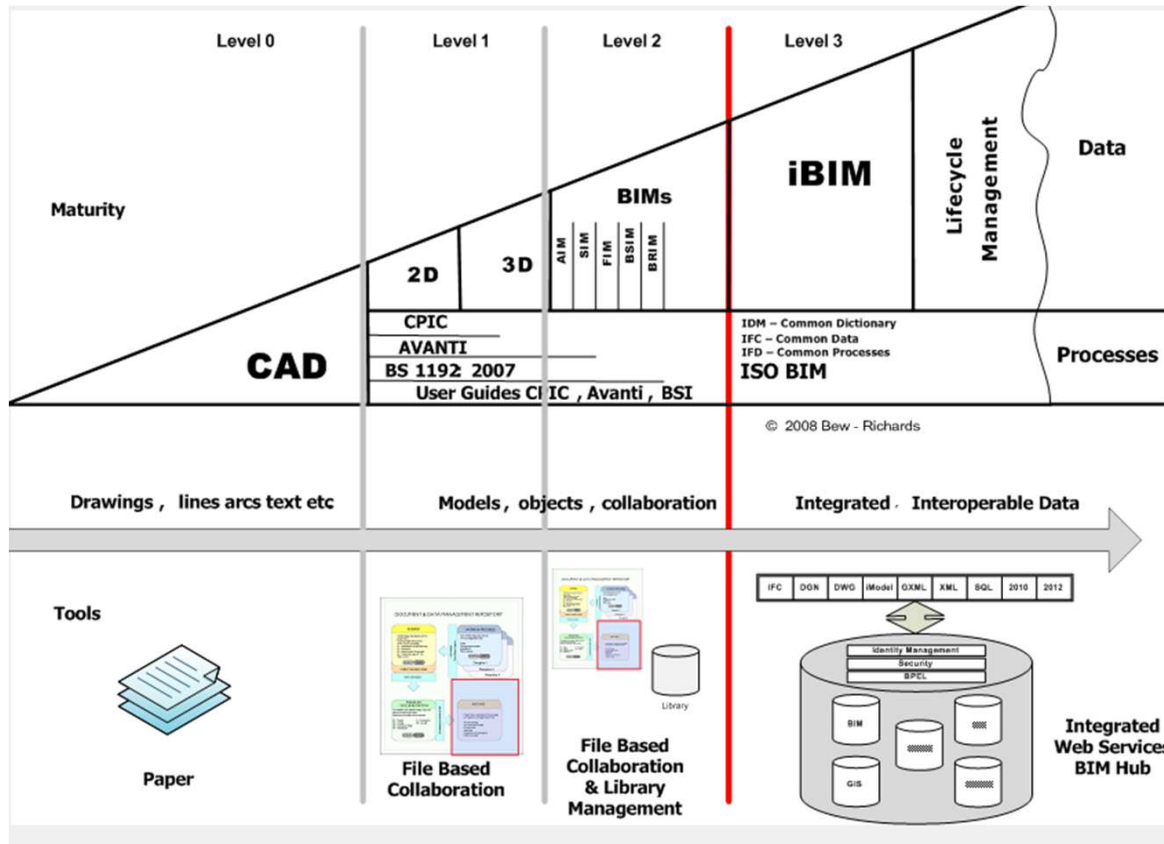


- ▶ Benchmarking
- ▶ Procurement Methods
- ▶ Government Soft Landings
- ▶ DfMA / Manufacturing
- ▶ Intelligent Client
- ▶ Fiscal Constraint
- ▶ Increasing Productivity

Since 1934 c70 reports have been issued on UK construction efficiency

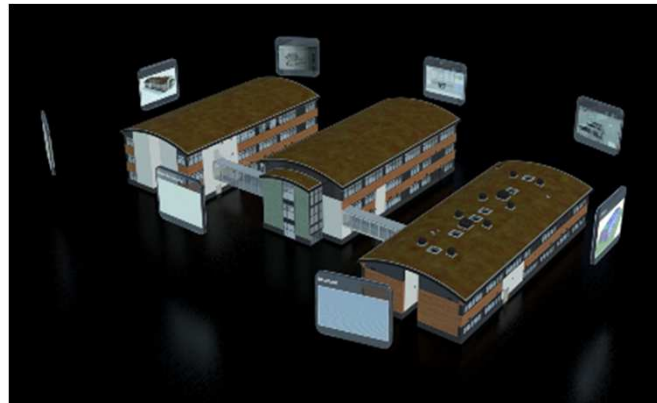


What is BIM?

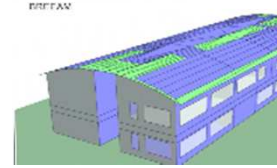
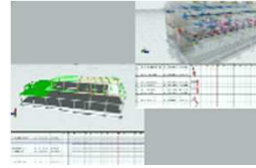
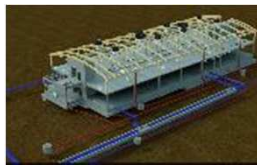
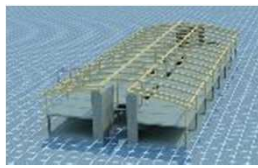
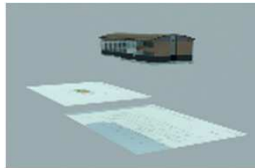


What is Level 1 BIM?

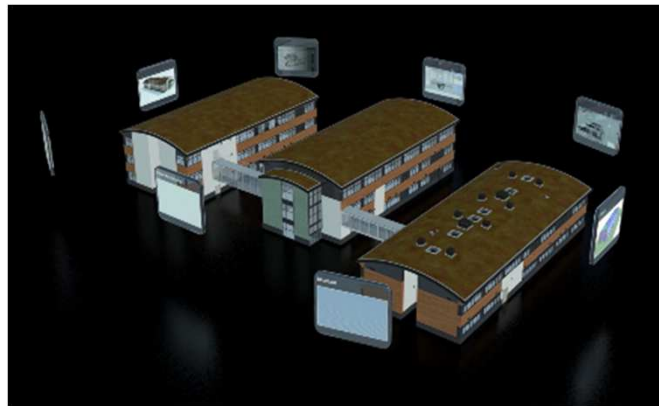
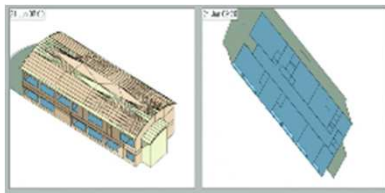
- Drawings
- Schedules
- Programmes
- Bills of Quantities
- Letters
- Emails
- Social Media
- Calculations
- Video



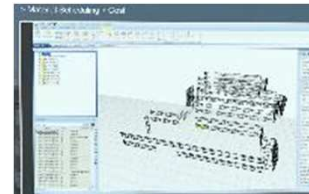
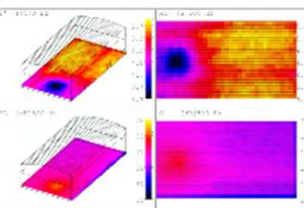
What is Level 2 BIM?



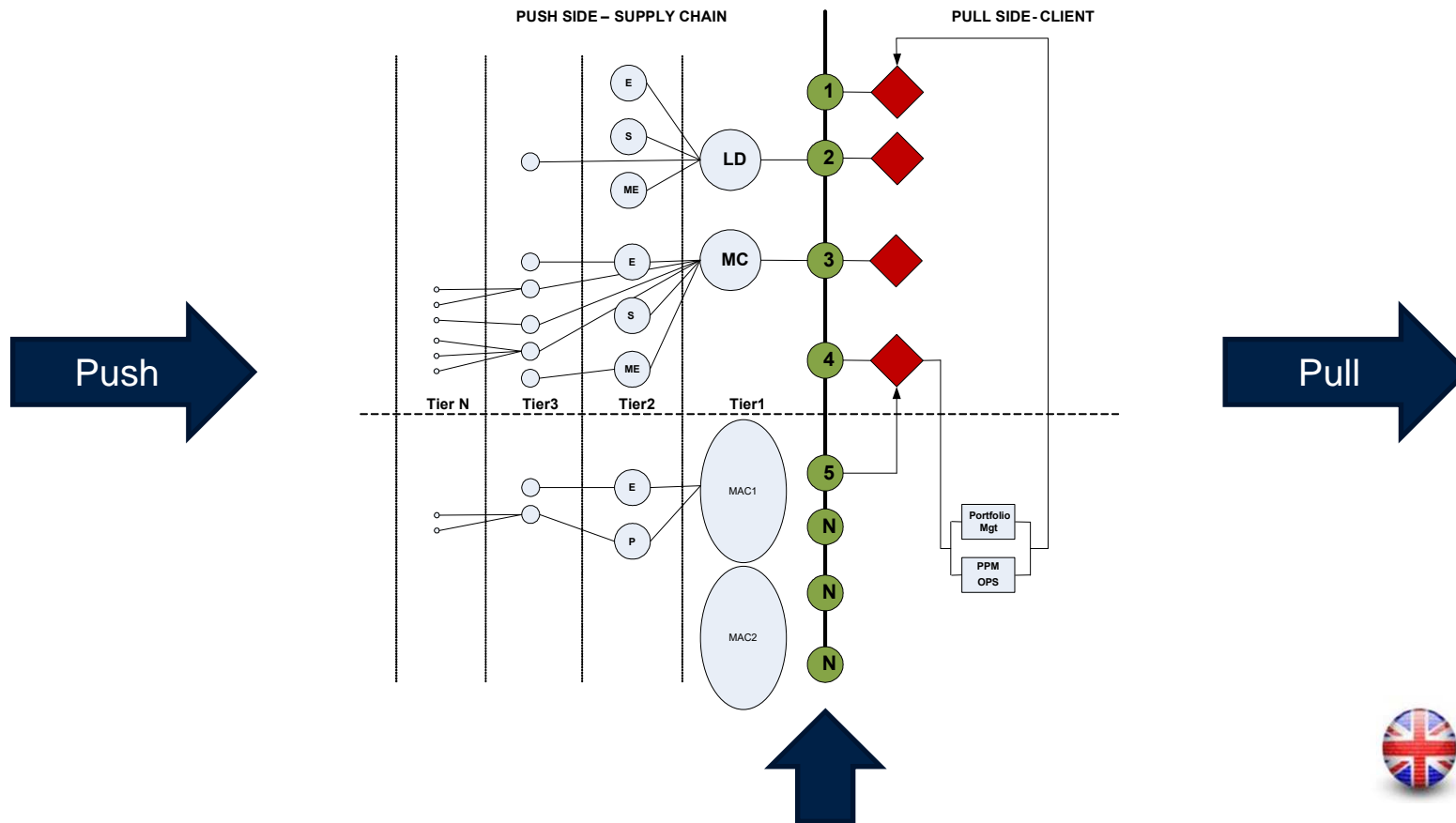
PEOS



Appearance



Push & Pull



Level 2 BIM “Package”

- ▶ PAS1192:2 Capital Delivery
- ▶ PAS1192:3 Operational Delivery
- ▶ BS1192:4 Data Structure
- ▶ Data Classification
- ▶ Digital Plan of Works (Levels of Data Detail)
- ▶ **PAS1192:5 Security**
- ▶ BIM Contract Protocol
- ▶ Government Soft Landings



bsi.

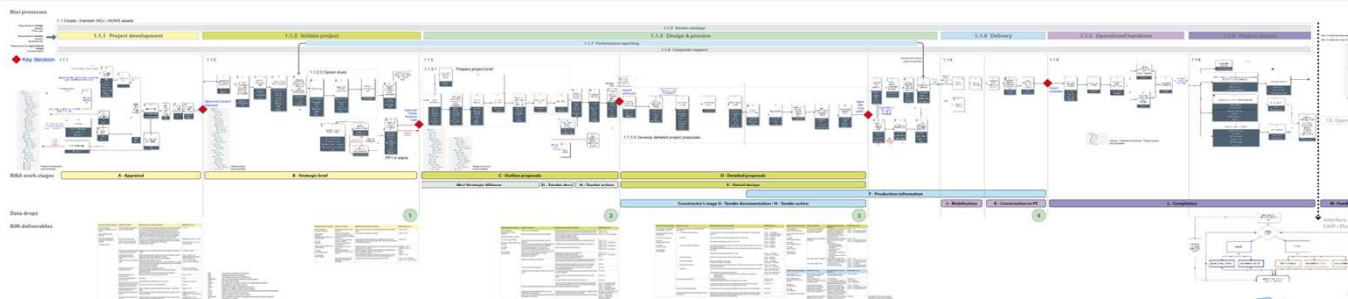


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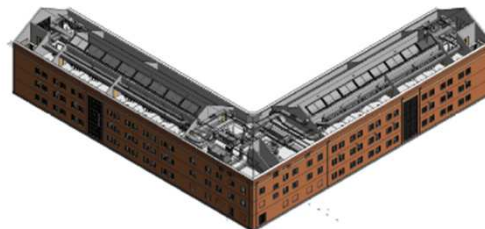
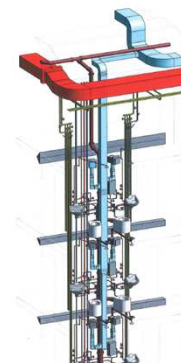
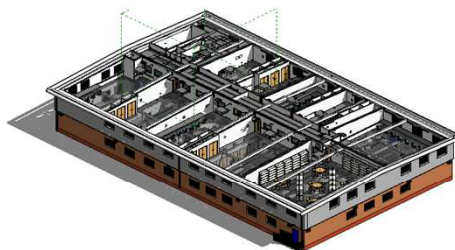


bsi.

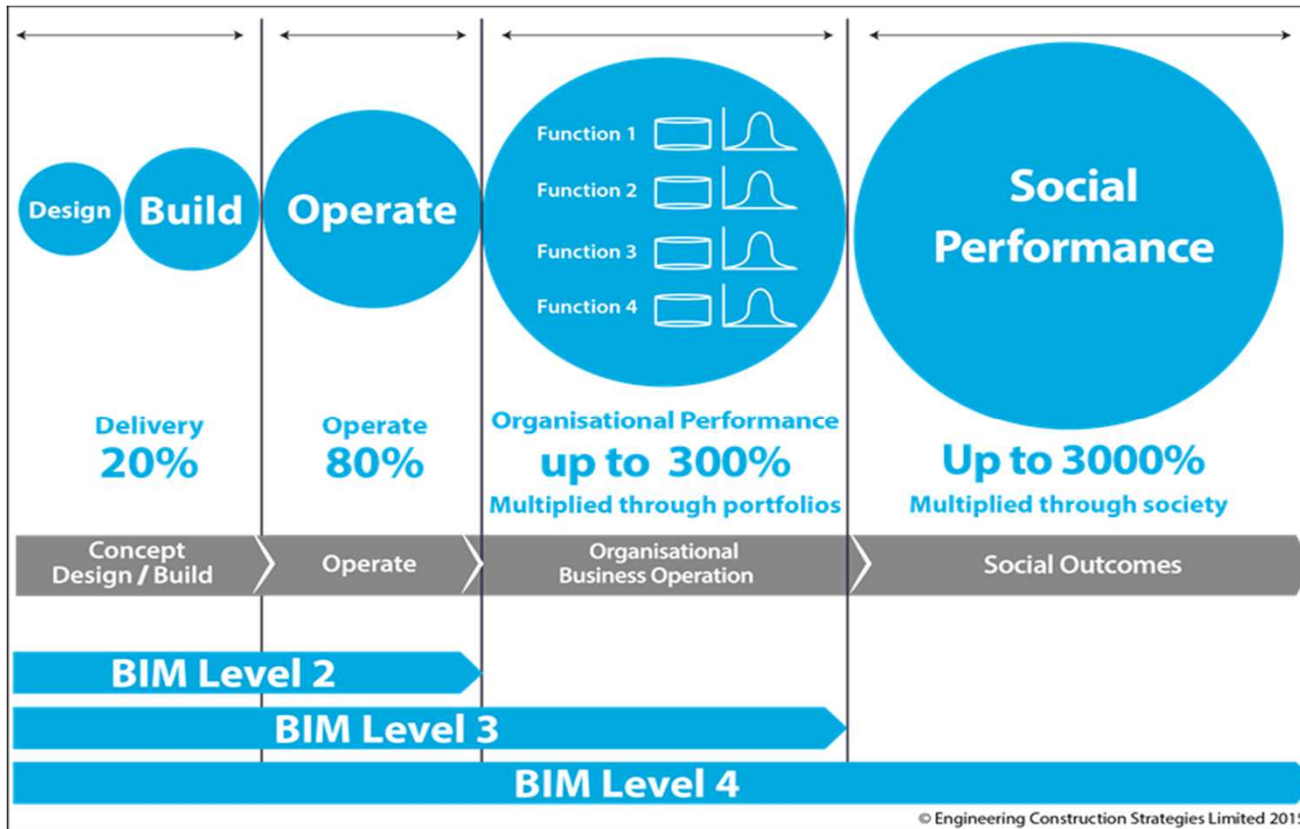
Case Study - MoJ



- Implementation Plan
- EIR
- Tender Documents
- Scoring Process
- Framework Training
- Framework Support



Where is the value?



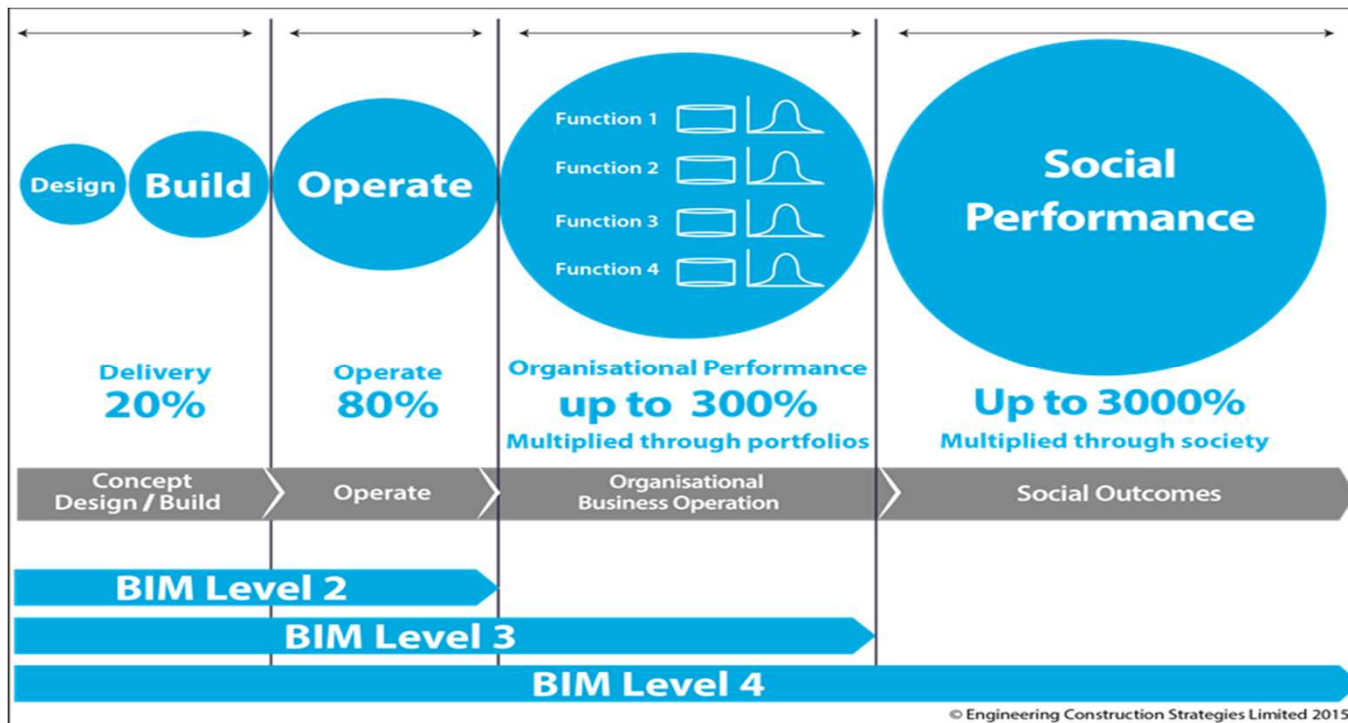
Level 2 City “Package”

- ▶ PAS 180 - Vocabulary
- ▶ PAS 181 – SC Concept Model – Guide to establishing a model for data interoperability
- ▶ PAS 182 - Smart city concept model
- ▶ *PAS 183 – Guide to establishing a decision framework for sharing data and information services*
- ▶ *PAS 184 - (Smart Cities – Guide to developing project proposals for delivering smart city solutions)*
- ▶ **PAS 185 – SC – Security Mindedness**

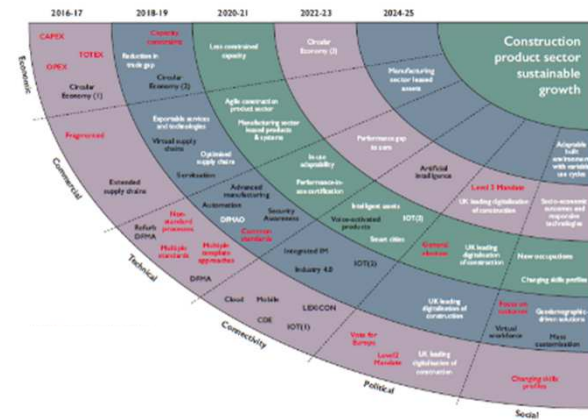
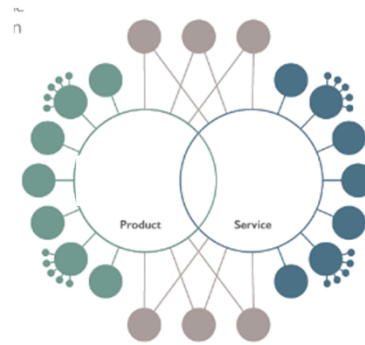
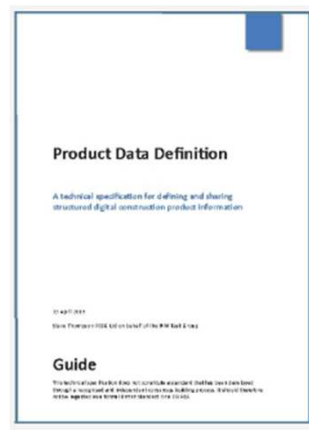
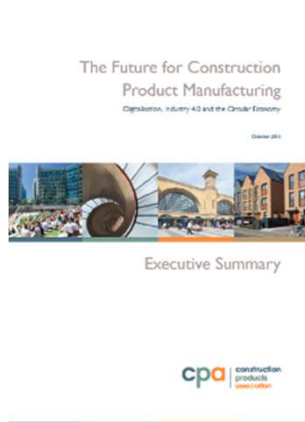
- ▶ PD 8100 – SC Overview – Guide
- ▶ PD 8101 – SC Guide to the role of the Planning & Development Process



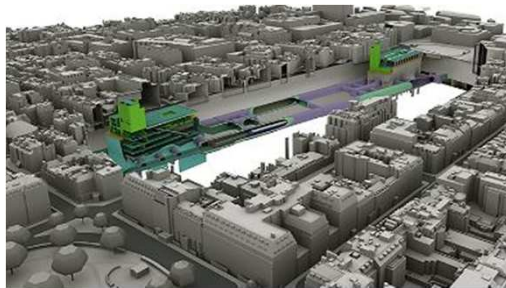
BIM & (Smart) Cities



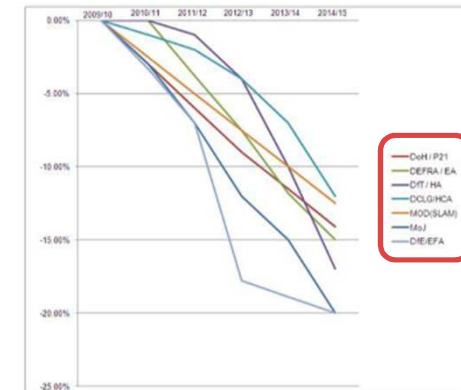
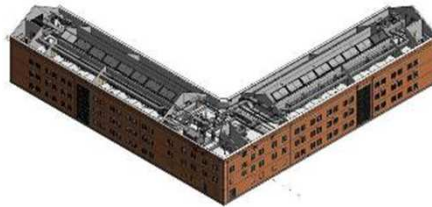
Level 2 - Manufacturing



Level 2 Achievements



Level 2 Achievements



International Programme



European Union



EU Public Procurement Directive

10 >> 22 nations

Grow market alignment to UK Level 2 – Opening Markets

Defend investment and grow trade



Improvement
in exports

50%

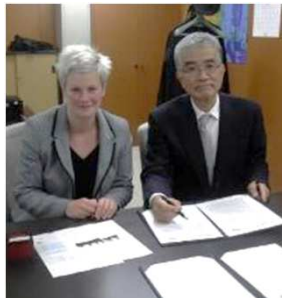


Latin America

MoU with Brazil, Chile, Mexico (2017)

FCO Support

Trade Development



Asia

Japan MoU: 2017/18

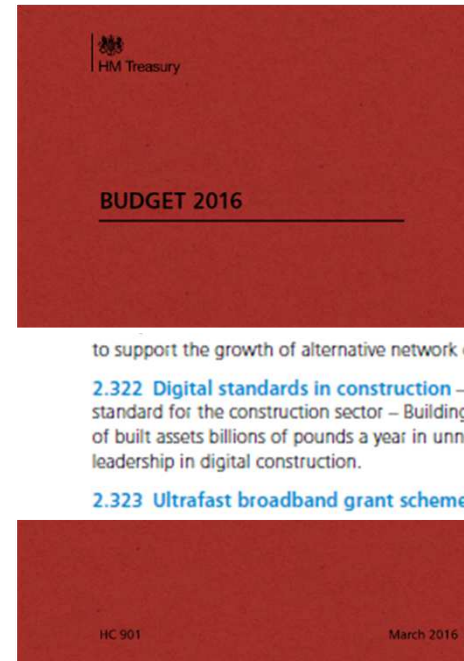
Indonesia, Vietnam – support from Prosperity

Growth & Development

Middle East / Asia Pac: 2017/18



Level 3 – Functional Improvements



to support the growth of alternative network developers by providing greater access to finance.

2.322 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.

2.323 Ultrafast broadband grant scheme – The government will distribute £14.5 million in

<http://digital-built-britain.com/>


Strategic Outline Business Case

1

**Strategic Outline Business Case for the delivery
of Digital Built Britain Programme Level 3**

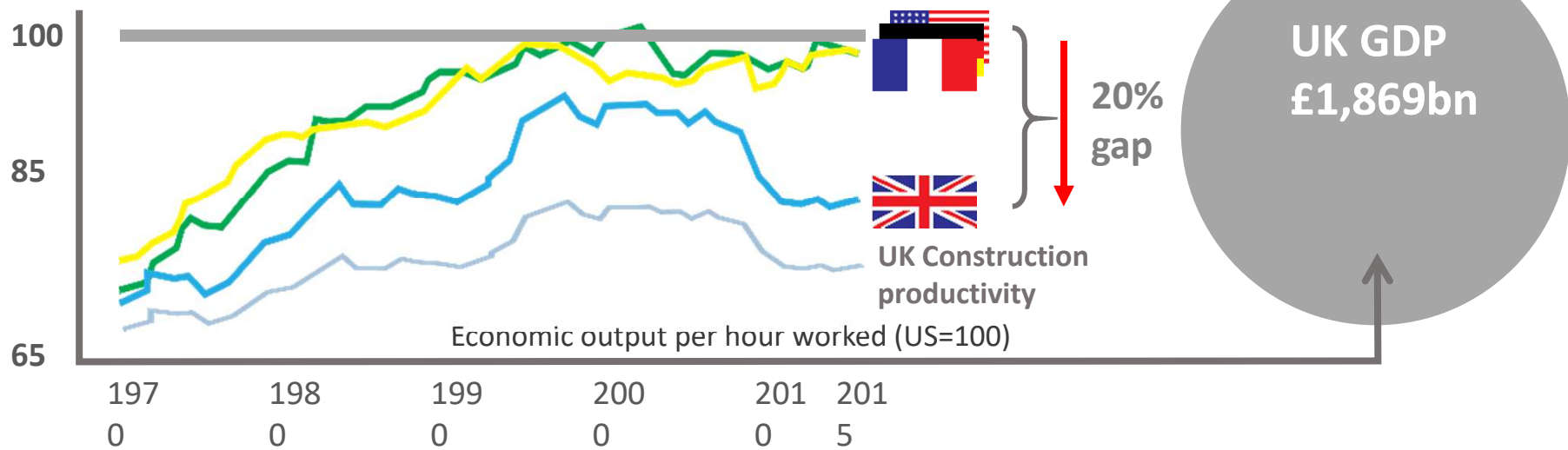
*Digital transformation of the built environment and full asset lifecycle
to increase productivity and improve economic and social outcomes*

Summary Overview July 2017

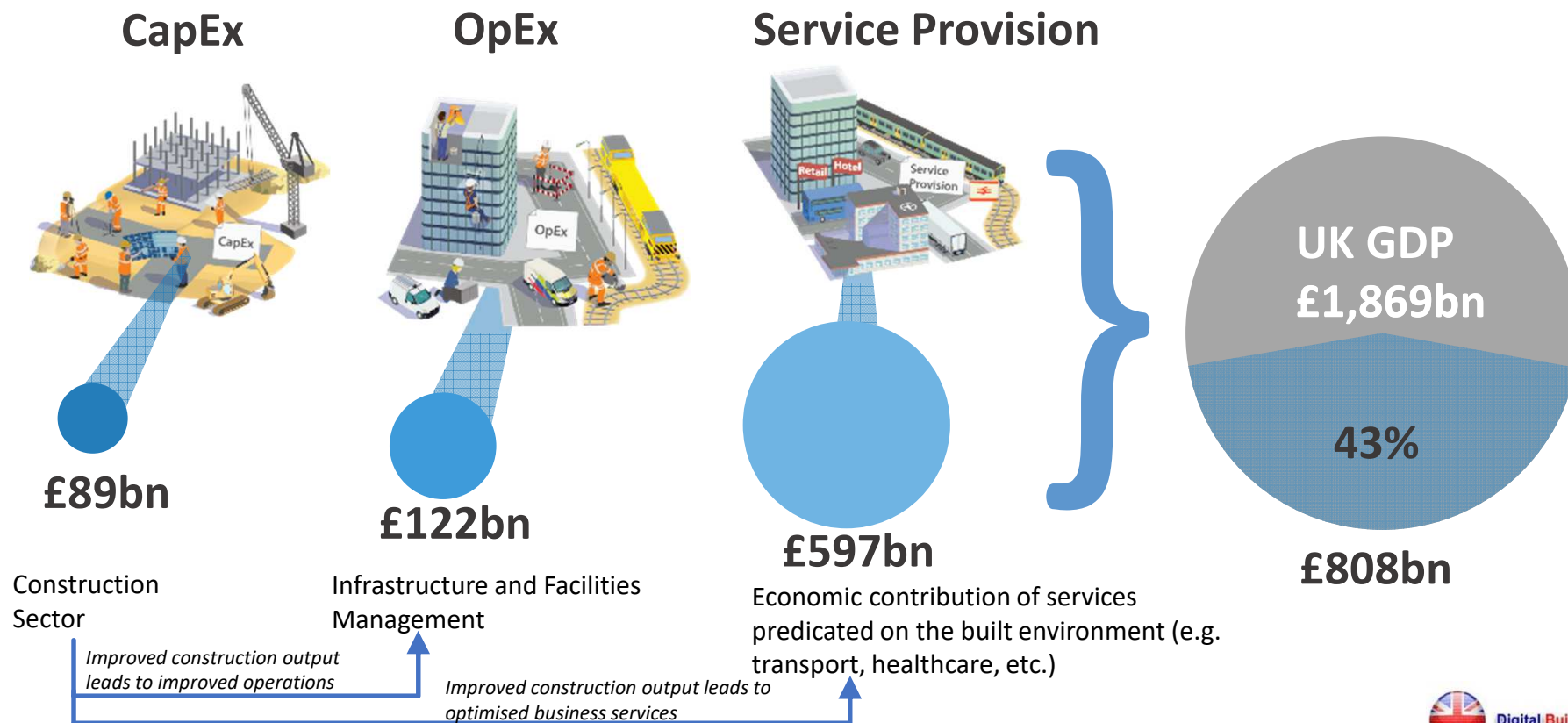

EY
Building a better
working world

Introduction

Economic Output (GDP)

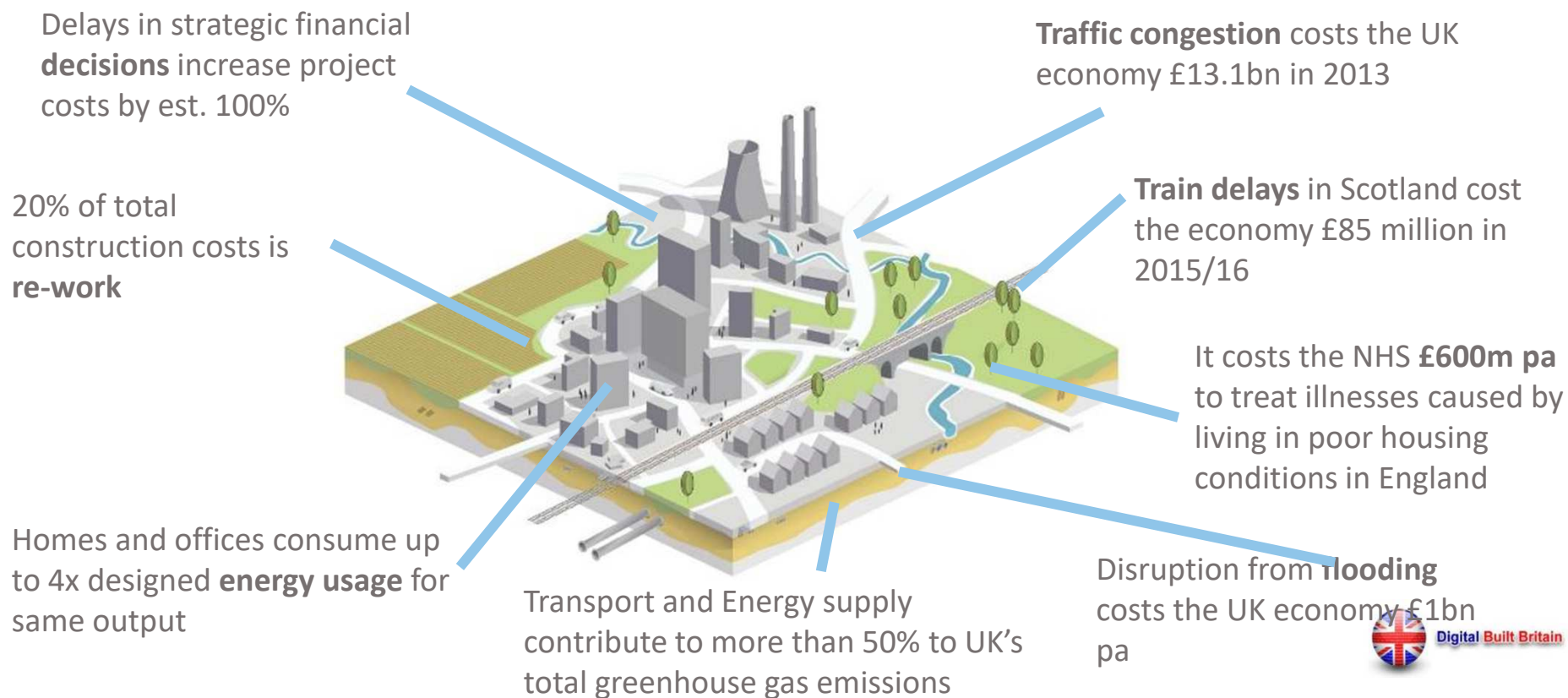


The Built Environment contributes significantly to economic output

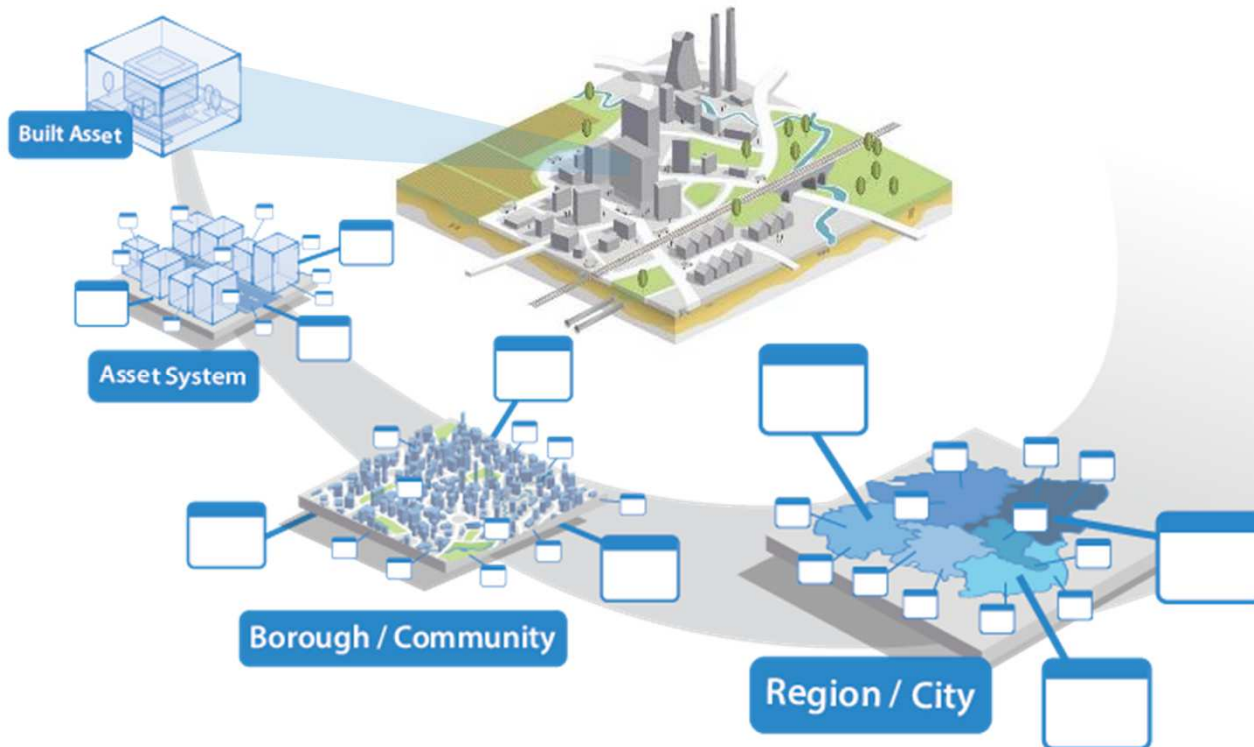


Sources: ONS, gov.uk, Gazprom, Facilities Management Journal, Arcadis

But constraints in Britain's built environment infrastructure are acting as a brake on economic growth

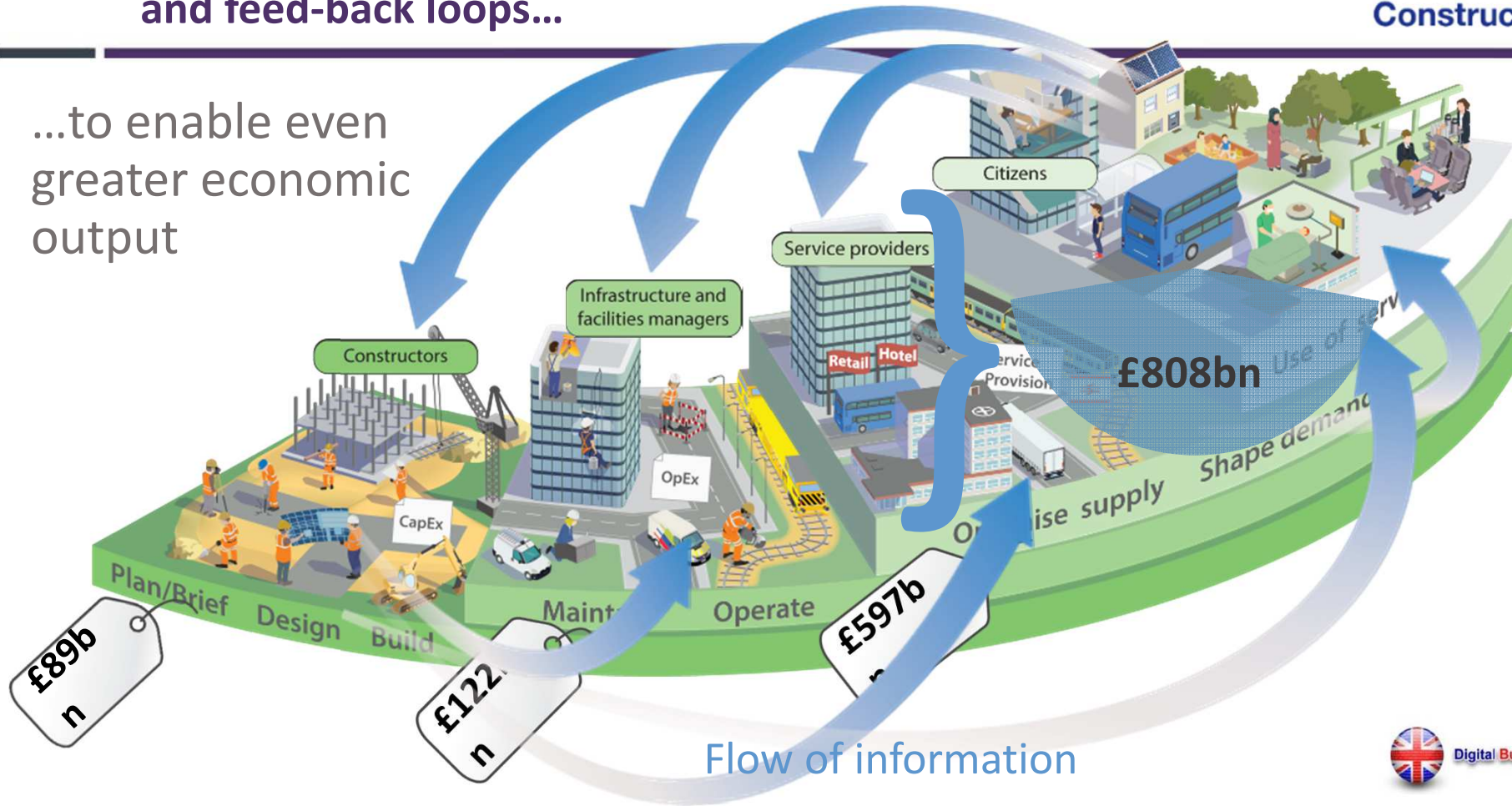


The DBB Programme supports the UK's Industrial Strategy with information tools, skills and services to support communities and places

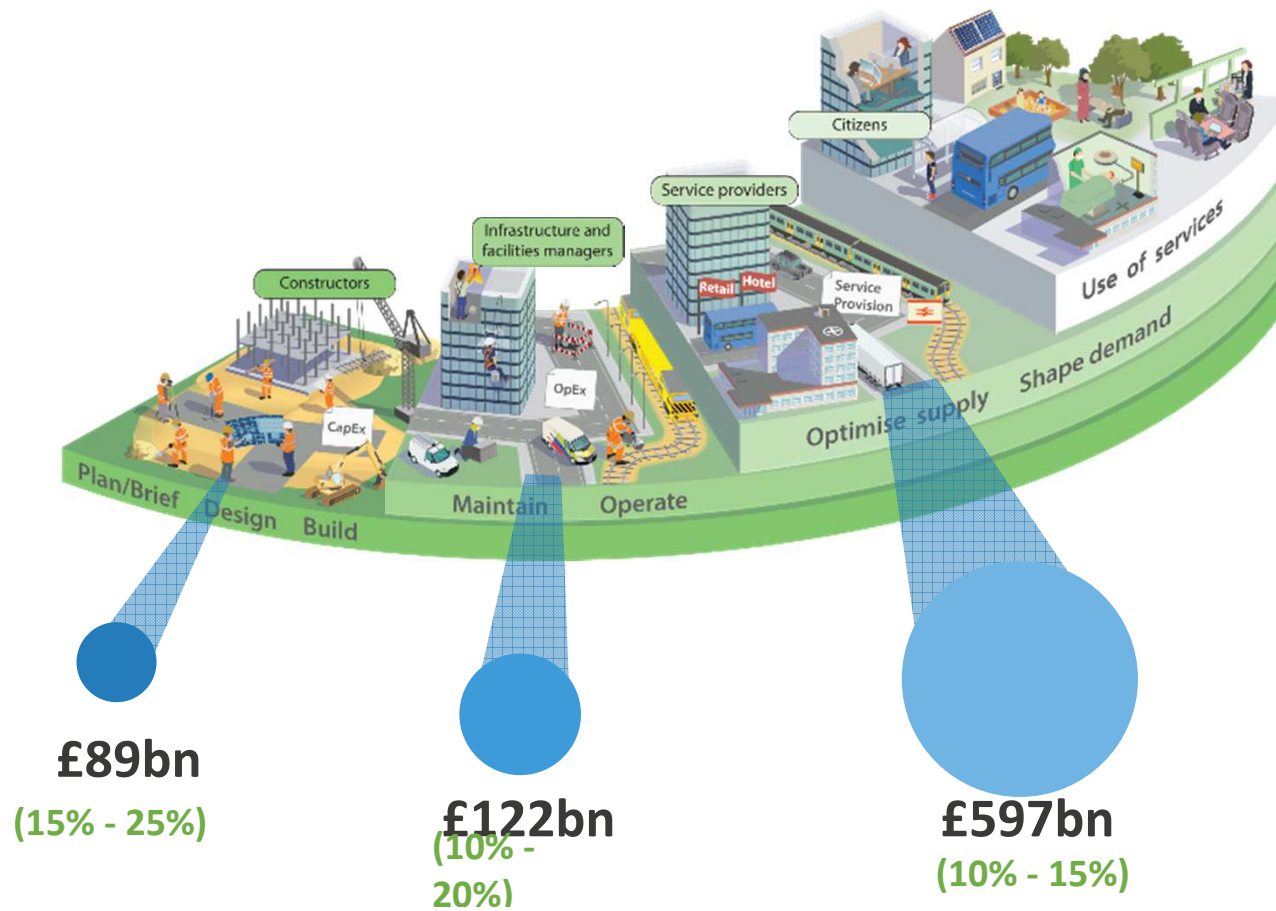


Digital Built Britain enables the information feed-forward and feed-back loops...

...to enable even greater economic output



Initial analysis shows whole-life benefits could be as much as 0.5-6% of GDP

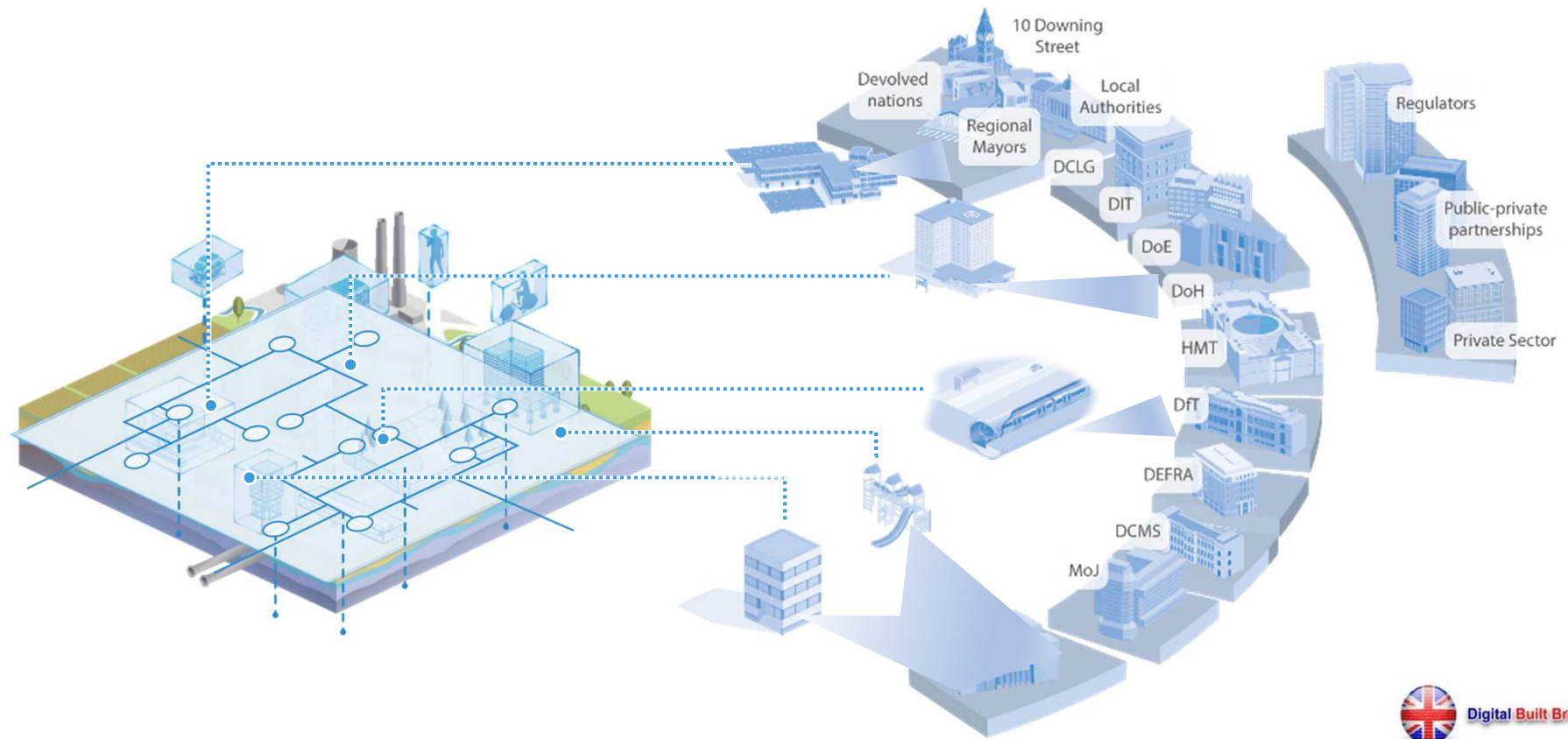


*Dependent on the option chosen

0.5% - 6%
increase
in GDP*

£1,869bn
(£9bn - £120bn)

We need a better understanding of how these systems fit together in order to enable integrated strategic financial investment planning



The Digital Built Britain programme is delivering:



An information framework of the UK built environment to enable data sharing across the entire market



New commercial frameworks for projects and facilities management designed with information management in mind



A co-operative cultural environment that seeks to learn and share



Training for the public sector in the use of data and data-driven decision making



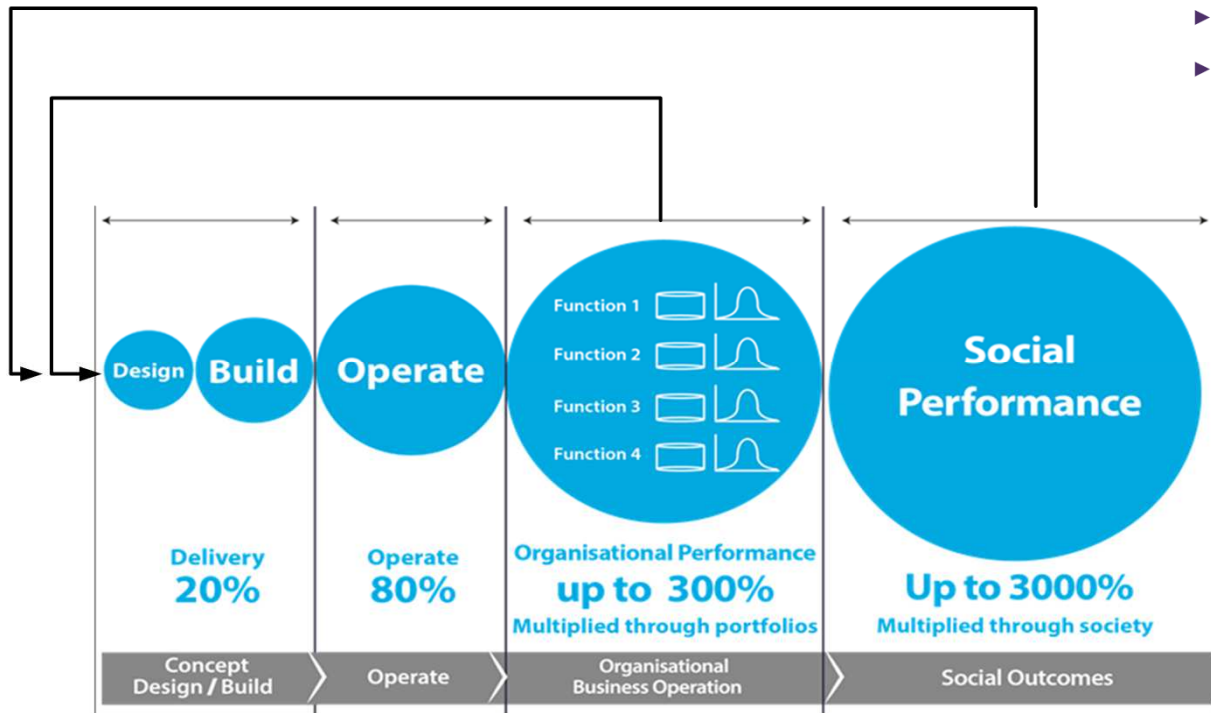
Domestic and international growth and jobs in technology and data sciences



Secure transaction for built environment data

Level 3 – Functional Improvement

- ▶ Demands of Customers
- ▶ Buildings and Communities
- ▶ Feedback & Systematic Learning



GeoConnect + Platform – 2D

The screenshot displays the GeoConnect + Platform 2D interface within a web browser. The browser's address bar shows the URL: https://twexnet.withbc.com/bc/bc.cgi/0/183776895?op=ui#oid=183776895&cid=0&if=bc&_xmlopt_interface_switch_to_tab=:. The interface includes a menu bar (File, Edit, View, History, Bookmarks, Tools, Help) and a toolbar with options like 'Add', 'View/Change', 'Selected ID', 'User', 'Advanced Search', and 'Help'. On the left, there is a 'My Projects' sidebar with a search filter and a list of project categories including 'AMPS Capital Delivery', 'SPOTest Test', 'AMPS Eight2o Enterprise', 'AMPS Energy Efficiency and Carbon', 'AMPS Light Wt Water Infra', 'AMPS TT', 'AMPS Wt Water Infra', 'AMPS Wt Water Non-Infra', 'AMPS WNI Waste Water Infra', 'AMPS WNI Waste Water Non-Infra', 'Private SPS Adoption Trials', 'SCADA Programme', 'SEMD', 'Training', 'No Category', and 'Personal'. The main map area shows a geographical view of the South East of England, with major cities like Worcester, Gloucester, Oxford, Reading, and Southampton labeled. The map is overlaid with a network of roads and infrastructure markers, primarily blue circles, with a few red circles. A legend on the left side of the map is titled 'Legend or Specific Geographic Interest' and contains the following sections:

- Boundaries, Topography and Roads**
 - Local Authority Boundaries
 - OS Roads
 - OS Topography
 - Thames Company Boundary
- Heritage**
 - Archaeological Priority Areas
 - Battlefields
 - Listed Buildings Points
 - Registered Historic Parks & Gardens
 - Scheduled Monuments
 - World Heritage Sites
- Categories**
 - All Categories
 - AMP6 WNI Waste Water Infra
 - AMP6 WNI Waste Water Non-Infra
 - AMP6 Wt Water Infra
 - AMP6 WNI Waste Water Non-Infra
 - Other

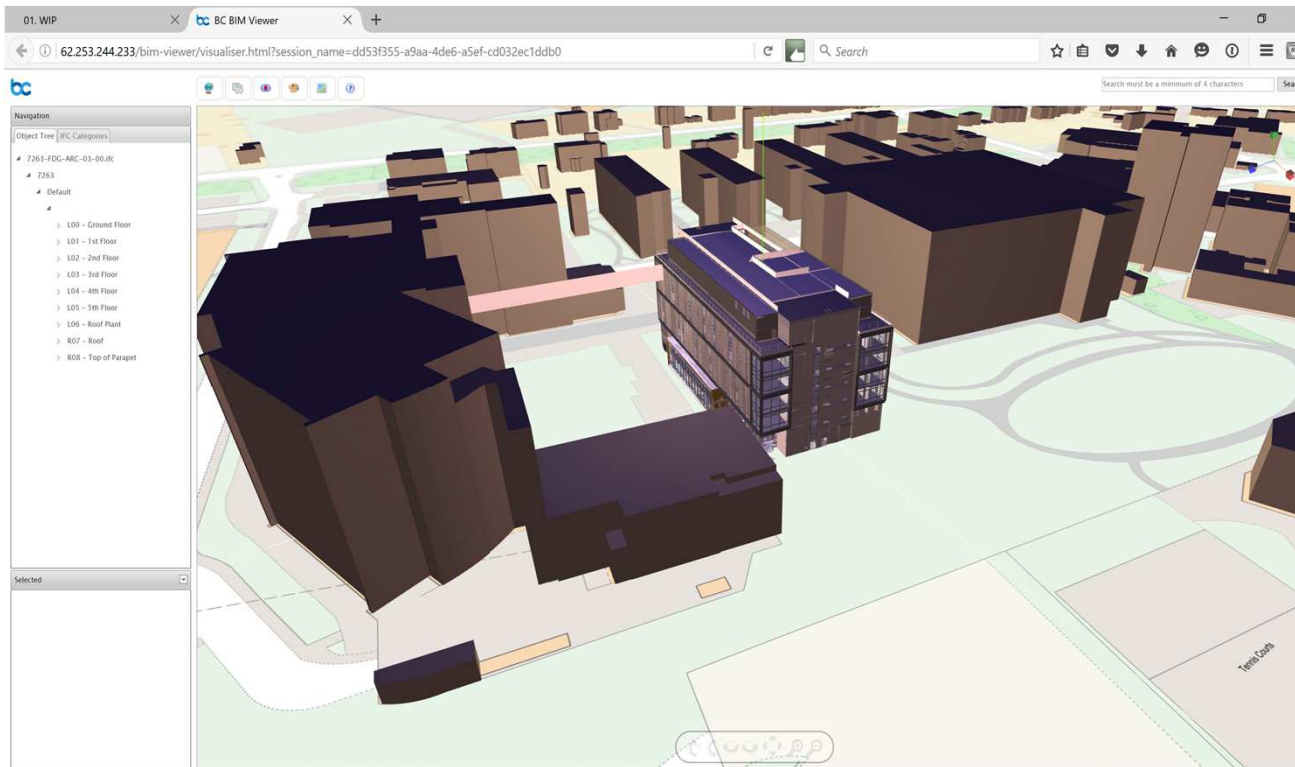
A 'Selected' dropdown menu at the bottom left of the legend area contains the text 'Click on a project marker to see details' and a 'clear' button. The map also features navigation controls like zoom in (+) and zoom out (-) buttons in the top right corner.



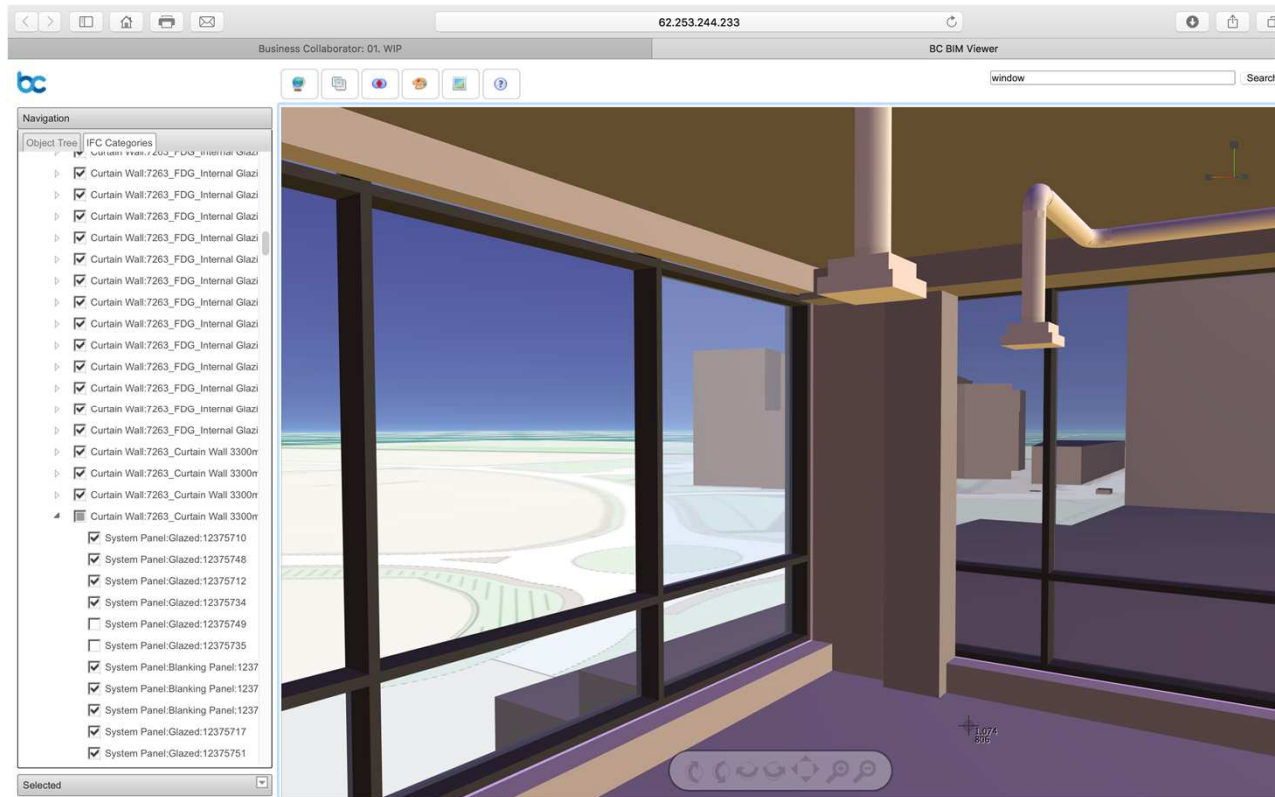
GeoConnect + Platform – 3D



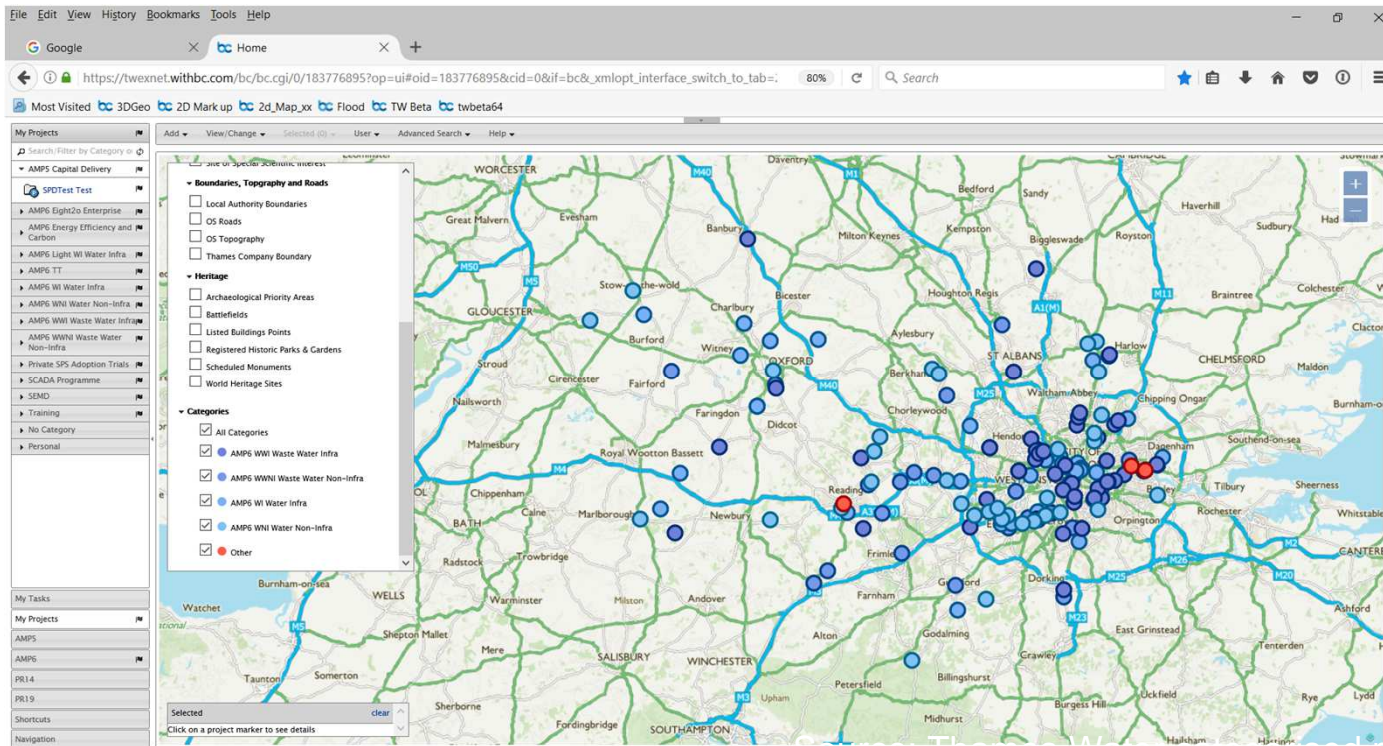
Connect: Extruded Building Heights



View: Looking Inside Out



Find and Locate : Assets & Projects

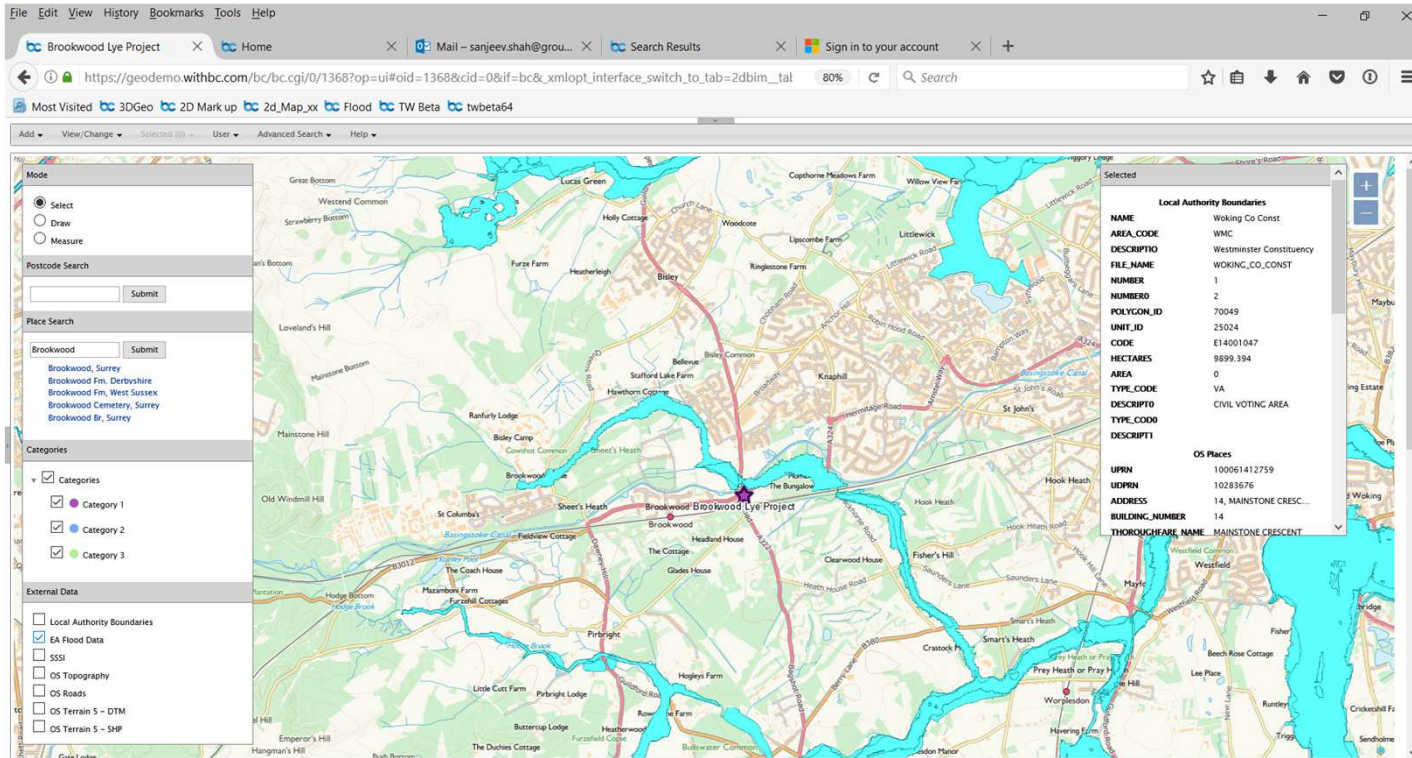


The screenshot displays a web browser window with the URL https://twexnet.withbc.com/bc/bc.cgi/0/183776895?op=ui#oid=183776895&cid=0&if=bc&_xmlopt_interface_switch_to_tab=. The application interface includes a top menu bar (File, Edit, View, History, Bookmarks, Tools, Help), a search bar, and a sidebar with the following sections:

- My Projects:** A list of project categories including AMPS Capital Delivery, SPDTest Test, AMPS Eight2a Enterprise, AMPS Energy Efficiency and Carbon, AMPS Light WI Water Infra, AMPS TT, AMPS WI Water Infra, AMPS WNI Water Non-Infra, AMPS WNI Waste Water Infra, AMPS WNI Waste Water Non-Infra, Private SPS Adoption Trials, SCADA Programme, SEND, Training, No Category, and Personal.
- Legend:** A panel on the left side of the map with the following sections:
 - Boundaries, Topography and Roads:** Local Authority Boundaries, OS Roads, OS Topography, Thames Company Boundary.
 - Heritage:** Archaeological Priority Areas, Battlefields, Listed Buildings Points, Registered Historic Parks & Gardens, Scheduled Monuments, World Heritage Sites.
 - Categories:** All Categories, AMPS WNI Waste Water Infra, AMPS WNI Waste Water Non-Infra, AMPS WI Water Infra, AMPS WNI Water Non-Infra, Other.

The main map area shows a geographical view of the South East of England, with numerous blue circular markers representing infrastructure assets and projects. Major roads like the M4, M40, M25, and M20 are visible. The map also shows local authority boundaries and topographic features.

Connect : Flood Areas



The screenshot shows a web browser window displaying a GIS application. The browser tabs include 'Brookwood Lye Project', 'Home', 'Mail - sanjeev.shah@grou...', 'Search Results', and 'Sign in to your account'. The address bar shows the URL: https://geodemo.withbc.com/bc/bc.cgi/0/1368?op=ui#oid=1368&cid=08&if=bc&_xmlopt_interface_switch_to_tab=2dbim_tal. The browser's most visited sites include 3DGeo, 2D Mark up, 2d_Map_xx, Flood, TW Beta, and twbeta64.

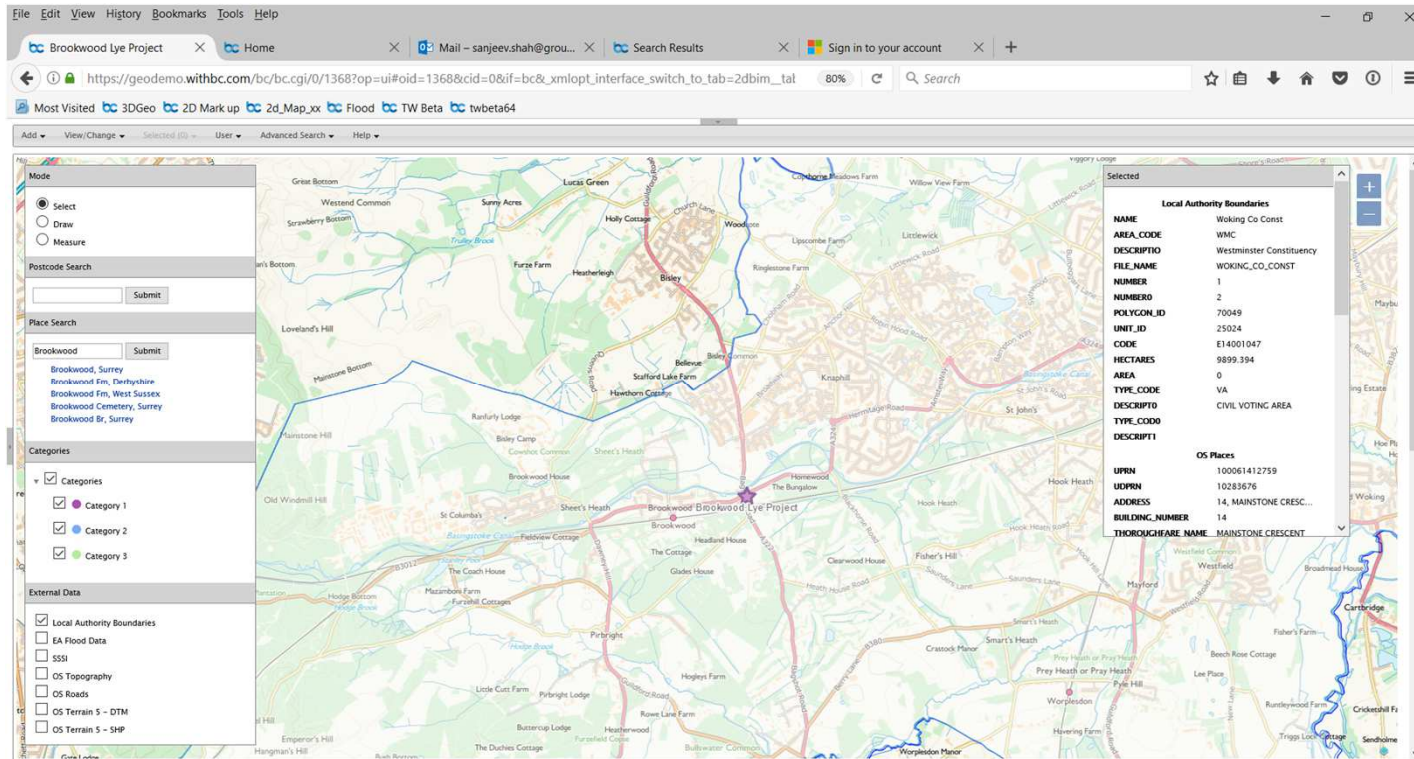
The application interface includes a 'Mode' panel with options for 'Select', 'Draw', and 'Measure'. There are also 'Postcode Search' and 'Place Search' sections. The 'Place Search' results for 'Brookwood' include: Brookwood, Surrey; Brookwood Fm, Derbyshire; Brookwood Fm, West Sussex; Brookwood Cemetery, Surrey; and Brookwood Br, Surrey.

The 'Categories' panel shows 'Categories' checked, with 'Category 1', 'Category 2', and 'Category 3' also checked. The 'External Data' panel has 'Local Authority Boundaries' checked, and 'EA Flood Data', 'SSSI', 'OS Topography', 'OS Roads', 'OS Terrain 5 - DTM', and 'OS Terrain 5 - SHP' are unchecked.

The main map area displays a satellite-style map with flood areas highlighted in cyan. A red dot on the map indicates the selected location. A 'Selected' information panel on the right provides details for the selected 'Local Authority Boundaries' and 'OS Places'.

Local Authority Boundaries	
NAME	Woking Co Const
AREA_CODE	WMC
DESCRIP10	Westminster Constituency
FILE_NAME	WOKING_CO_CONST
NUMBER	1
NUMBER	2
POLYGON_ID	70049
UNIT_ID	25024
CODE	E14001047
HECTARES	9899.394
AREA	0
TYPE_CODE	VA
DESCRIP10	CIVIL VOTING AREA
TYPE_CODE0	
DESCRIP11	
OS Places	
UPRN	100061412759
UDPRN	10283676
ADDRESS	14, MAINSTONE CRESC...
BUILDING_NUMBER	14
THOROUGHFARE_NAME	MAINSTONE CRESCENT

Connect : Local Authority Boundaries



The screenshot displays a web-based GIS application. The browser address bar shows the URL: https://geodemo.withbc.com/bc/bc.cgi/0/1368?op=ui#oid=1368&cid=0&if=bc&_xmlopt_interface_switch_to_tab=2dbim_tal. The map shows a residential area with various streets and green spaces. A red boundary line is drawn around a specific area, which is highlighted in the 'Selected' data panel on the right.

Selected Local Authority Boundaries

NAME	Woking Co Const
AREA_CODE	WMC
DESCRPTIO	Westminster Constituency
FILE_NAME	WOKING_CO_CONST
NUMBER	1
POLYGON_ID	2
UNIT_ID	77049
CODE	25034
HECTARES	E14001047
AREA	9899.394
TYPE_CODE	0
DESCRPTO	VA
TYPE_CODE0	CIVIL VOTING AREA
DESCRPT1	

OS Places

UPRN	100061412759
UDPRN	10283676
ADDRESS	14, MAINSTONE CRESC...
BUILDING_NUMBER	14
THOROUGHFARE_NAME	MAINSTONE CRESCENT

Mode

- Select
- Draw
- Measure

Postcode Search

Submit

Place Search

Submit

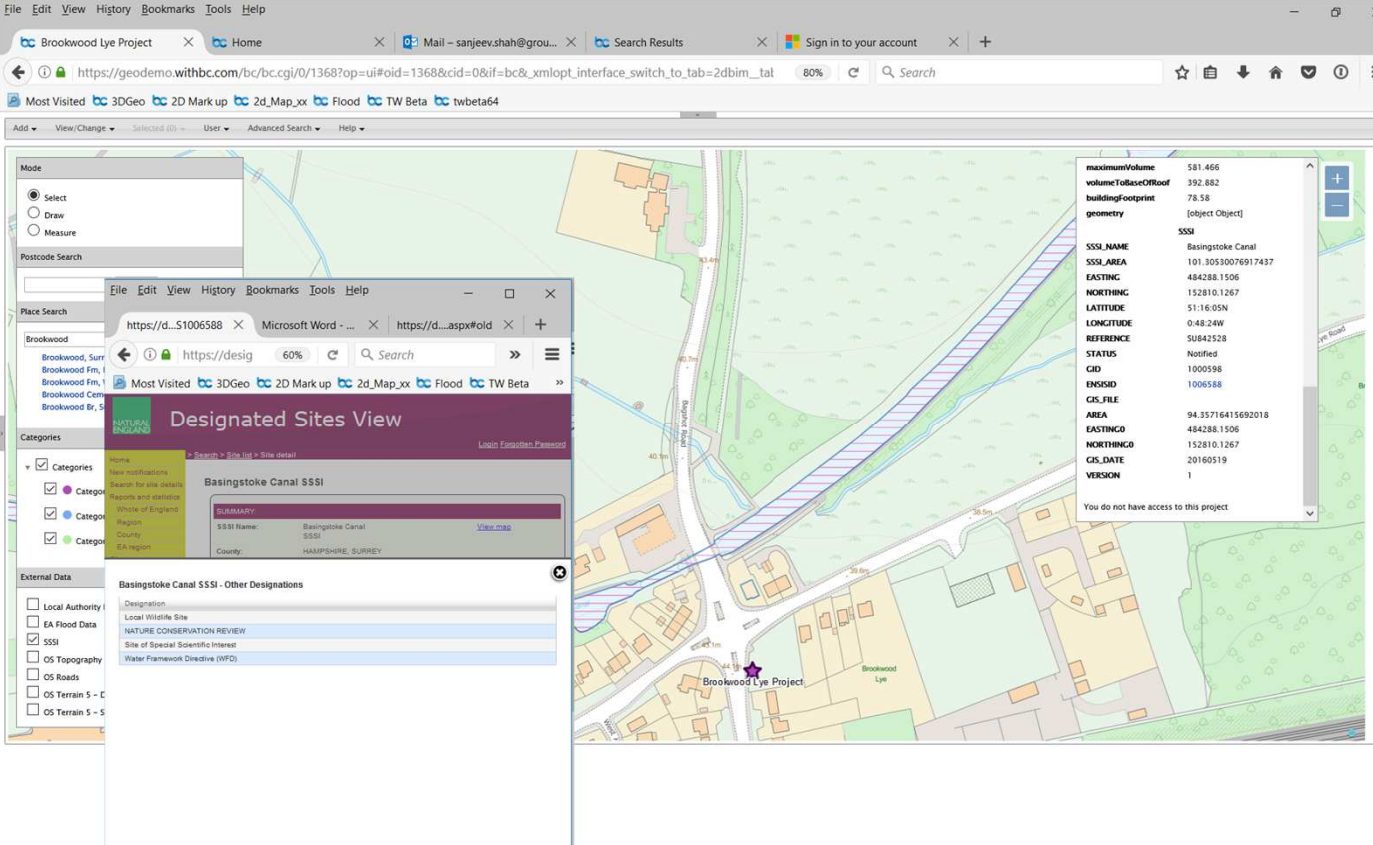
Categories

- Categories
- Category 1
- Category 2
- Category 3

External Data

- Local Authority Boundaries
- EA Flood Data
- SSSI
- OS Topography
- OS Roads
- OS Terrain 5 - DTM
- OS Terrain 5 - SHP

Connect : Sites of Special Scientific Interest



The screenshot displays a web application interface for the Brookwood Lye Project. The main map shows a satellite-style view with various overlays, including a blue hatched area representing a designated site. A 'Designated Sites View' window is open, showing details for the 'Basingstoke Canal SSSI'. The window includes a 'SUMMARY' section with the following information:

Field	Value
SSSI Name	Basingstoke Canal
SSSI	SSSI
Region	Whole of England
County	HAMPSHIRE, SURREY

Below the summary, there is a section for 'Other Designations' with the following entries:

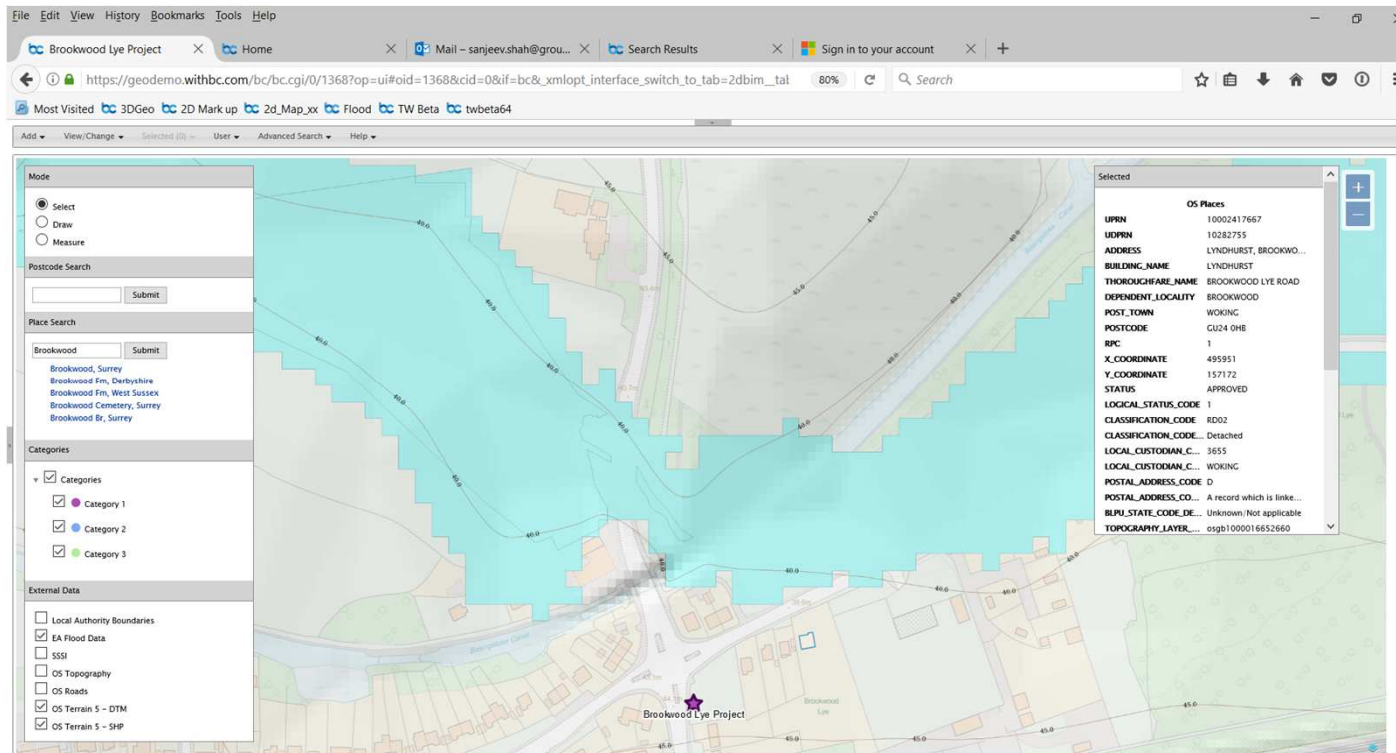
- Designation
- Local Wildlife Site
- NATURE CONSERVATION REVIEW
- Site of Special Scientific Interest
- Water Framework Directive (WFD)

On the right side of the map, a data panel provides the following information:

maximumVolume	581.466
volumeToBaseOfRoof	392.882
buildingFootprint	78.58
geometry	[object Object]
SSSI	
SSSI_NAME	Basingstoke Canal
SSSI_AREA	101.30530076917437
EASTING	484288.1506
NORTHING	152810.1267
LATITUDE	51.16.05N
LONGITUDE	0.48.24W
REFERENCE	S0842528
STATUS	Notified
CID	1000588
ENSGID	1006588
CIS_FILE	
AREA	94.35716415692018
EASTINGO	484288.1506
NORTHINGO	152810.1267
CIS_DATE	20160519
VERSION	1

At the bottom of the data panel, a message states: 'You do not have access to this project'.

Connect : Terrain 5 + Flood Data



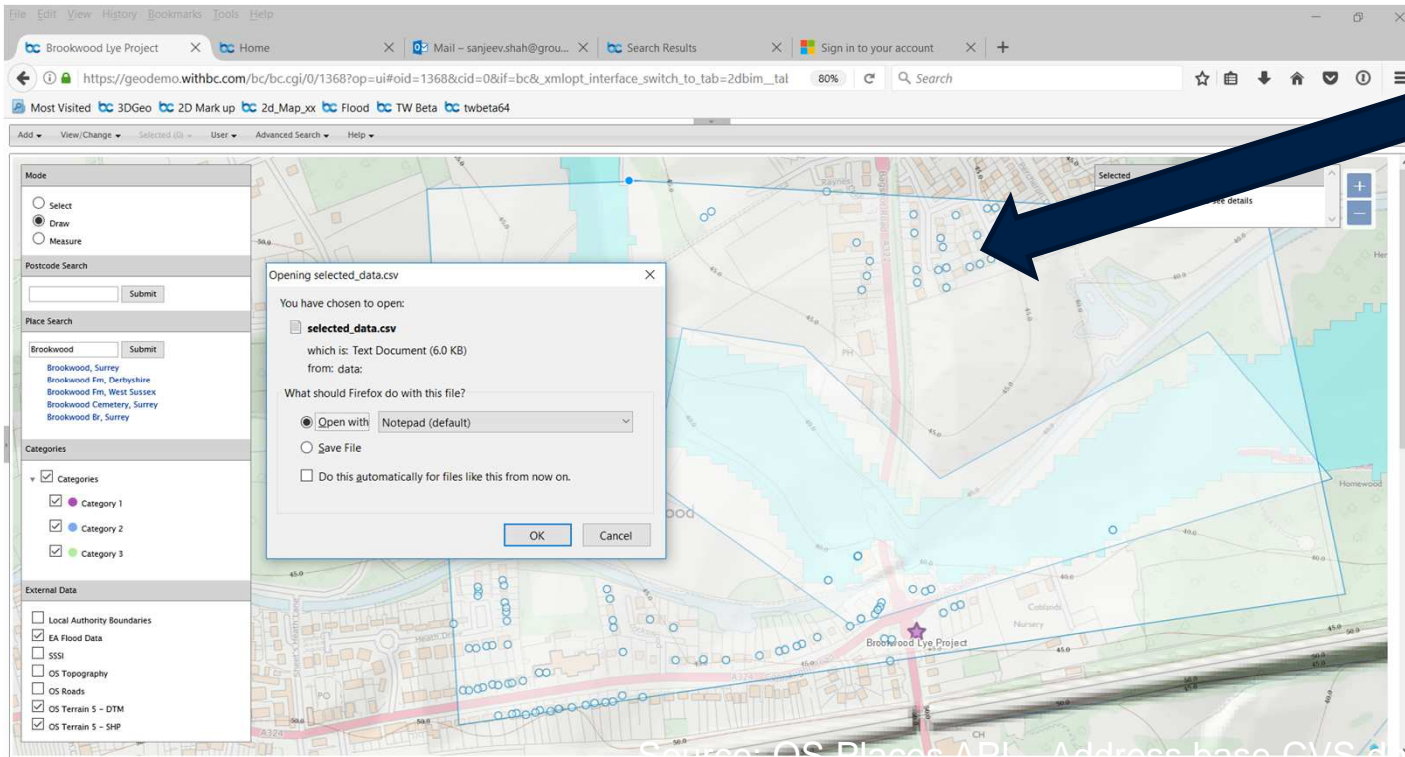
The screenshot shows a web browser window displaying a GIS application. The browser's address bar shows the URL: https://geodemo.withbc.com/bc/bc.cgi/0/1368?op=ui#oid=1368&cid=0&if=bc&xmlopt_interface_switch_to_tab=2dbim_tal. The application interface includes a left-hand sidebar with several sections:

- Mode:** Select (selected), Draw, Measure.
- Postcode Search:** A search box with a 'Submit' button.
- Place Search:** A search box containing 'Brookwood' and a 'Submit' button. Below it, a list of search results: Brookwood, Surrey; Brookwood Fm, Derbyshire; Brookwood Fm, West Sussex; Brookwood Cemetery, Surrey; Brookwood Br, Surrey.
- Categories:** A checked 'Categories' section with three sub-items: Category 1, Category 2, and Category 3.
- External Data:** A list of data layers with checkboxes: Local Authority Boundaries (unchecked), EA Flood Data (checked), SSSI (unchecked), OS Topography (unchecked), OS Roads (unchecked), OS Terrain 5 - DTM (checked), and OS Terrain 5 - SHP (checked).

The main map area displays a terrain map with a cyan-colored flood overlay. A purple star icon on the map is labeled 'Brookwood Lye Project'. On the right side, a 'Selected' panel displays a table of data for the selected location:

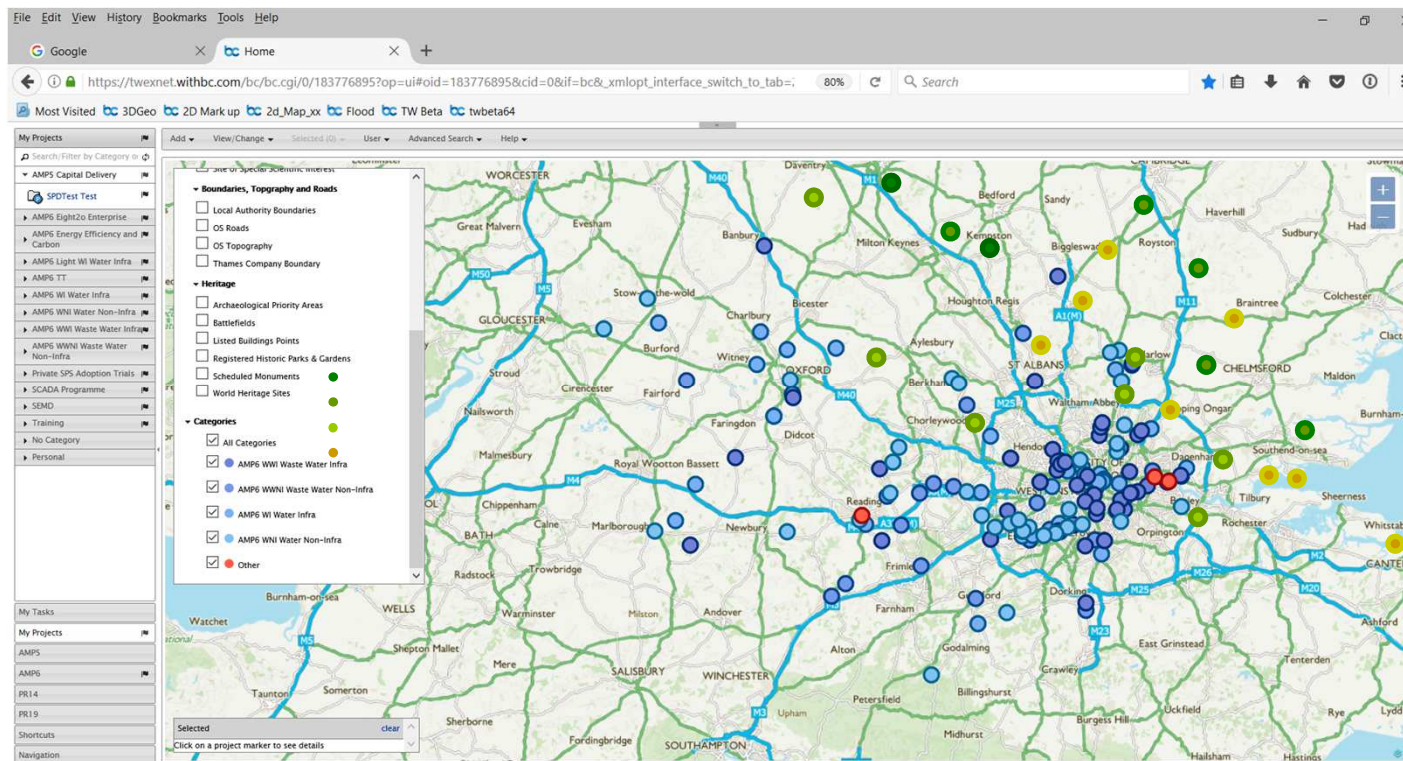
OS Places	
UPRN	10002417667
UPRN	10282755
ADDRESS	LYNDHURST, BROOKWO...
BUILDING_NAME	LYNDHURST
THOROUGHFARE_NAME	BROOKWOOD LYE ROAD
DEPENDENT_LOCALITY	BROOKWOOD
POST_TOWN	WOKING
POSTCODE	GU24 0HE
RPC	1
X_COORDINATE	499951
Y_COORDINATE	157172
STATUS	APPROVED
LOGICAL_STATUS_CODE	1
CLASSIFICATION_CODE	RD02
CLASSIFICATION_CODE...	Detached
LOCAL_CUSTODIAN_C...	3655
LOCAL_CUSTODIAN_C...	WOKING
POSTAL_ADDRESS_CODE	D
POSTAL_ADDRESS_CODE...	A record which is linke...
BLPU_STATE_CODE_DE...	Unknown / Not applicable
TOPOGRAPHY_LAYER...	osgb1000016652660

Connect : Addresses



User defined region

Connect : Supplier Data from ERP



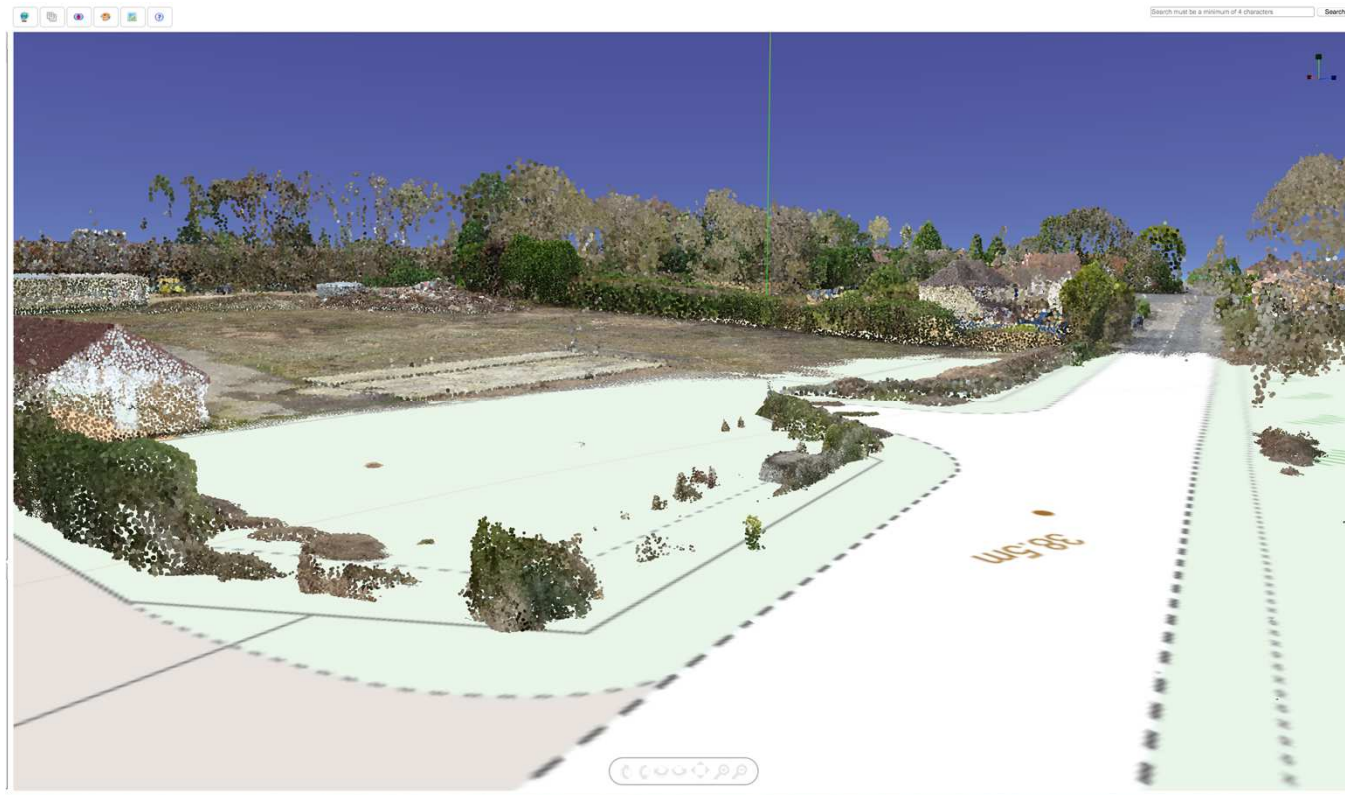
Connect : Point Cloud & OS Data



Connect : Point Cloud & OS Data

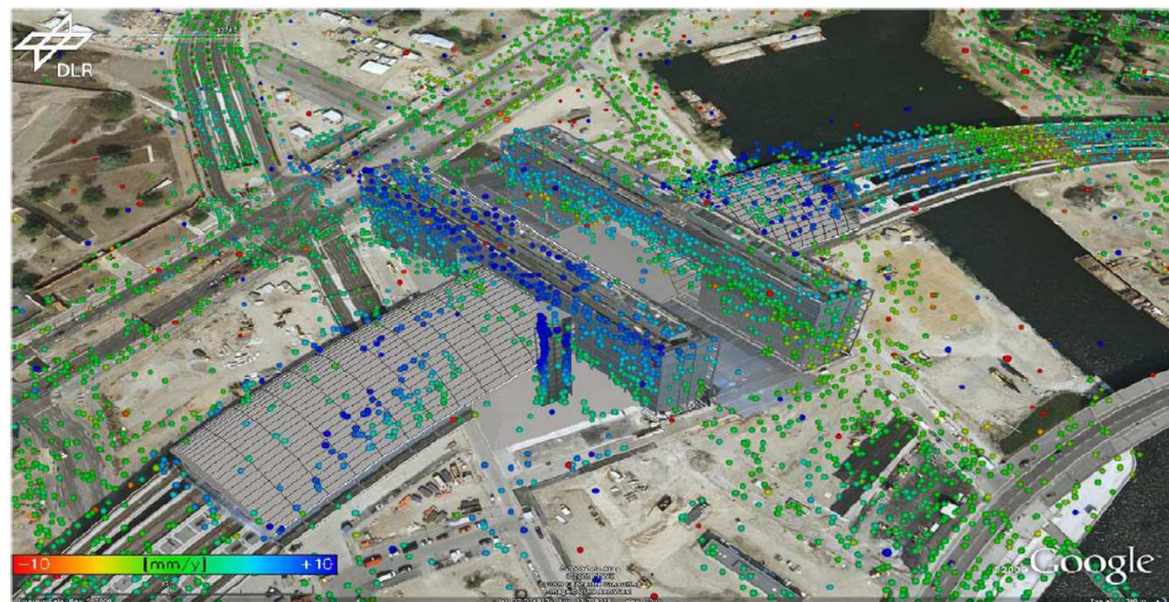


Connect : Point Cloud & OS Data

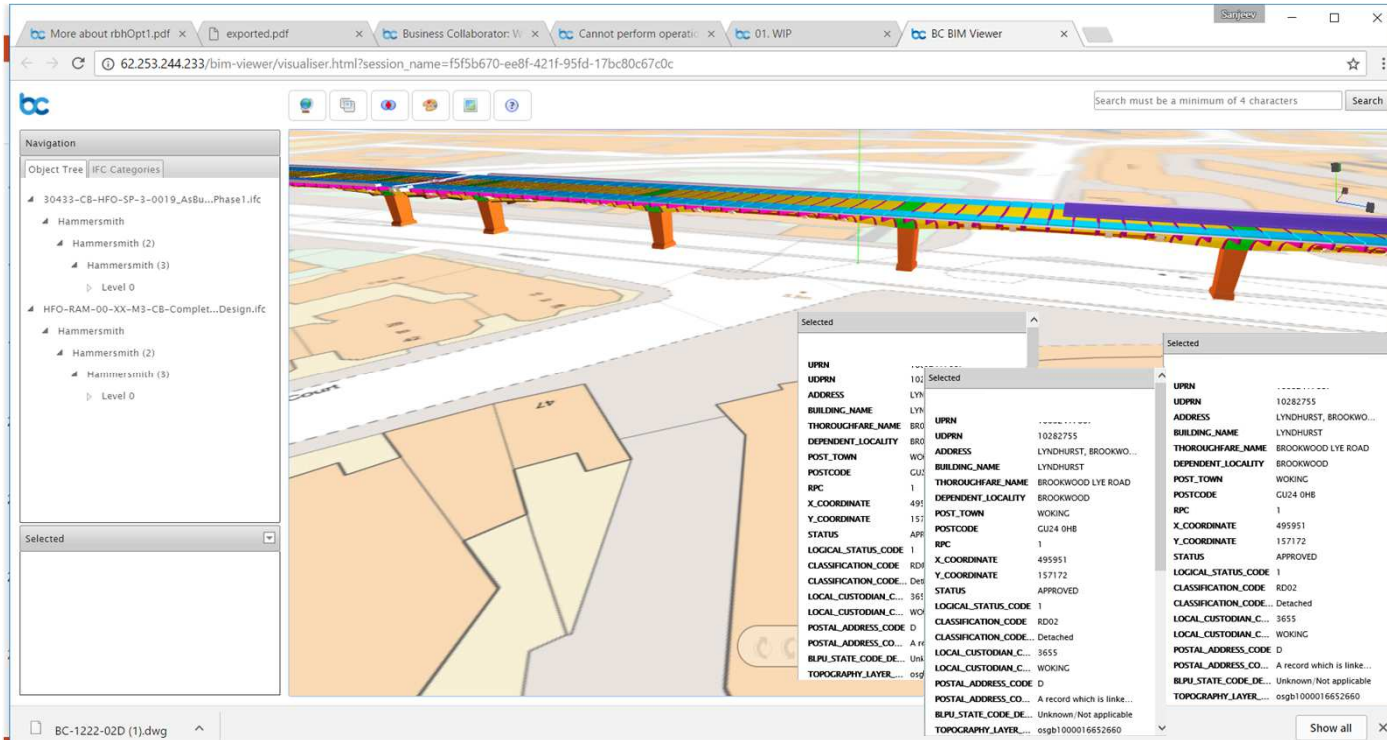


Monitoring Structures From Satellites

- ▶ St Marys Abchurch Building (Bank)
- ▶ Waterloo Bridge
- ▶ Hammersmith Flyover



Connect : Sensor Data



The screenshot shows a web-based BIM viewer interface. The main window displays a 3D model of a bridge structure with multiple spans supported by pillars. On the left, there is a navigation pane with an 'Object Tree' and 'IFC Categories' sections. The 'Object Tree' shows a hierarchy of objects including '30433-CB-HFO-SP-3-0019_AsBu...Phase1.ifc', 'Hammersmith', and 'HFO-RAM-00-XX-M3-CB-Comple...Design.ifc'. Below the navigation pane is a 'Selected' list. The main view area contains a search bar and a search button. Two data tables are overlaid on the 3D model, showing selected object properties.

Selected		Selected	
UPRN	10282755	UPRN	10282755
ADDRESS	LYNDHURST, BROOKWOOD LYE ROAD	ADDRESS	LYNDHURST, BROOKWOOD LYE ROAD
BUILDING_NAME	LYNDHURST	BUILDING_NAME	LYNDHURST
THOROUGHFARE_NAME	BROOKWOOD LYE ROAD	THOROUGHFARE_NAME	BROOKWOOD LYE ROAD
DEPENDENT_LOCALITY	BROOKWOOD	DEPENDENT_LOCALITY	BROOKWOOD
POST_TOWN	WOKING	POST_TOWN	WOKING
POSTCODE	GU24 0HB	POSTCODE	GU24 0HB
RPC	1	RPC	1
X_COORDINATE	495951	X_COORDINATE	495951
Y_COORDINATE	157172	Y_COORDINATE	157172
STATUS	APPROVED	STATUS	APPROVED
LOGICAL_STATUS_CODE	1	LOGICAL_STATUS_CODE	1
CLASSIFICATION_CODE	RD02	CLASSIFICATION_CODE	RD02
CLASSIFICATION_CODE_DETAILED	Detached	CLASSIFICATION_CODE_DETAILED	Detached
LOCAL_CUSTODIAN_CODE	3655	LOCAL_CUSTODIAN_CODE	3655
POSTAL_ADDRESS_CODE	D	POSTAL_ADDRESS_CODE	D
POSTAL_ADDRESS_CODE_DETAILED	A record which is linked to...	POSTAL_ADDRESS_CODE_DETAILED	A record which is linked to...
BLPU_STATE_CODE_DETAILED	Unknown/Not applicable	BLPU_STATE_CODE_DETAILED	Unknown/Not applicable
TOPOGRAPHY_LAYER	osgb1000016652860	TOPOGRAPHY_LAYER	osgb1000016652860



UK Government – Building A New World

Digital Built Britain – Programme Overview

Dr Mark Bew MBE

