



Benefits of BIM for Transportation Joe Bates Technical Authority – Transportation BIM

# Agenda

- What is BIM
- Collaboration and the Common Data Environment (CDE)
- Realising the benefits
- Case Studies CR2 and East West rail
- Conclusion
- Q&A

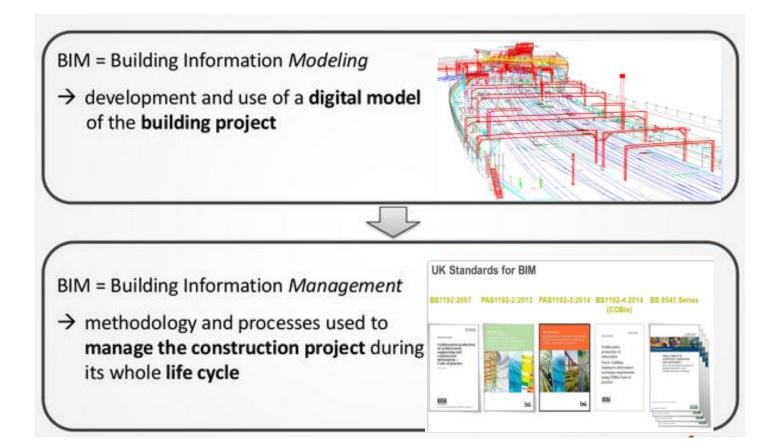
#### **CONGRATULATIONS!**

You have met the requirements of the Kitemark schemes in accordance with **BIM Level 2** (PAS 1192-2, PAS 1192-3, BS 1192, BS 1192-4 PAS 1192-5) and have been formally <u>recommended</u> for Kitemark – <u>subject to</u> the approval of our Compliance & Risk assessment.

What is **BIM**?

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# Building Information Modelling is...

- Collaborative working
- Multi-Disciplinary Design Team(s) coordination
- Sharing and exchange of information between all parties (owners, designers, contractors, fabricators etc.)
- Single 'federated' integrated model
- Enabler for progressive assurance through collaborative design
- Whole life approach to managing digital assets (realising value)



# Why?

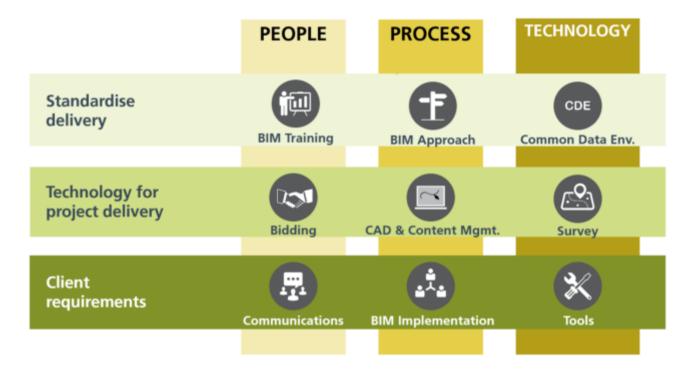
- Information Centred Working is proven to:
  - Reduce overall project schedules
  - Deliver improvements in Quality
  - Drive down costs
  - Improve safety
- Proven in numerous similar industries
  - Oil and Gas
  - Buildings
  - Nuclear
  - Roads & Infrastructure



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• The basis for BIM: BS 1192, PAS-1192 etc

#### How we will deliver this?



#### **Project delivery is changing** PLANNING RAPID DETAILED **DIGITAL ASSET** BUSINESS BIDDING MANUFACTURE ASSEMBLY **OPTIONEERING** DESIGN MANAGEMENT CASE 000 ≕ ጠስሪ m b Employers Rapid iect based On site Data Digital BIM Offsite/3D Information Engineering erative **Execution Plans** manufact collection Requirements Model nr Asset AECO Data Data Lake, Common Data Environment **Digital Survey** management Requirements from Digital Twin **Digital Rehearsal** Project Management

Production Hub

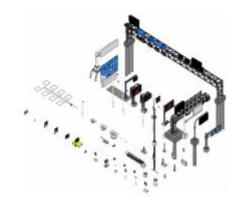


### What our clients want

- Drive a step change in efficiency, predictability, benefits & value
- Eliminating project and programme development product waste
- Streamlining common activities
- Standardised design & streamlined approvals
- Value based procurement not hours based
- Share/re-use designs across community



HIGHWAYS ENGLAND LAUNCHES BIM COMPONENT LIBRARY





# **Clients Requirements**

• Informed Employer's Requirements

	Level of Model Definition Network Rail GRIP Process has been aligned to be compliant with the PAS11922 Publically Accessible Specification.										
	GRIP Process Relation to PAS1192:2 Level of Definition										
GRIP Stage	1	2	3	4	5	6	7	8			
	Initiate		Choose Option	Design		Build	Close				
	Output Definition	Concept	Option Selection	Single Option Development	Detailed Design	Construction, Test and Commission	Scheme Handback	Project Closeout			
GRIP Aim	Define the output for the project	that the outputs can be	Assesses and selects the most appropriate option	Initiation of the development of	Produce a complete, robust engineering design that underpins definitive cost, time, resource and risk estimates	Delivery to specification and testing to confirm operation in accordance with design	Transfer asset responsibility from the project team to the operator and maintainer	Closeout in an order manner. Contractual accounts are settled and any contingencies pr warranties are put into place. Assessment of benefits is carried out			
PAS1192 LOD	Brief	Concept	Definition	Design		Build and Commission	Handover and Closeout	Operation			



#### Croydon Area Remodelling Scheme Employer's Information Requirements

GRIP 3 Implementing BIM principles for Railway Infrastructure Projects Oct 2017

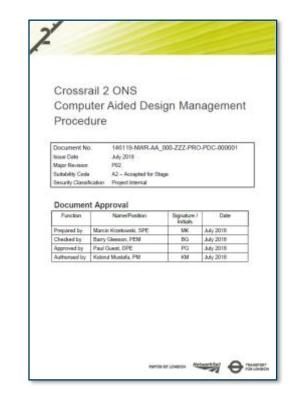
Ref. 156930-NWR-GV\_000-ZZ-REM-PDC-000001 Revision: P02 Suitability: A3 – Approved for Stage



### **Common Project Standards**







# How we need to work – Integrated BIM

#### **Conditions for success**

#### Process

Agreed methods of working to agreed standards

#### **Technology**

CDE, collaboration platforms, interoperable software

#### People

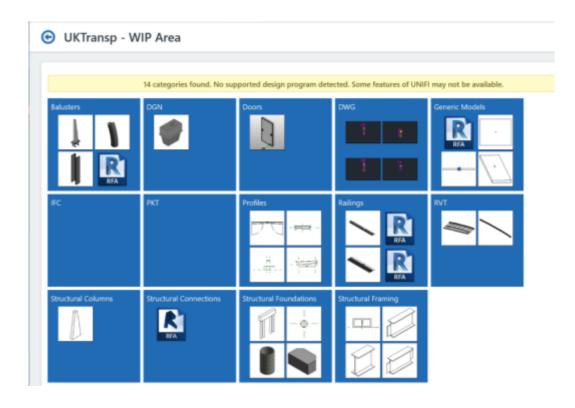
We need everyone to be BIM enabled

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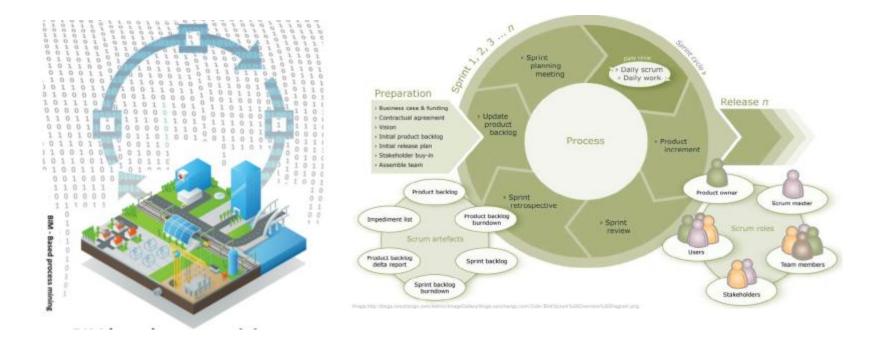
# **Design Reuse**

Agreed LODs between the manufacturer and contractor





#### Iterative Model based re design (2D only as an output)

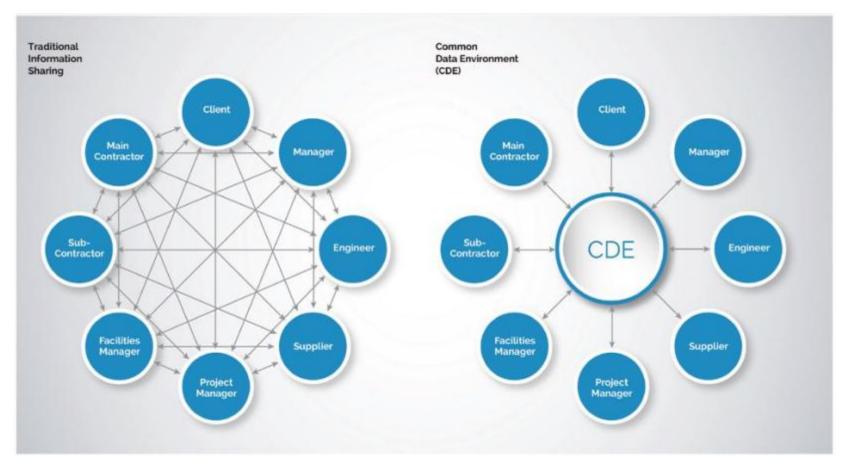


# Collaboration and the Common Data Environment (CDE)

# What's a CDE?

- Contains the project's Integrated Information Set
- Graphical Data 3D objects
- Non-Graphical data embedded digital attribution
- Documents Project Documentation (e.g. Standards, RFI's, etc.)
- GIS (Geospatial Information System)



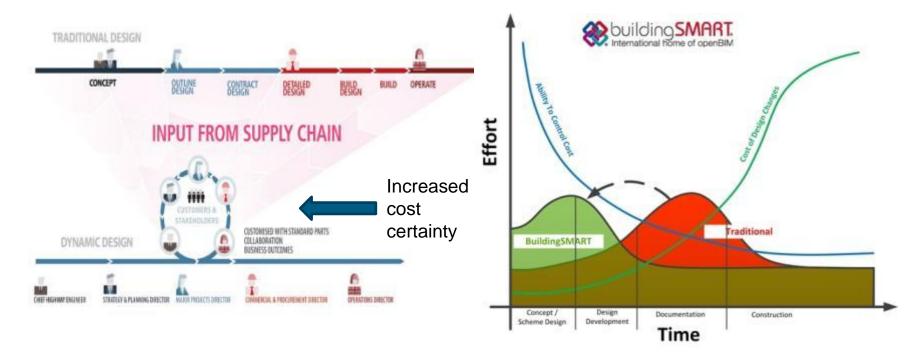


# Realising the benefits from BIM





# The "Left Shift" agile design with the contractor



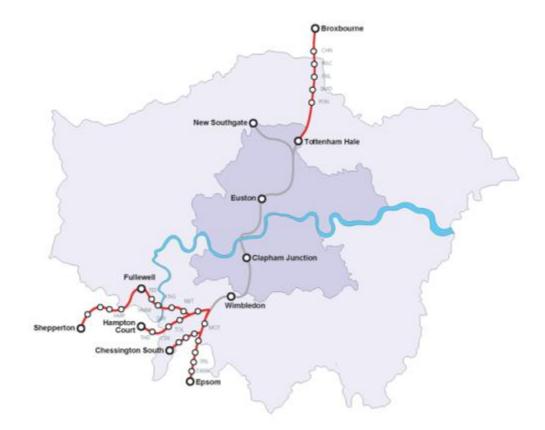
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#### Data informed decision making on projects

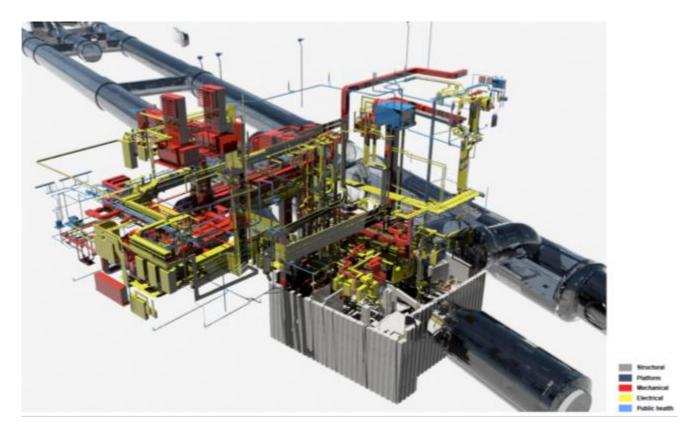


# **BIM on projects**

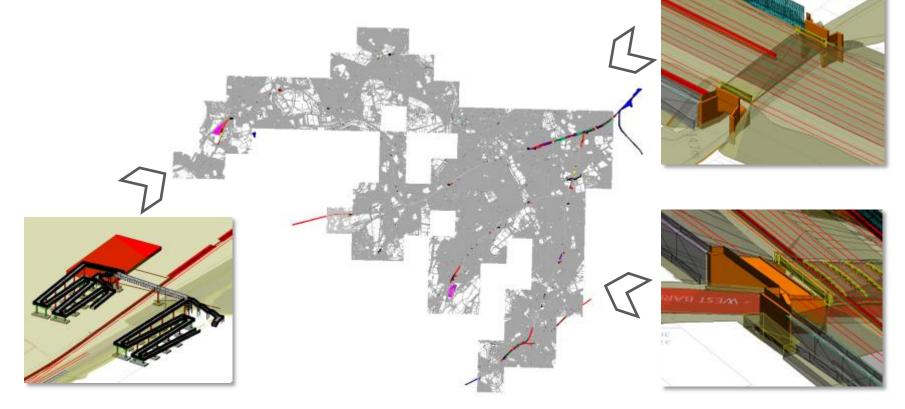
# Crossrail 2 (ONS)



### **Crossrail Farringdon ETH**



### Federated 3D coordination model



#### GIS







MAYOR OF LONDON

#### Welcome to GiGi

This is the project centralised data environment offering access to all geographical information across work packages. New data is constantly being added so please view the 'what's new' section below.

All information available through these web maps is for use on the Crossrail 2 project only in line with the project confidentiality requirements. Users must not share any information available on GiGi outside of the internal project team.

Please click on the relevant map image below to take you to the web maps.

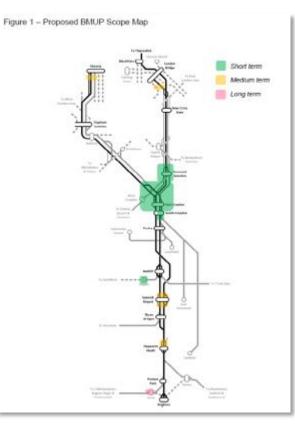
For training, data requests, feedback or any other information please contact Isabella Allen by email at Crossrail2GIS@tfl.gov.uk or phone on 020 3054 7692

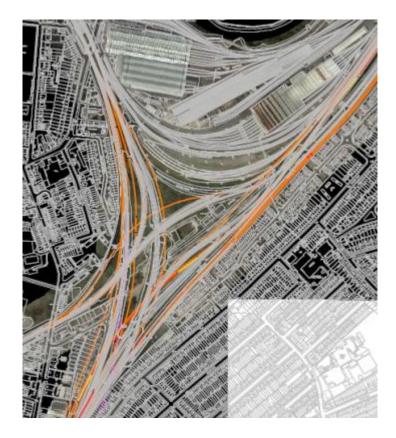
GiGi is part of the Crossrail 2 Common Data Environment. Please click on this link to send us feedback.

#### What's New:



# CARS (Croydon Area Remodelling Scheme)

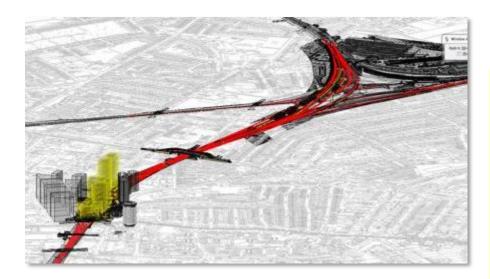


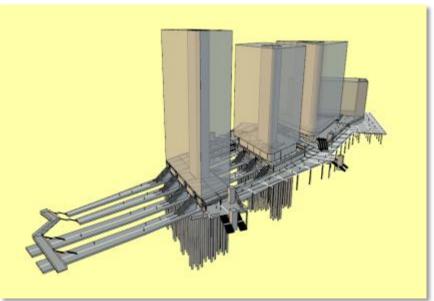






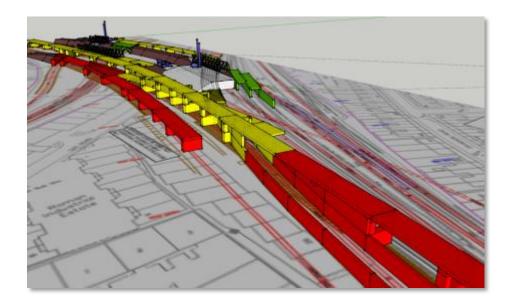
#### Federated 3D coordination model

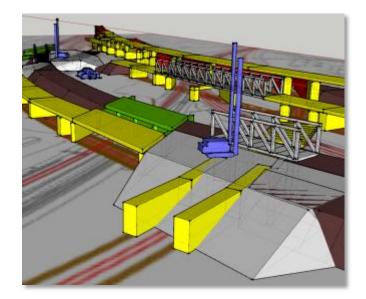






# Preliminary Construction Planning (4D)









#### East West Rail Phase 2 (EWR)



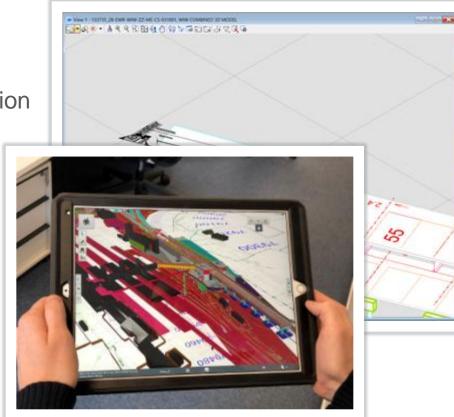
# **3D Coordination**

#### **Benefits**

- > Design and Construction Integration
- > Paperless management
- > Training and upskilling

#### Challenges

- > Training and upskilling
- > Technology Limitations
- > Resources





# 4D Sequencing

#### **Benefits**

- > Visualization
- > Time saving
- > Construction cost savings
- > Health and Safety

#### Challenges

- > IT capabilities
- > Resources





# Quantification

#### **Benefits**

- Visibility
- > Ease of Interrogation
- Accuracy
- > Automation

#### Challenges

- Modelling methods
- > Compatibility
- > Assumptions

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Design Document Options Teamount Westing

- What you have seen here is really happening on these (and new) projects. This is not theory.
- There is behavioural change required within existing design teams and with traditional working methods.
- Training and upskilling will be required.
- It's not as scary as it looks!





#### Thank you. Any questions?