

# Geotechnical Data Integration: The foundation of good Building Information Models (BIM)

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**Bentley Systems**

8<sup>th</sup> of November, 2.45pm

# Bentley Systems

Bentley provides **software** and **professional services** for the **lifecycle of the world's infrastructure**.

Comprehensive portfolio for the building, plant, civil, and geospatial markets, spanning architecture, engineering, construction and operations



**Civil**



**Plant**



**Building**



**Geospatial**



# Bentley Solution Offerings

Solution includes:

- Intra-operable software product portfolio
- Professional services and learning
- Professional communities networking



Oil and Gas



Cadastral and Land Development



Roads



Metals and Mining



Buildings



Bridges



Power Generation



Campuses



Utility Networks



Industrial Facilities



Rail and Transit



Water and Wastewater

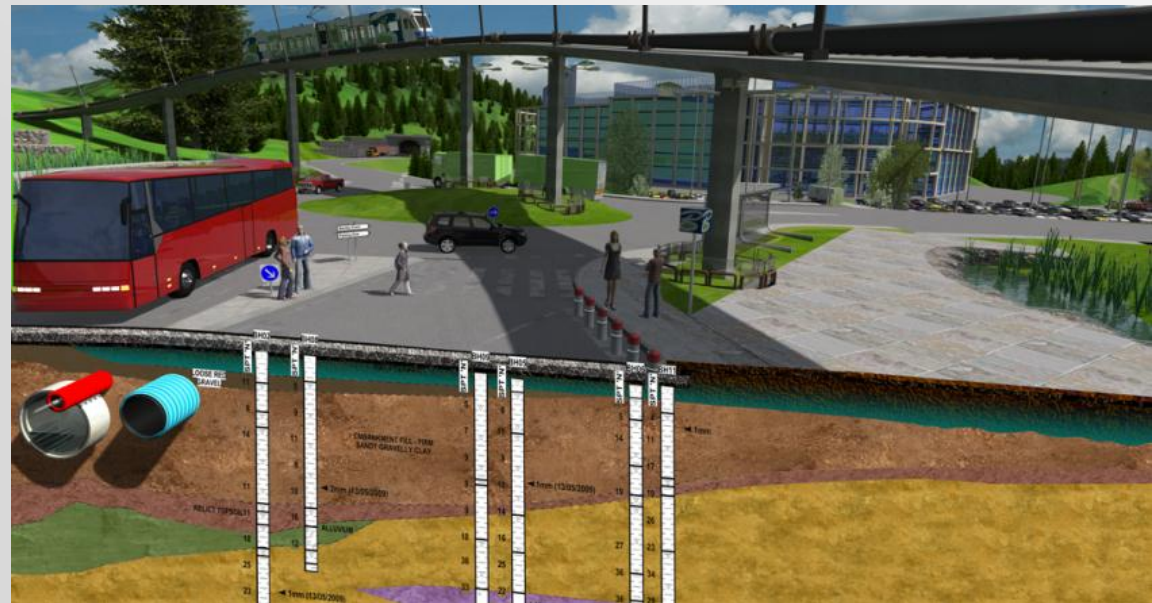


Communications



# Agenda

- Defining what is BIM
- Understand key features, terminology and benefits
- What is the role of Geotechnical Information in BIM
- Examples of across discipline and environment delivery



# What is BIM?

**B**uilding **I**nformation **M**odelling is nothing more than a multi-disciplinary collaborative, model based approach to the design, construction, commissioning, ownership, operation, maintenance, demolition of built assets.

*John Dickinson, P. Eng., Ph.D.*

The BIM model is a digital resource of reliable information for decisions from the initial conception to the final disposal of a facility or asset, founded on open standards for interoperability and integration

Targeted at reducing costs

Not a 'product' it is a "process"



# Why is BIM so important?



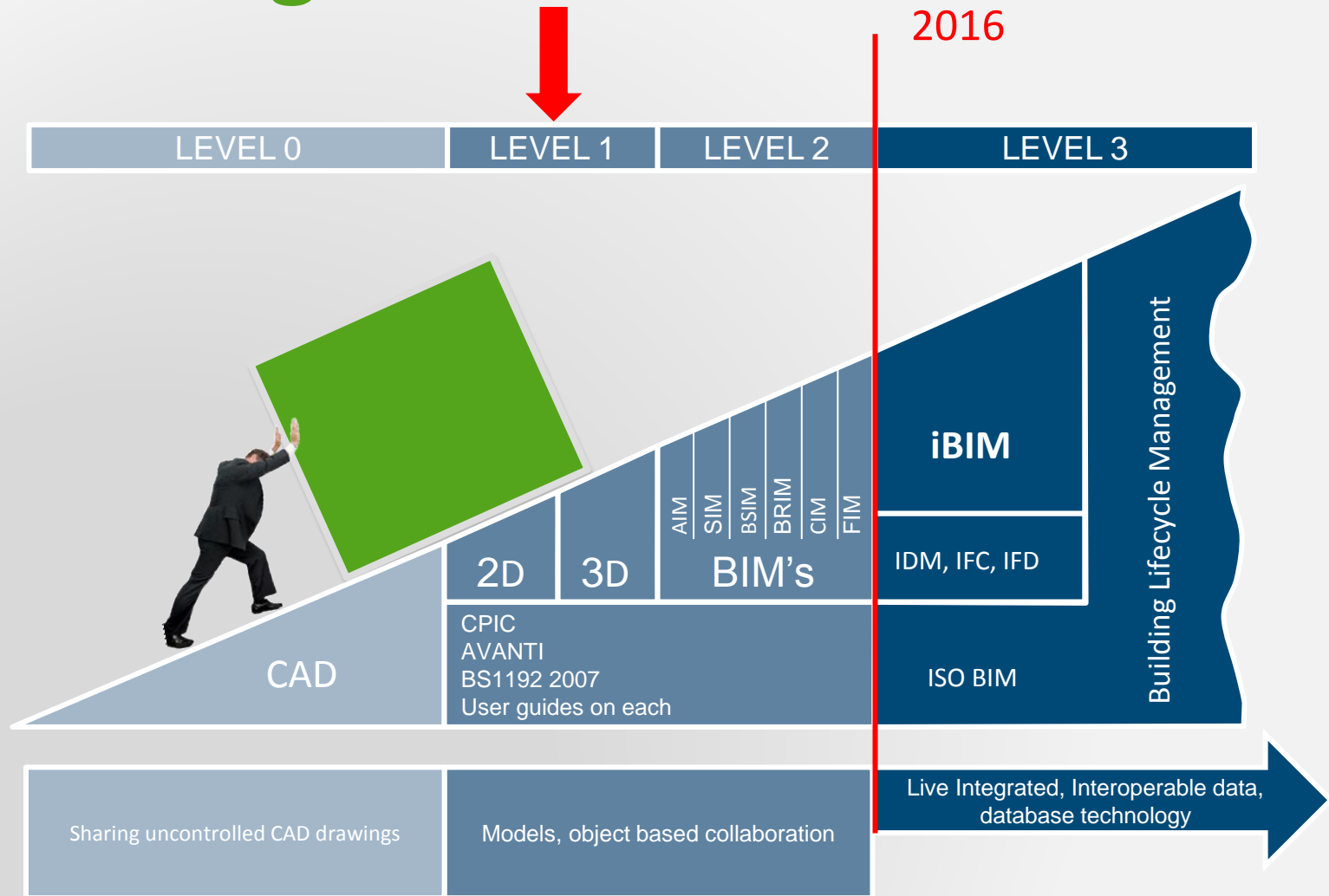


# Government 'Encouragement'



- Reduce costs by 20%
- Public Money
- Adoption within 5 years
- Competitiveness

# Evolving BIM



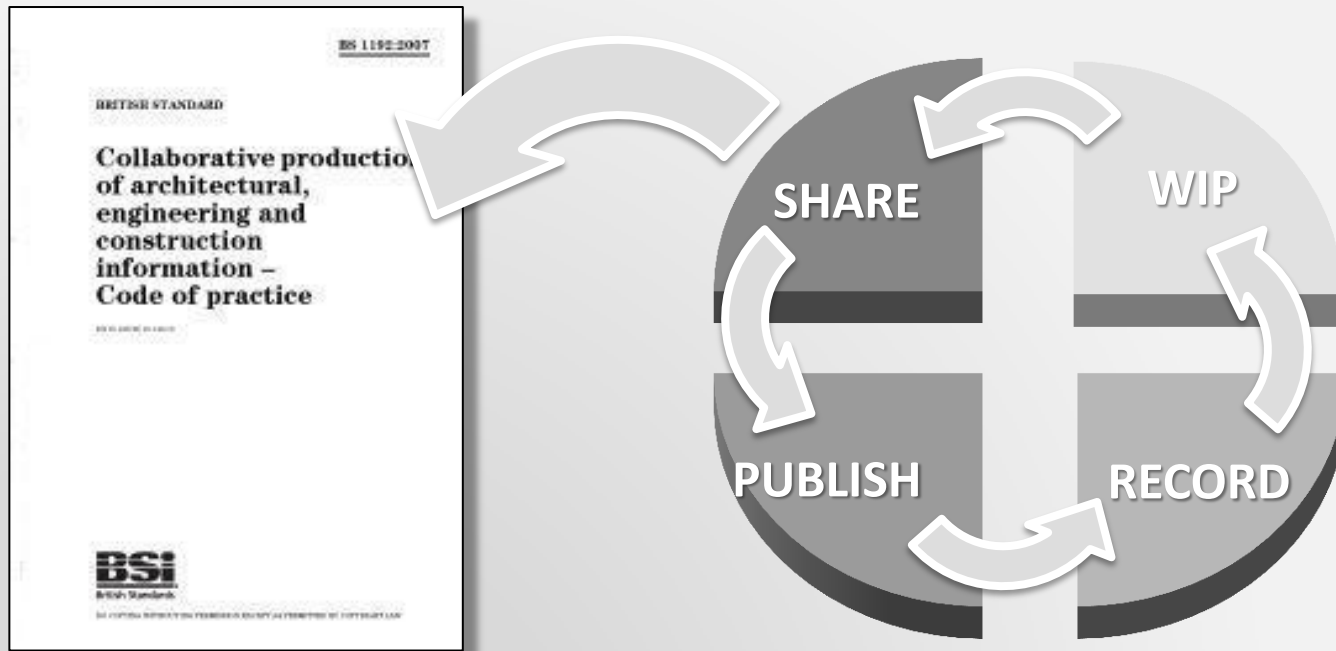


# Key elements of BIM

- 2D and 3D data
- Federated data approach
- A collaborative work flow process
- Interoperability and data re-use
- Agreed data deliverables
- Culture



# British Standards 1192



- Defines how to create a trusted **common data environment**
- Defines processes and conventions that make true data co-ordination and collaboration work
- BS1192 is based upon a federated approach to **Building Information Modelling/Management (BIM)**

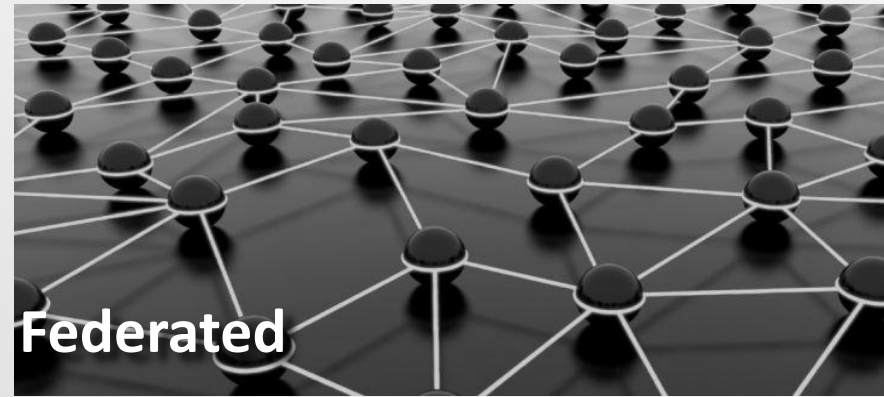
# Federated Approach



Monolithic



- Task driven
- Proprietary
- Dictatorial
- Local
- Unsustainable



Federated



- Process driven
- Open
- Democratic
- Distributed
- Sustainable



# Federated BIM Data

Steel structure  
Concrete structure  
MEP services  
Coordination  
Combined Together  
Contextual  
information



# Integrated data model - BIM

Fully integrated BIM, “supply the correct information to the correct person at the correct time” !

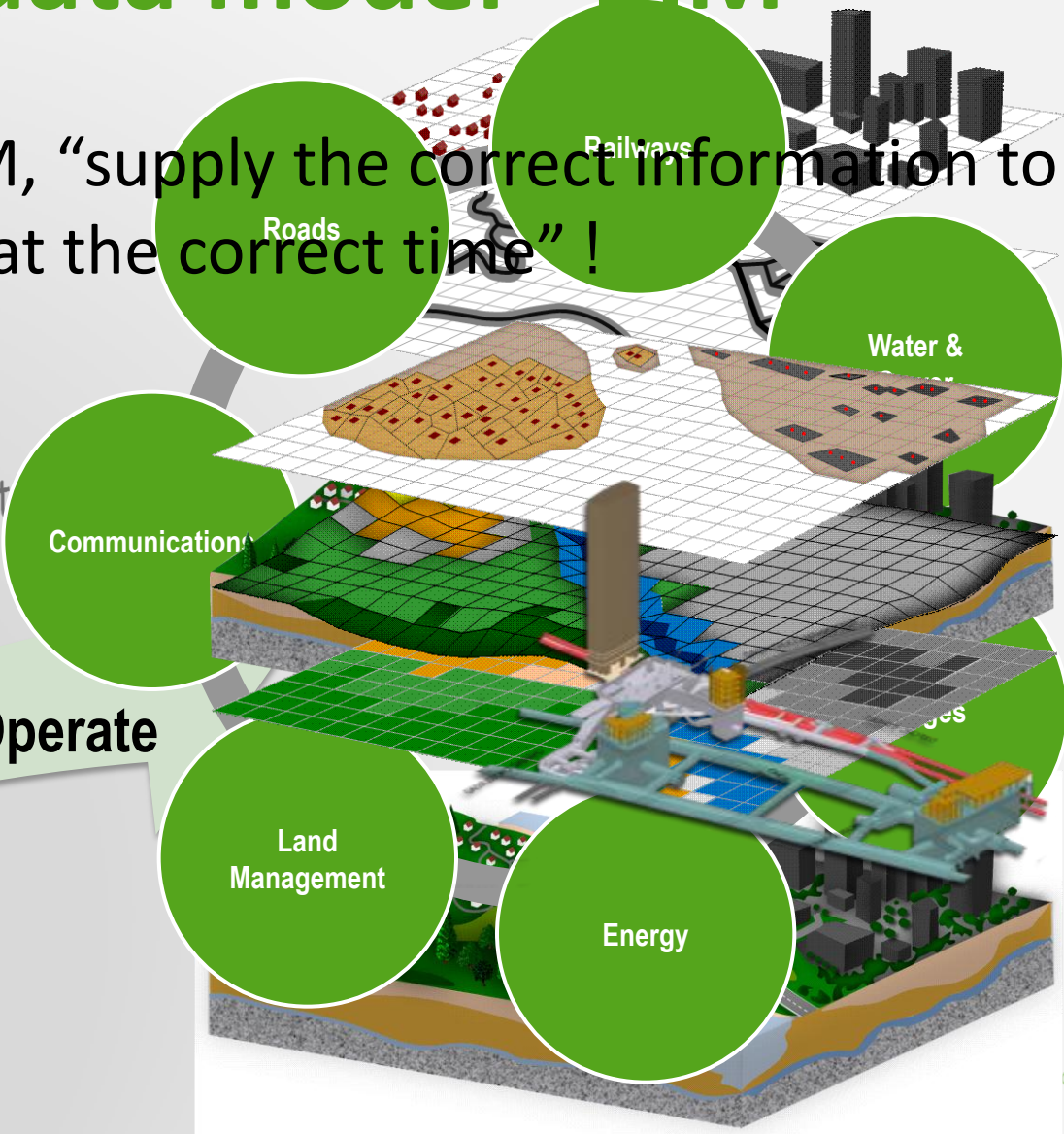
Data developed throughout project lifecycle



Build



● Operate



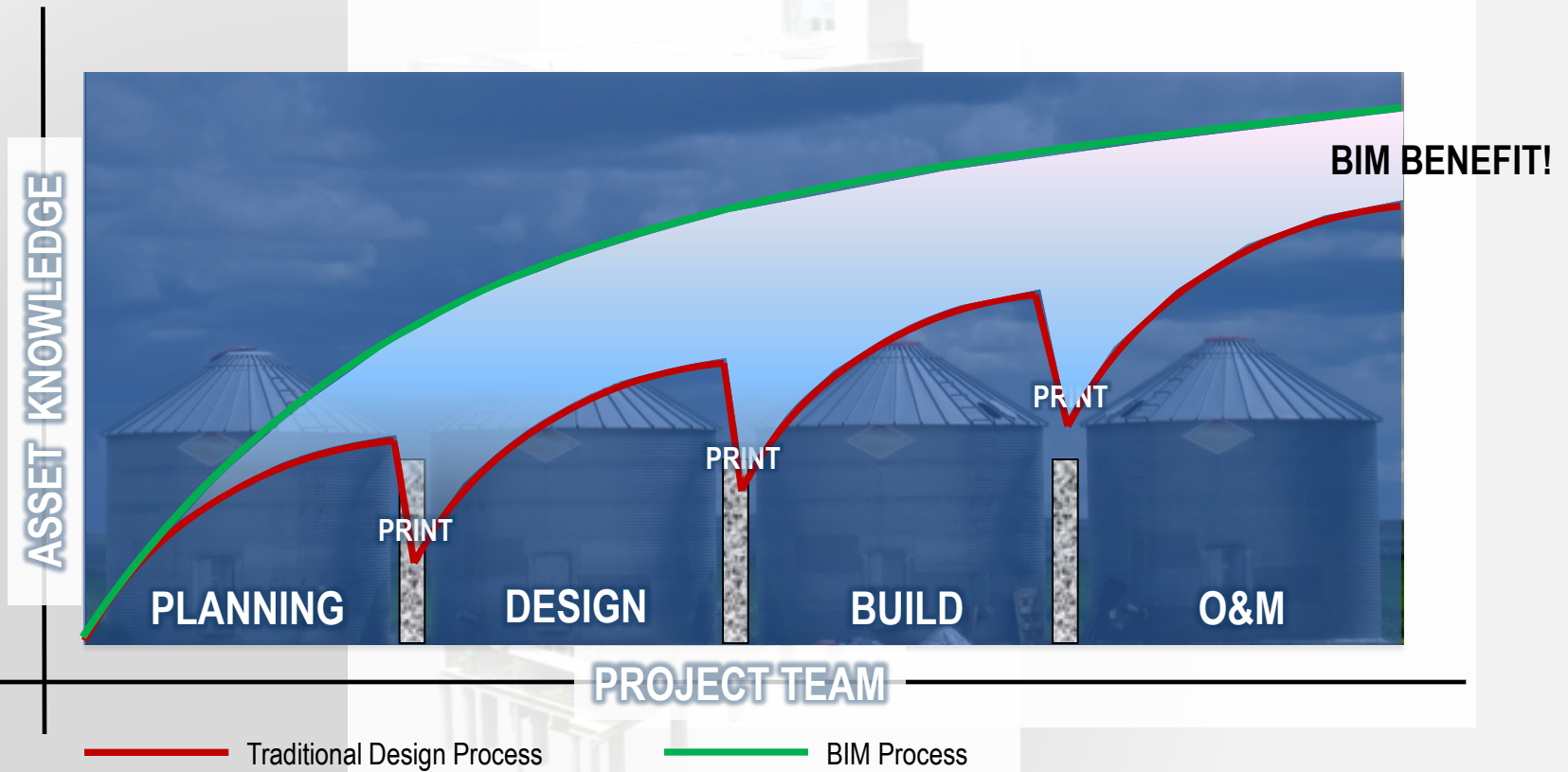


Okay, so what are the benefits



# Why Building Information Modelling ?

?





# Where BIM returns value?

- Reduce costs while improving productivity
- Improve quality while maintaining industry standards
- Improve your understanding of risk on projects
- Provides you with greater control
- Avoid time and cost over-runs
- Increase efficiency within your supply chain
- Increase your understanding of the asset
- Protect profit margins

# The Role of Geotechnical Engineering in BIM

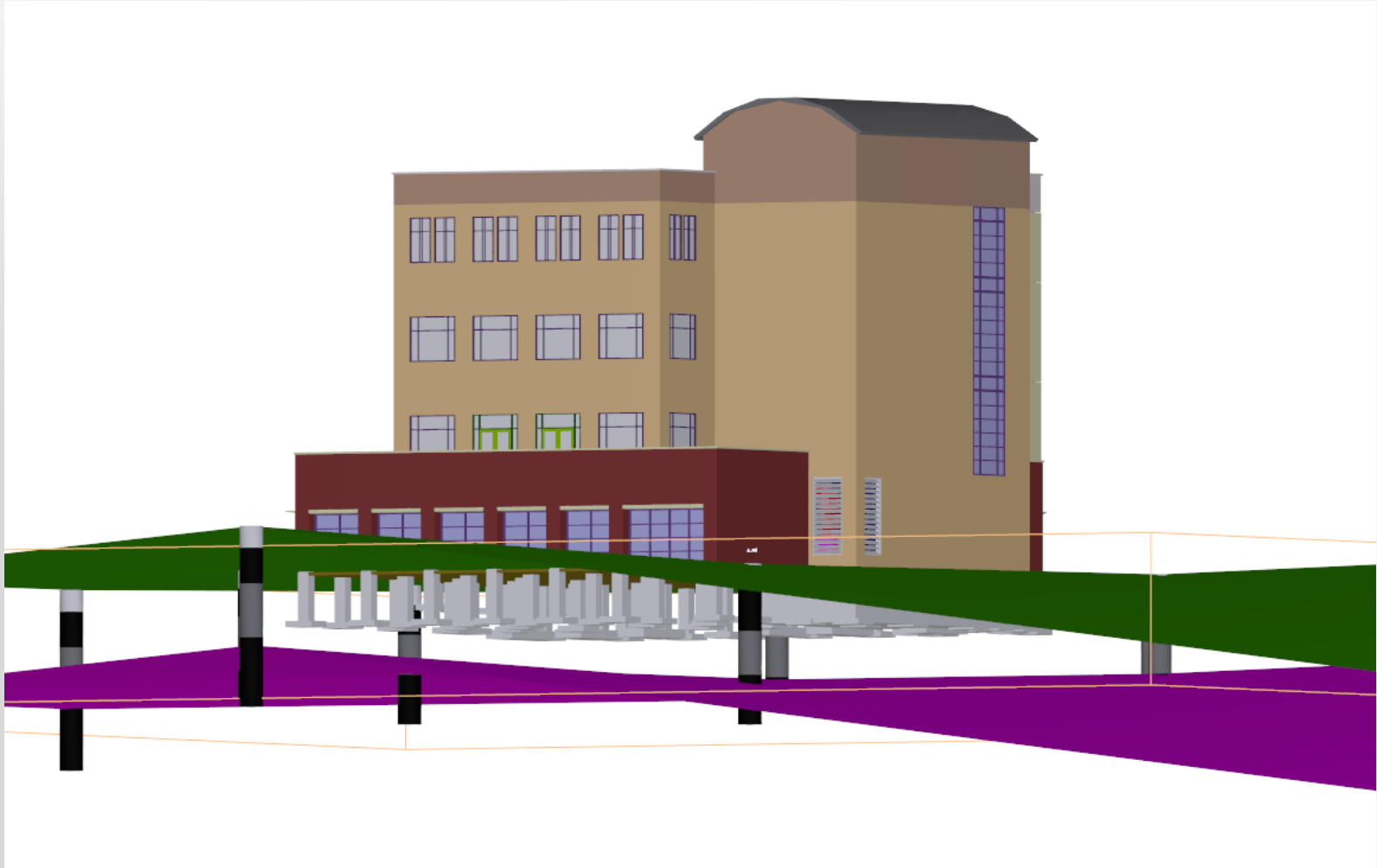
- Underpins all structures that exist on or above the ground
- Surrounds all underground structures
- Dictates the choice of design and costs related to the design
- Subsurface information acts as the source for all BIM models

If complacent, costs are cut, information is isolated or poorly managed ..... What happens!!!

# The Role of Geotechnical Engineering in BIM



# Geotechnical Data in BIM



# Geotechnical Data in BIM

What kind of information should be made available to the BIM environment?

- Factual Information – hole location, lab, stratigraphy, geophysics, etc.
- Derived information – classification, reports, etc.
- Interpretive Information – sub-surface models
- Analysis and Design – GeoStructural Designs

All have importance when integrated into a multi-discipline environment



# Geotechnical Data in BIM – Federated Approach

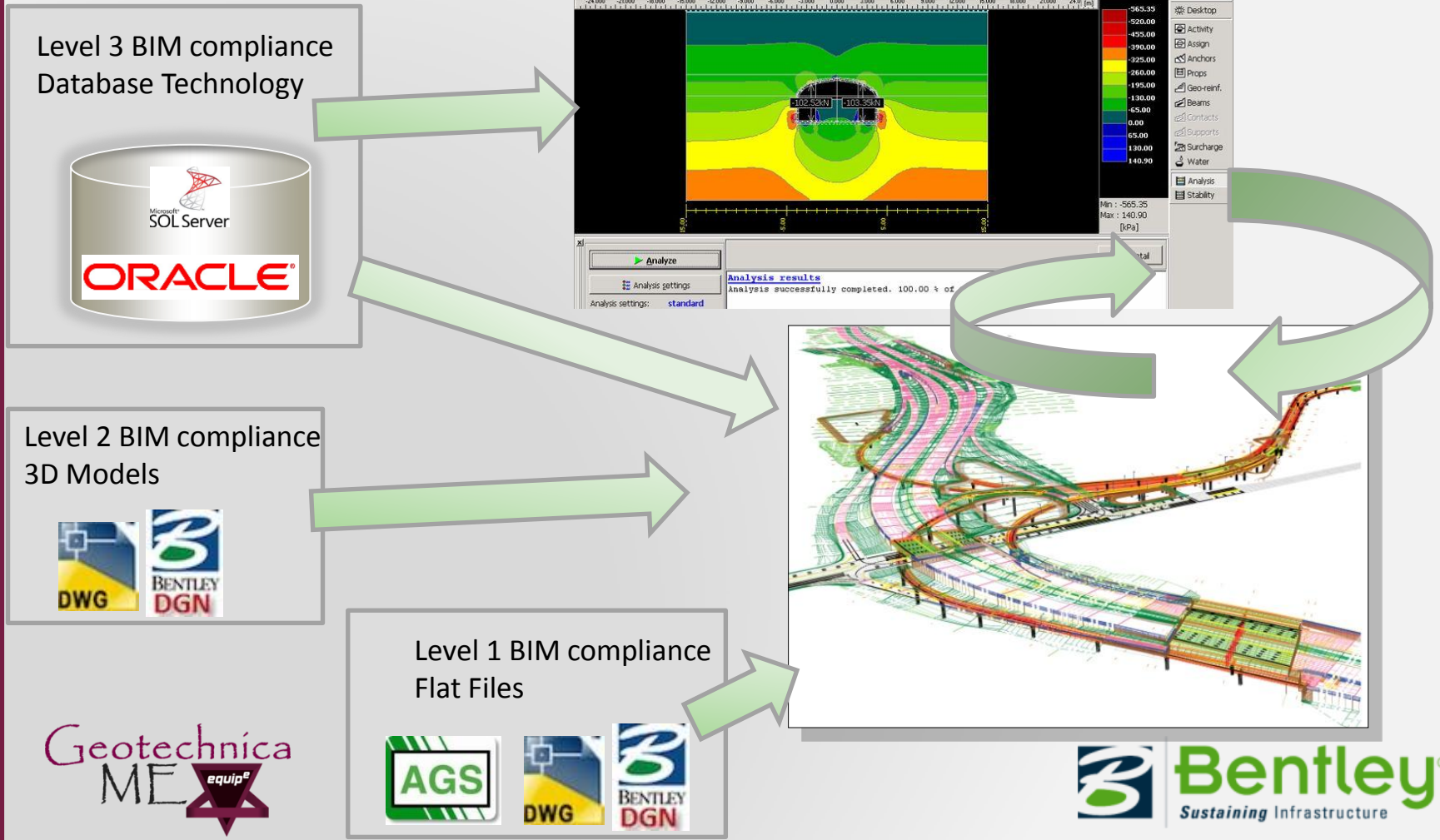
What does this mean for Geotechnical Information?

- Data resides where it was created and is managed
- Updated information reduces risk and gives a clear picture of the underlying challenges.
- Decisions are made through interaction not a snapshot in time.



# Geotechnical Data in BIM – Federated Approach

**Little BIM** – often preferred by design teams who wish to adopt the BIM workflow.

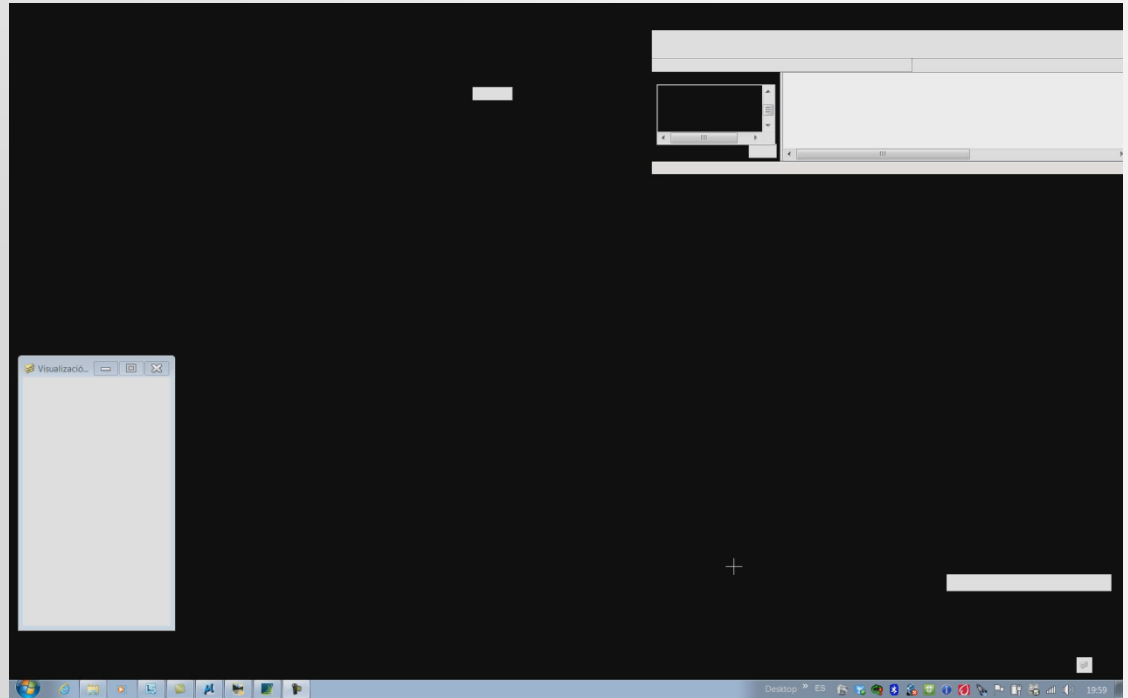




# Geotechnical Data in BIM – Federated Approach

Application Example – Road Design

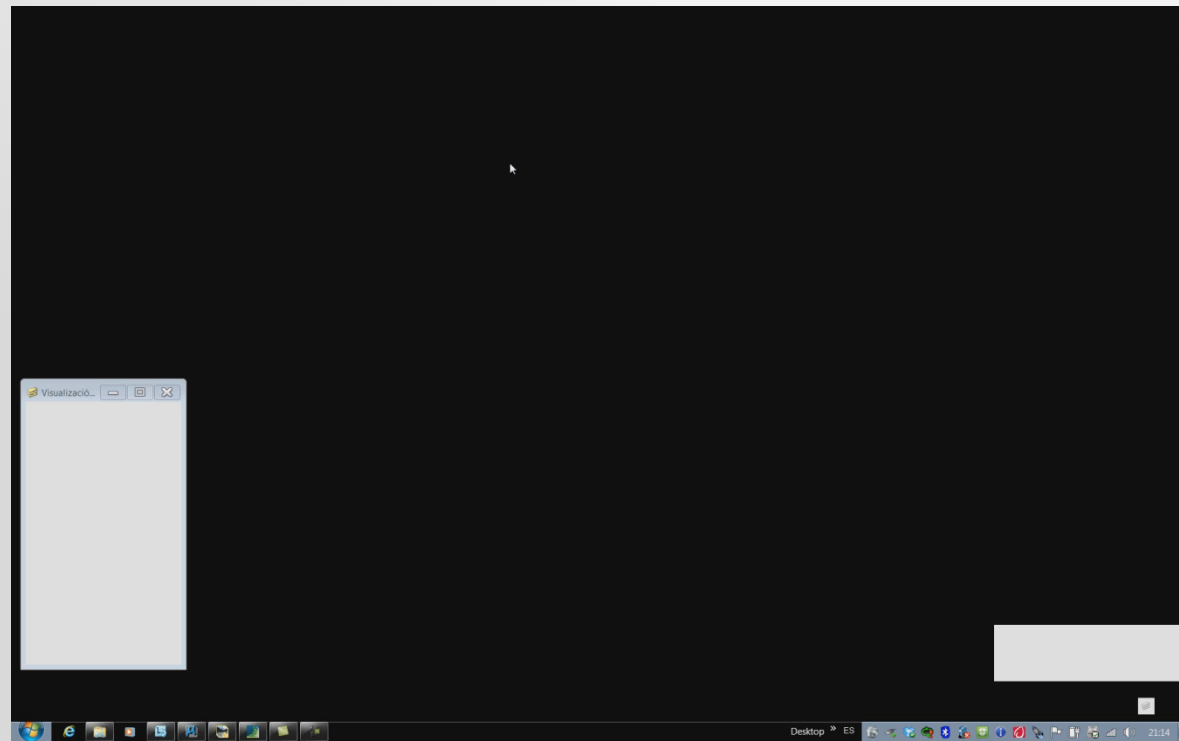
Feasibility Study



# Geotechnical Data in BIM – Federated Approach

Application Example – Road Design.

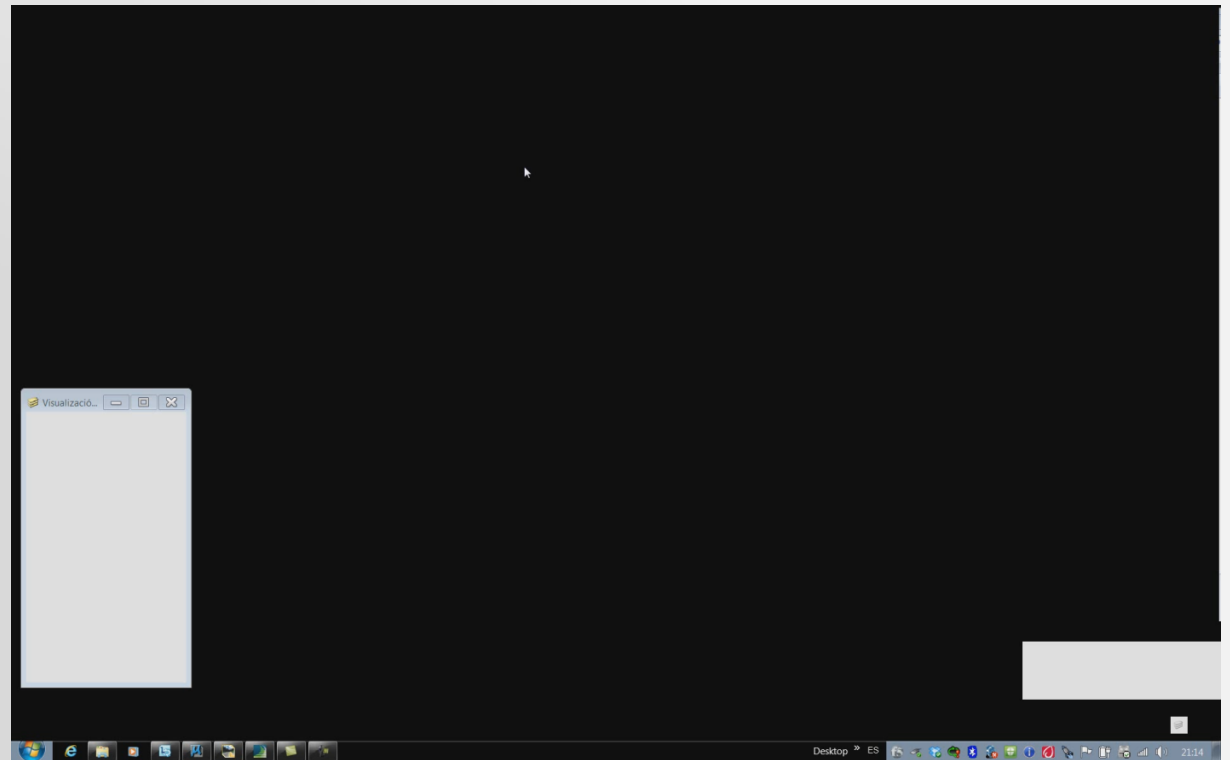
Addition of a more detailed survey



# Geotechnical Data in BIM – Federated Approach

Application Example – Road Design

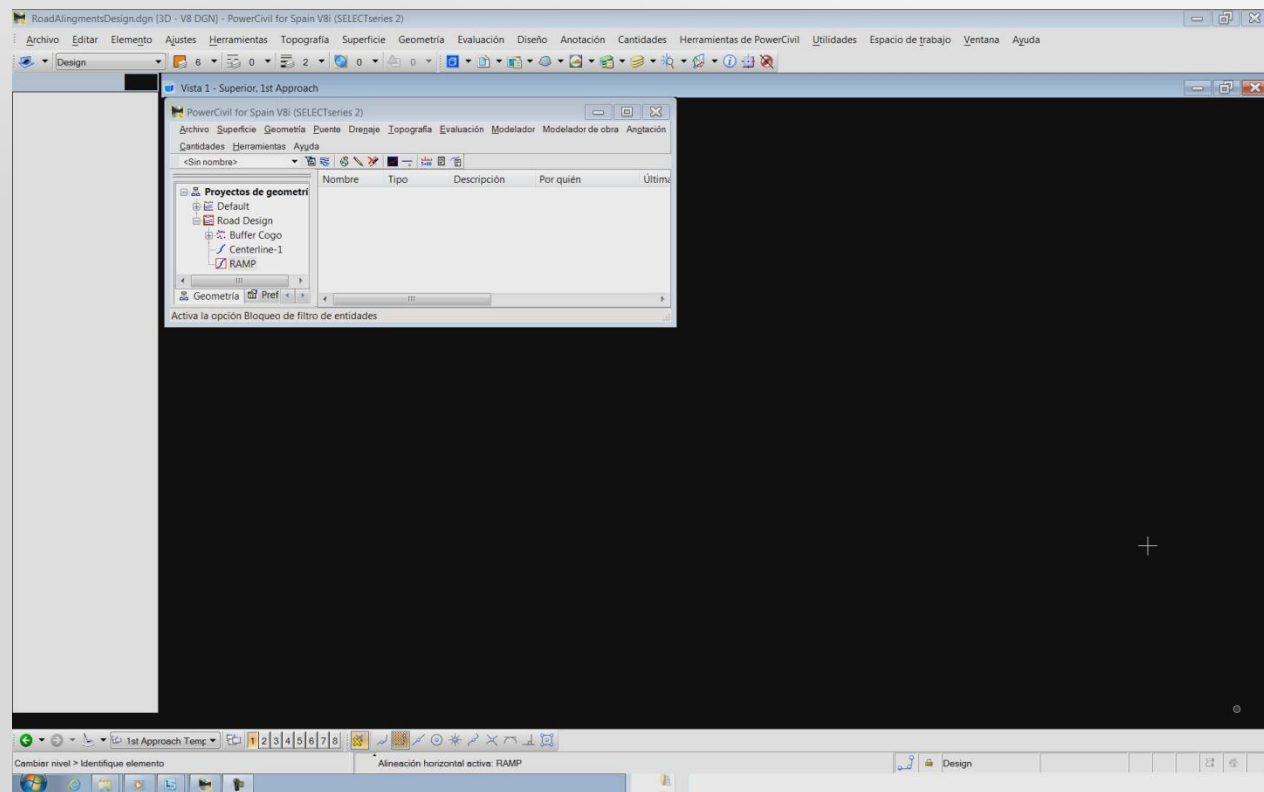
Iterative cycle



# Geotechnical Data in BIM – Federated Approach

Application Example – Road Design

Completed Design



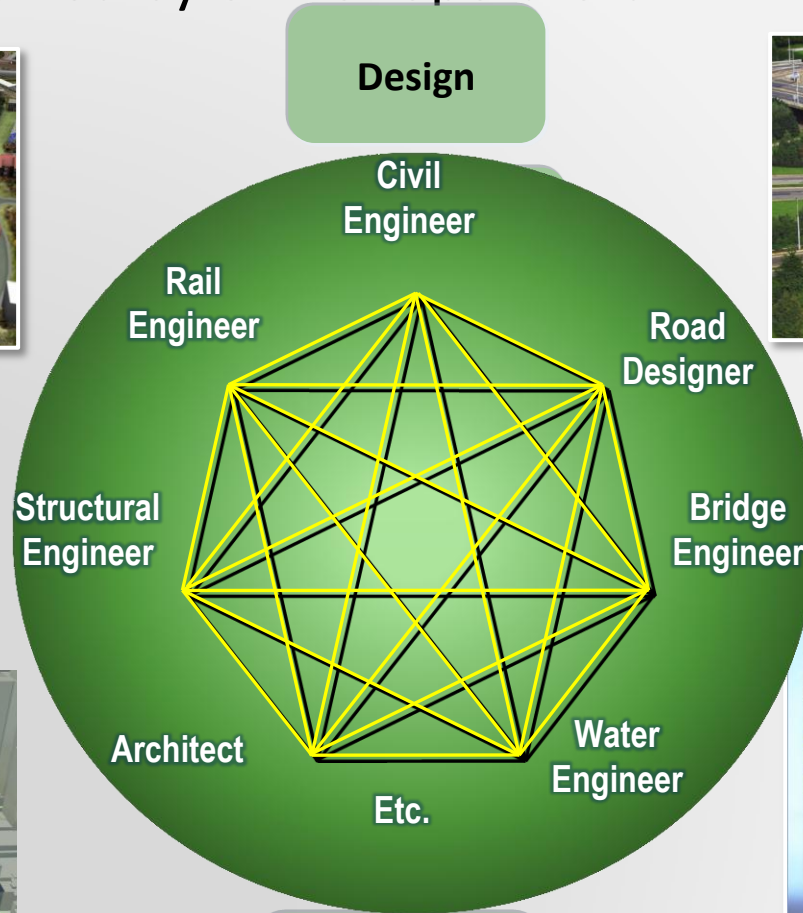
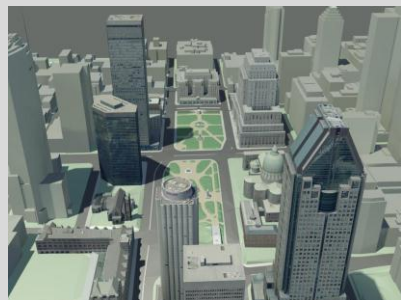
# Geotechnical Data in BIM – Federated Approach

Big BIM – preferred by owner operators



Continued use of the model

Procure & Construct

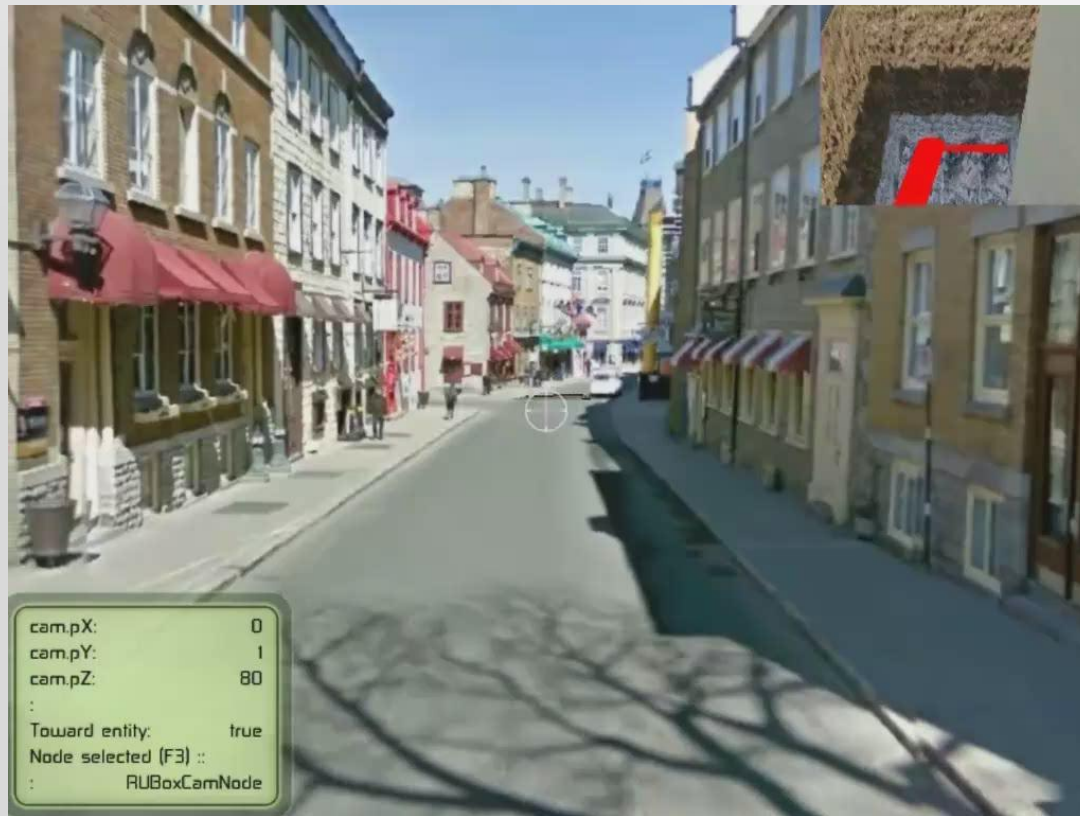


Operate & maintain

# Geotechnical Data in BIM – Federated Approach

Post build maintenance phase, reusing subsurface information

Sharing information through hand held devices

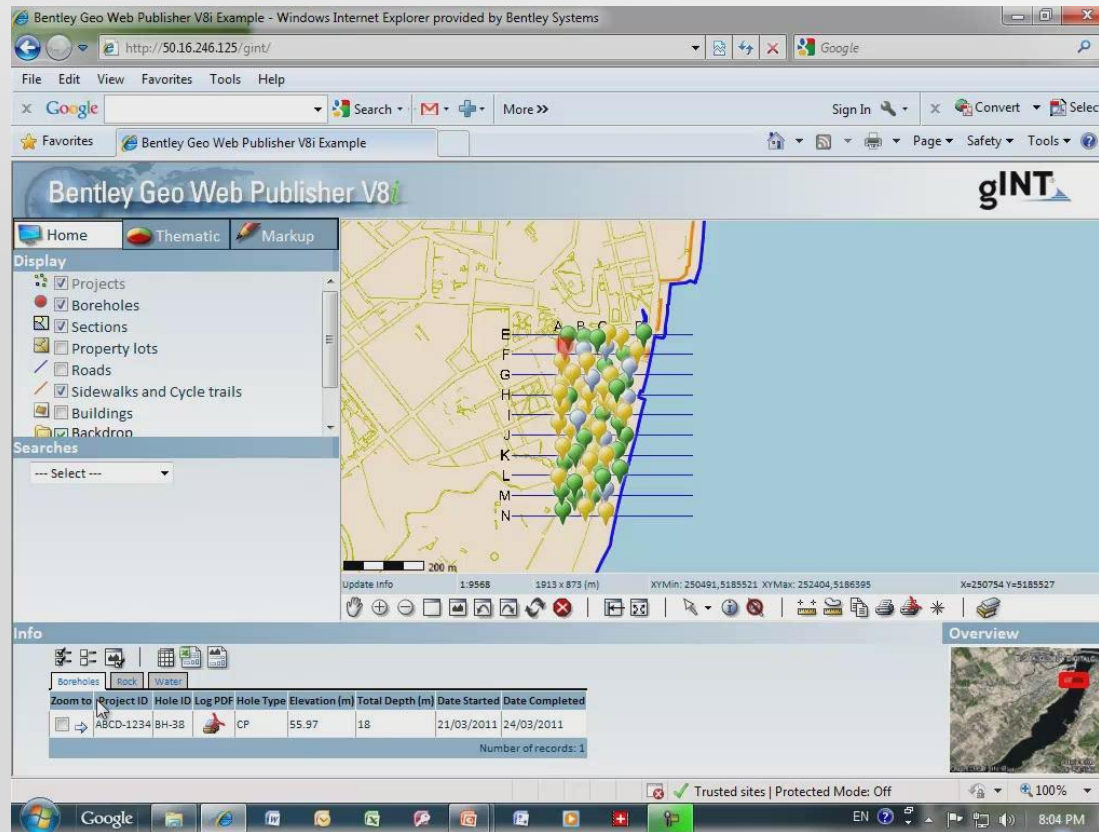




# Geotechnical Data in BIM – Federated Approach

Post build maintenance phase, reusing subsurface information

Sharing information to Desktop and Web based GIS





# Summary, what have we learned

- Geotechnical data adds considerable value to the BIM environment
- Subsurface conditions can be the defining parameters to the success of a infrastructure project.
- Supplying the correct information, to the correct person at the correct time, is an effective work practise (BIM)
- Do not be scared, it is only a process



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