

NOVEMBER 2017

PROJECT ICEBERG BREAKING NEW GROUND FOR FUTURE CITIES

Our cities are growing, and with increasing pressure on space, higher land prices and a drive for compact, resource efficient cities, **we are seeing more urban development underground**. This is leading to increased pressure on subsurface space in our cities. Urban subsurface space provides a **valuable resource often forgotten in city planning** – out of sight, out of mind. Yet we rely on land beneath cities to **build on**, to house our **critical transport** and utility infrastructure, to provide natural resources to **sustain urban growth** and increasingly for **innovative applications** such as growing food underground, ground heat recovery, and underground data-stores.



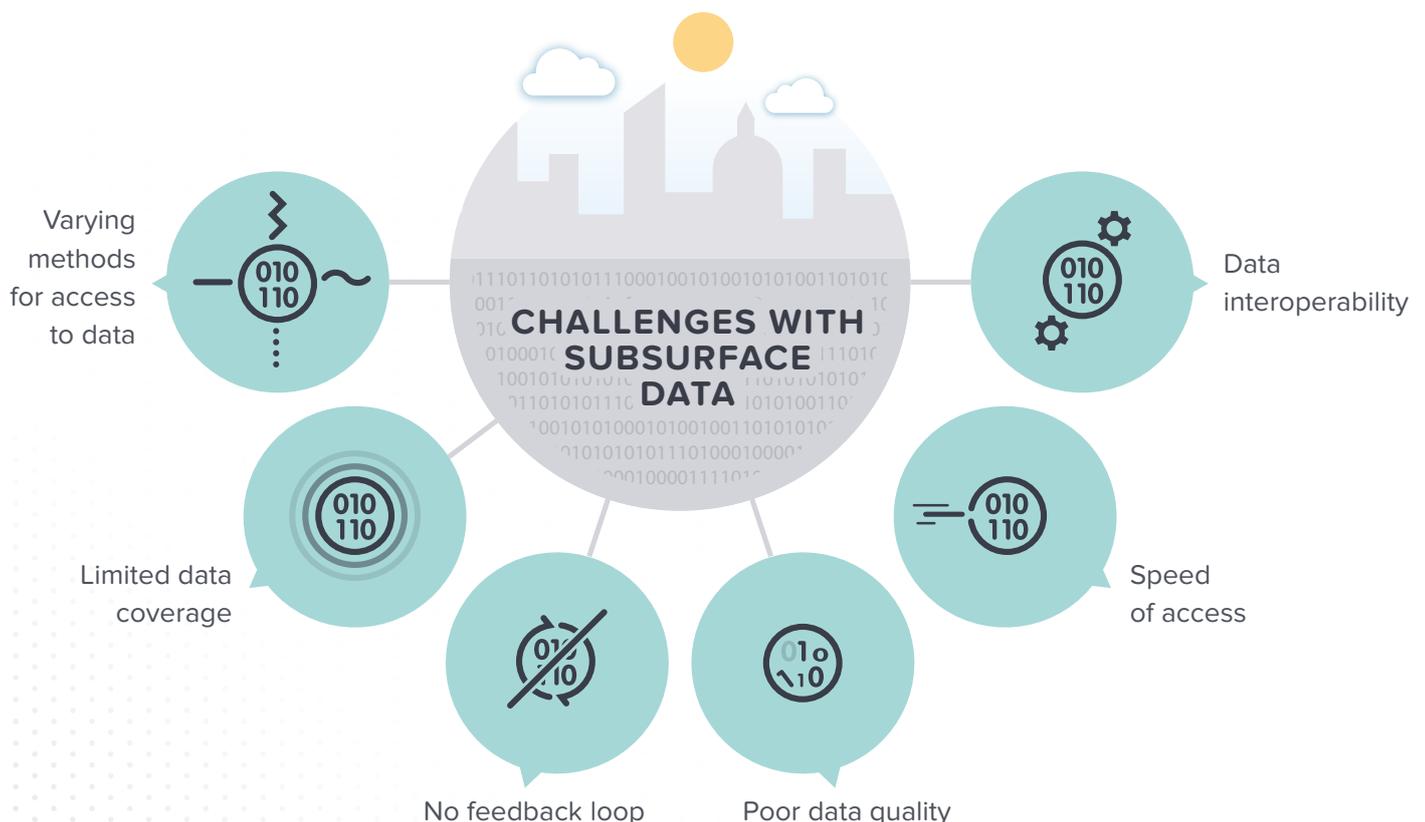
THE CHALLENGE

The direct costs associated with 'normal' maintenance of underground electricity, gas and water assets runs into the billions of pounds a year without considering indirect costs such as increased road congestion during ground works. How we understand and manage underground space determines how sustainable and resilient our cities will be. As extreme weather conditions become more persistent we must consider the environmental risks to infrastructure and the capacity of the ground to dampen extremes. More than 50 London Underground sites are at high risk of flooding. Meanwhile our limited knowledge of the condition of land means that sites with the potential to accommodate desperately needed housing are dismissed as unviable.

The surface world is mapped down to a matter of centimetres but interest in and understanding of the underground is limited to a small number of transport planners, urban geologists and construction workers. There is some information about who owns what water pipe, where the electricity cable was laid or the type of soil that is surrounding the new tube line but its scattered amongst many, many different public and private organisations, held in different formats. Some data is security sensitive, but much is withheld for reasons of perceived commercial advantage or lack of incentive to invest in data sharing. Even if you can request the information, it often takes weeks to receive it.

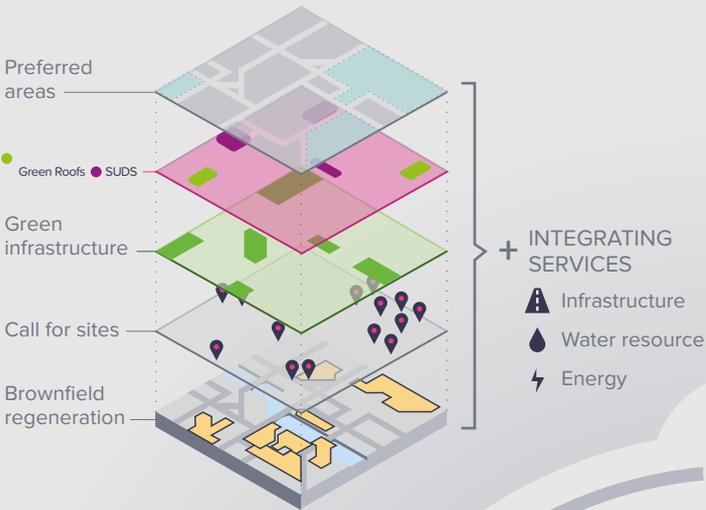
Critically the holders of this data have different technical expertise, different incentives and different approaches to data utilisation. New sensing and sensor technologies are beginning to capture more data, more precisely about assets, their condition and the soil they sit in. However until there is a way for anyone who needs to know about the subsurface to easily and reliably access the appropriate data for their task, it will be impossible to manage the growing costs associated with underground development and asset management, creating a financial burden for society.

This lack of coordination and collaboration has many costs. The Department of Transport estimates that street works account for an estimated cost of £4.3bn annually (2005). Meanwhile the Treasury estimated in 2013 that greater cross infrastructure collaboration can save the economy an estimated £3bn. Not only could we do things more efficiently with subsurface data but also quicker. It was estimated that the \$2bn light rail scheme in Sydney could have been built one and a half years earlier if they had reliable underground utility information. We can only guess at the acres of brownfield land that might become economically viable for housing development if there was greater sharing of subsurface information.



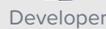
DEVELOPING TOOLS, SERVICES & SOLUTIONS: USE CASE APPLICATIONS

INTEGRATED PLANNING

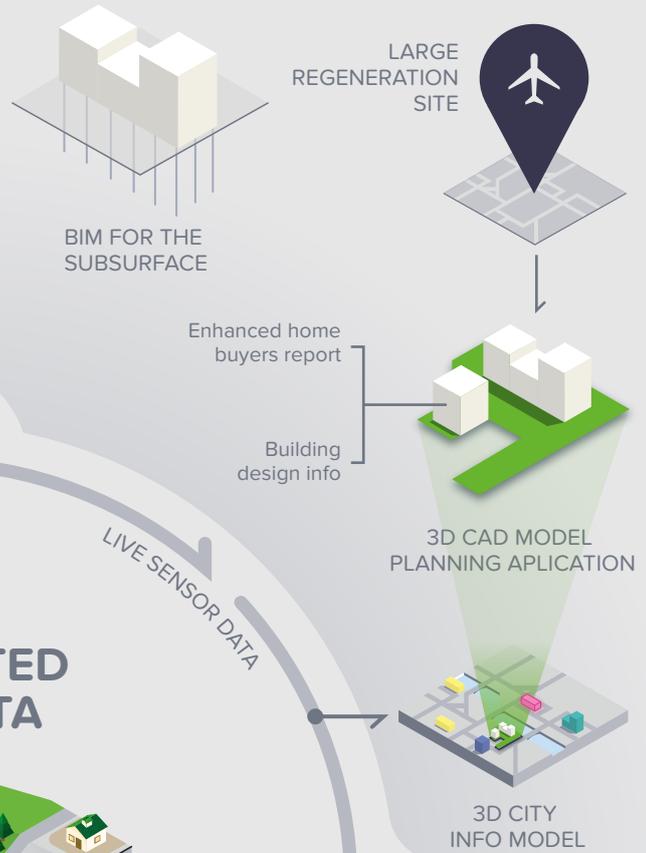


LOCAL DEVELOPMENT PLANS

INTEGRATED CITY DATA



INTEGRATED 3D MODELLING



BROWNFIELD LAND

BROWNFIELD REMEDIATION COSTING TOOL

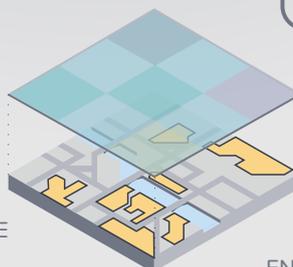
REFINED BROWNFIELD REGISTER



UTILITY IDENTIFIER TOOL

TOOL TO ASSESS CAPACITY IN ALL UTILITIES AT A SPECIFIC SITE

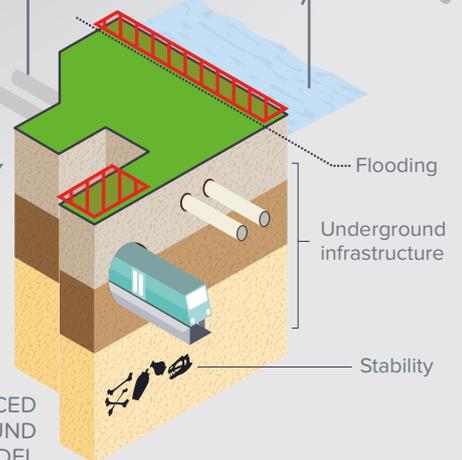
INTEGRATED UTILITY INFRASTRUCTURE MAP



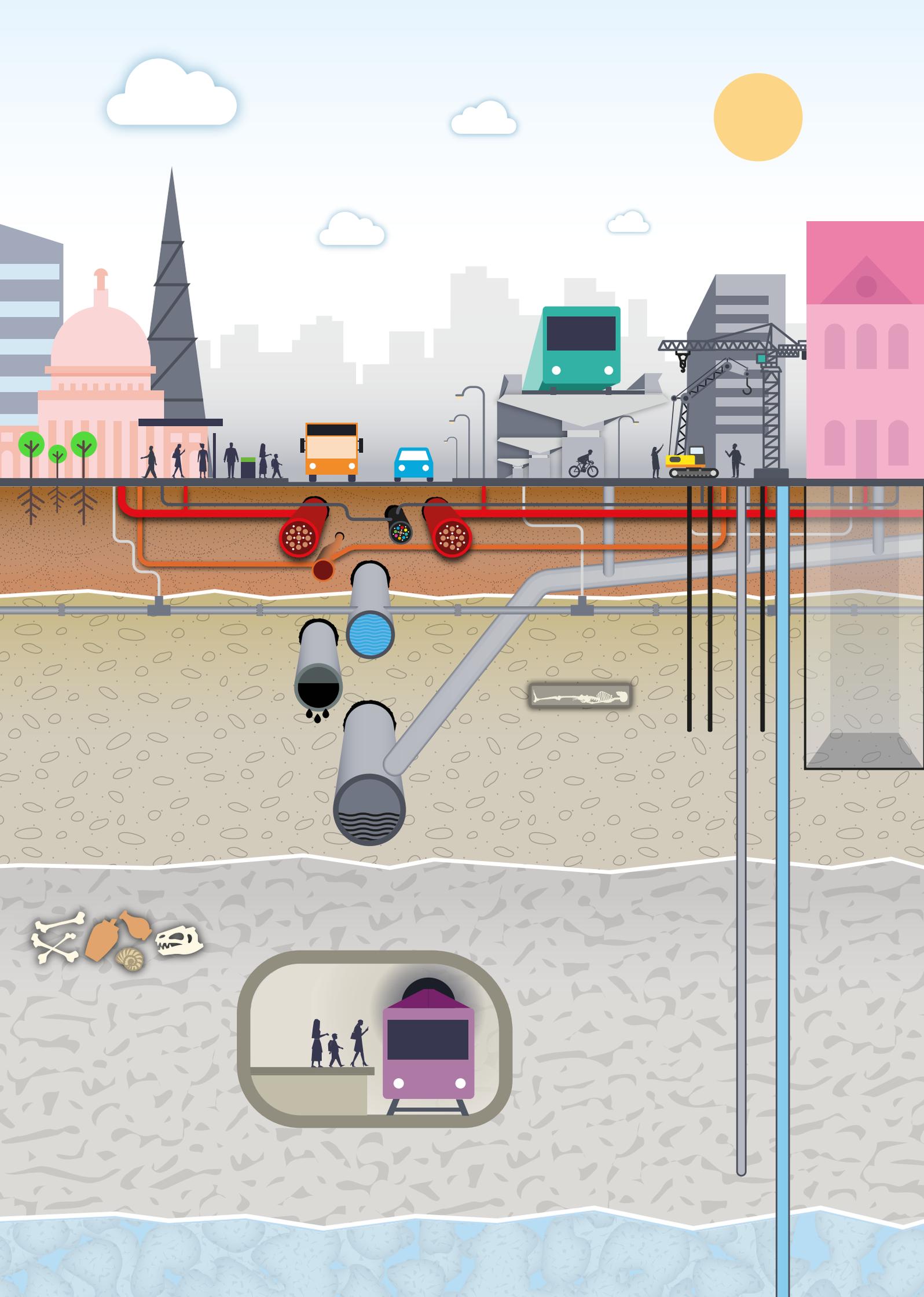
UTILITIES

UTILITIE LIFECYCLE COST

RISK ASSESSMENT



ENHANCED 3D GROUND CONDITION MODEL





**INTERESTED IN WHAT
WE'RE DOING?**

THEN WHY NOT...

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www.bgs.ac.uk/urban/iceberg

<http://futurecities.catapult.org.uk/project/future-planning-project-iceberg/>

Or send us an email

projecticeberg@os.uk

Project Iceberg is an exploratory project undertaken by **Future Cities Catapult, British Geological Survey** and **Ordnance Survey**. The project aims to address the serious issue of the lack of knowledge about the ground beneath our cities and the un-coordinated way in data about the subsurface is captured, used and reused. **The long-term goal is to help increase the viability of land for development and de-risk future investment through better management of subsurface data.** To help achieve this, our study aims to enable a means to discover and access relevant data about the ground's physical condition and assets housed within it, in a way that is suitable for modern, data driven decision making processes.