

# UK URBAN SUBSURFACE RESEARCH – WHERE NOW AND WHERE TOO

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The British Geological Survey (BGS) has been a world leader in urban 3D geological modelling. This reputation was largely developed through the Glasgow and London cross cutting projects and led to follow-up high profile international 3D geological modelling collaborations in Europe (Horizon 2020 COST SubUrban Action), the Middle East (Abu Dhabi) and Asia (Singapore).

Urban 3D geological data and information has been leveraged for use across many types of projects, such as tunnelling and construction, shallow geothermal energy systems and geohazards, such as the shrinking and swelling of clays rich environments, a cause of subsidence. However, there are opportunities to better understand the urban subsurface and how we interact with the data and information provided.

For example, anthropogenic deposits, including their make-up and depth, are often poorly understood in urban areas. Artificially modified ground can mimic naturally occurring deposits as they have a lithological variation akin to natural deposits albeit at more localised scale. Similarly, the geotechnical and hydrogeological properties of the urban subsurface will be affected by the anthropogenic deposits (up to 20m below ground level). Infrastructure such as basements and tunnels can also impact the future use of the resource available in the subsurface. The risk being that some resource (geothermal energy or mineral re-

sources) may become sterilised because of unmanaged development of the near surface urban environments. The convergence of Digital Twin and smart city technologies can provide a key role in the interaction and understanding of geological data (including real-time telemetric data) with the built environment, including subsurface artificial structures and artificially modified ground. Providing a virtual decision information system in one immersive space will be key to analysis, understanding and choosing the optimal option.

In this presentation we will look at some recent examples from the BGS (including external collaborations) in urban subsurface 3D investigations, and a look at where further research is required.