

Monitoring capabilities at the National Green Infrastructure Facility

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ABSTRACT

The National Green Infrastructure Facility (NGIF) is interlinked with the national network of Urban Observatories across the United Kingdom (UK), as part of UKCRIC – the UK Collaboratorium for Research on Infrastructure and Cities. The NGIF is based on the university campus, in and around the Urban Sciences Building at Newcastle upon Tyne, and consists of both indoor and outdoor facilities. NGIF is a living laboratory, that allows researchers to develop and test new technologies under a range of scales and can monitor how they perform over time. Conventional laboratory experiments on soil and water samples can be performed in the indoor laboratory. While outdoor facilities encompass various sized lysimeters and ensembles, which are coupled with advanced sensing networks.

Two examples of ongoing research projects conducted at NGIF related to hydrological, mechanical and thermal behaviour of soil are Priming Laboratory EXperiments on infrastructure and Urban Systems (PLEXUS) and Assessment, Costing and enHancement of long life Long Linear Assets (ACHILLES). Our research within PLEXUS is investigating how meteorological conditions, e.g. rainfall/drought, and vegetation influence the thermal properties of subsoil. A large-scale and heavily instrumented lysimeter is being used at NGIF to establish the hydro-thermal behaviour of soil subjected to a simulated summer heating load. ACHILLES focusses on weather-driven deterioration mechanisms in heterogeneous and cracked soils, and researchers at NGIF will setup a lysimeter to measure crack formation, and to observe the changes of permeability, conductivity and soil water retention properties under various climatic conditions.