Hydrogeology (Non Abstraction)

This module is intended for clients assessing a site for development, including the installation of a closed loop ground heat pump system, and contains hydrogeological information such as aquifer descriptions, groundwater levels, direction of groundwater flow, groundwater quality and groundwater vulnerability. It does not contain detailed information on yields or borehole design and is therefore not suitable for customers proposing to drill a water borehole, or establish an open-loop ground heat pump system.

Hydrogeology (not site specific)
In lowland areas of the UK with little topographic variation, groundwater is likely to be found at shallow depths of only a few metres. Water table fluctuations will be small as they will be constrained by the ground surface and the base level of the local perennial streams and rivers.

In upland areas, precipitation is usually high and the dominantly metamorphic and igneous rocks often have relatively shallow groundwater levels. This is due to preferential groundwater storage in near-surface weathered and fractured zones with limited drainage into the underlying unweathered lower permeability rock. Exceptions can occur where higher permeability rocks, such as sandstone or limestone, allow faster throughflow of groundwater towards the nearest stream or other discharge point.

Perched water tables occur where a less permeable horizon (e.g. a clay layer) in an otherwise permeable sequence retains a body of groundwater above the level of the regional water table. They usually occur at shallow depths in alluvial and glacial sediments and can be difficult to identify or to delimit.

An aquifer becomes confined when it is overlain by a less permeable horizon that restricts the upward movement of groundwater. When this less permeable horizon is penetrated (e.g. by drilling), the groundwater level rises above where struck to a level controlled by the hydrostatic pressure. If this is above ground level, overflowing artesian conditions will be encountered. Confined conditions should be anticipated, where possible, in order to plan for the problems they can generate.

Hydrogeology of the site

Geological unit	Groundwater potential	Water level and strikes	Quality	Environment Agency Groundwater vulnerability classification
Alluvium	Likely to contain some groundwater in hydraulic continuity with associated surface water	Shallow	Similar to associated surface water	Minor Aquifer
Oadby Member	Likely to contain some groundwater in basal sand	Shallow	Glacial deposits often contain ferruginous groundwater	Low permeability superficial cover, however some groundwater flow may still occur (particularly in the basal sand) and this should be taken into consideration when assessing persistent pollutants
Blue Anchor Formation	Generally of low permeability. Some water possible in weathered or fractured horizons			Non-Aquifer, however some groundwater flow may still occur and this should be taken into consideration when assessing persistent pollutants
Branscombe Mudstone Formation	Generally of low permeability; small amounts of groundwater may be encountered in the coarser-grained horizons	Water level is anticipated to be between 5 and 20 m below the ground surface depending on the position within the site. Seasonal water fluctuations may be several metres.	Water likely to be very hard with a total dissolved solids content possibly in excess of 2000 mg/l, with high calcium and sulphate derived from gypsum; water therefore may be corrosive to metal and concrete	Non-Aquifer, however some groundwater flow may still occur and this should be taken into consideration when assessing persistent pollutants

The groundwater gradient in the Mercia Mudstone Group is westwards and borehole evidence indicates that it is steep at about 1 in 17.