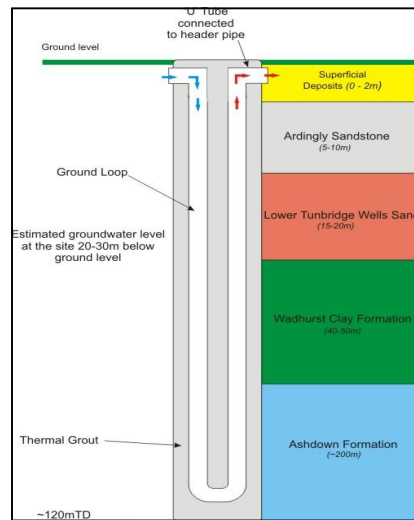


# Thermal Response Testing



**Carbon Zero Consulting** is a specialist hydrogeological and thermogeological consultancy. We offer a full *Thermal Response Testing (TRT)* service including field survey and follow-up data analysis, modelling and design. This can include borehole drilling if required. We recommend a test on the first borehole for all closed loop systems of more than about 50kW heating/cooling.

## What does a TRT provide?

- The test provides in-situ borehole & formation data including Thermal Conductivity ( $\lambda$ ).
- Measured values of  $\lambda$  vary between a minimum of about 1.2 up to nearly 8W/m/K. Although in many cases, a desk-top value can provide a close estimate, it cannot account for the positive effect of groundwater flow or unforeseen changes of geology.
- Drilling of a test borehole confirms site geology and identifies risks and unforeseen ground conditions that need to be taken into account for subsequent drilling. The borehole is incorporated into the final borehole array and is therefore not an 'extra' cost to the project.
- Together with the building's seasonal heat/cool profile the test provides the inputs necessary to model and design the precise extent of the final closed loop borehole array

## Why do you need a TRT?

- Commonly used 'Rules of thumb' regarding borehole thermal output can be hopelessly wrong and can lead to +/-50% design error. The TRT results provide the data for a Warranted closed loop array design and output. The following scenarios are avoided.

Too few closed loop boreholes = Your system won't work as specified

Too many closed loop boreholes = Your system is needlessly expensive

- CZC provide all expertise necessary for post-test modelling of the closed loop borehole array
- Forensic evaluation of borehole array performance. If a system is not performing, or has failed, we can retrospectively perform a TRT to confirm whether the array is fit for purpose.

The tests are carried out to comply with the guidelines laid down by ASHRAE (2002), the IGSHPA (2007) and the IEA.

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