Geosciences Society of New Zealand
Hydrogeology Special Interest Group
Bimonthly Technical Talk Series
October 2020 Talk – All Welcome

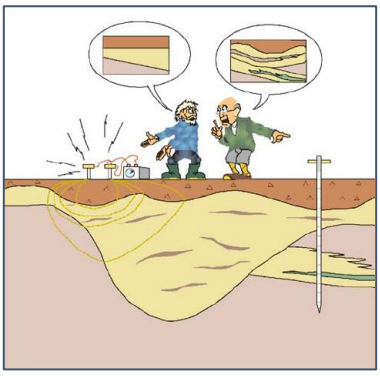
The "Hole truth" – is what you see, what you get?

Combined talks by
Helen Rutter (Aqualinc) and **Iain Haycock** (McMillan Drilling)

Join online or meet at Room 111, Beatrice Tinsley Block, University of Canterbury, Christchurch (map attached)

Wednesday 7 October, 6:00–7:00 pm. Doors open from 5.30 pm. Nibbles before the talk and drinks offsite afterwards (courtesy of Stantec, Aqualinc and McMillan Drilling)

Please register using the following link or QR code.
https://www.surveymonkey.com/r/JXWK9MH



The picture of the world is your own*

Abstract

Drillers' logs are vital to the understanding of the underlying geology. They are used in numerous ways, including in developing various models, which, in turn are used to support decision making. Therefore, an understanding of how reliable the lithological data obtained from drillers' logs is, is critical to understand.

Christchurch City Council wanted to identify the depth to the first confining layer at several sites and drilled sonic bores for this purpose. This sonic core data was compared to nearby original drillers' logs. How closely the logs matched nearby sonic logs was calculated by comparing the lithologies and predominant sediment type at increments of 0.5 m.

Analysis of all comparatives showed that only 53.5% of the main sediment types were identified correctly by drillers' logs. Overall, there was an over-identification of clay, where the sediment was silts or sands. Worryingly, gravels were regularly described as sands or silts, and vice versa. However, it was reassuring that clear confining layers, were often identified correctly.

The main lithology was correctly identified 57 % of the time by cable drilling, but only 38 % of the time by rotary drilling, showing, as expected, that cable tool drilling is a more reliable source of lithological data.

In conclusion, the reliance placed on drill logs should be reassessed. When using logs to interpret city-wide aquitards and aquifers, they are probably adequate, especially if no great weight is placed on individual logs. However, detailed local-scale modelling, is likely to be influenced by the issues identified.

* Thomsen, R, Søndergaard, V and Sørensen, Kurt (2004). Hydrogeological mapping as a basis for establishing site-specific groundwater protection zones in Denmark. Hydrogeology Journal. 12. 550-562. 10.1007/s10040-004-0345-1.

See overleaf ➔

Geosciences Society of New Zealand
Hydrogeology Special Interest Group
Bimonthly Technical Talk Series
October 2020 Talk – All Welcome

Helen Rutter

Helen is a hydrogeological research scientist with 29 years' expertise. This includes 17 years with the British Geological Survey working on varied hydrogeology projects in the UK and Africa. She has expertise in resource assessment, recharge processes, groundwater flooding, catchment characterisation, geology, and geochemistry, and also expertise in the application of GIS techniques to assist in analysing spatial data. Her current areas of interest include:

- assessment of source protection zones and aquifer vulnerability assessment,
- impacts of sea level rise and climate change on water resources and groundwater flooding,
- earthquake impacts on groundwater resources and flooding, and
- assessment of groundwater quality impacts from land use change.

She is a Chartered Geologist (Geological Society of London), a Research Adjunct at the University of Canterbury, and a member of the Executive Committee of the Hydrological Society of NZ.

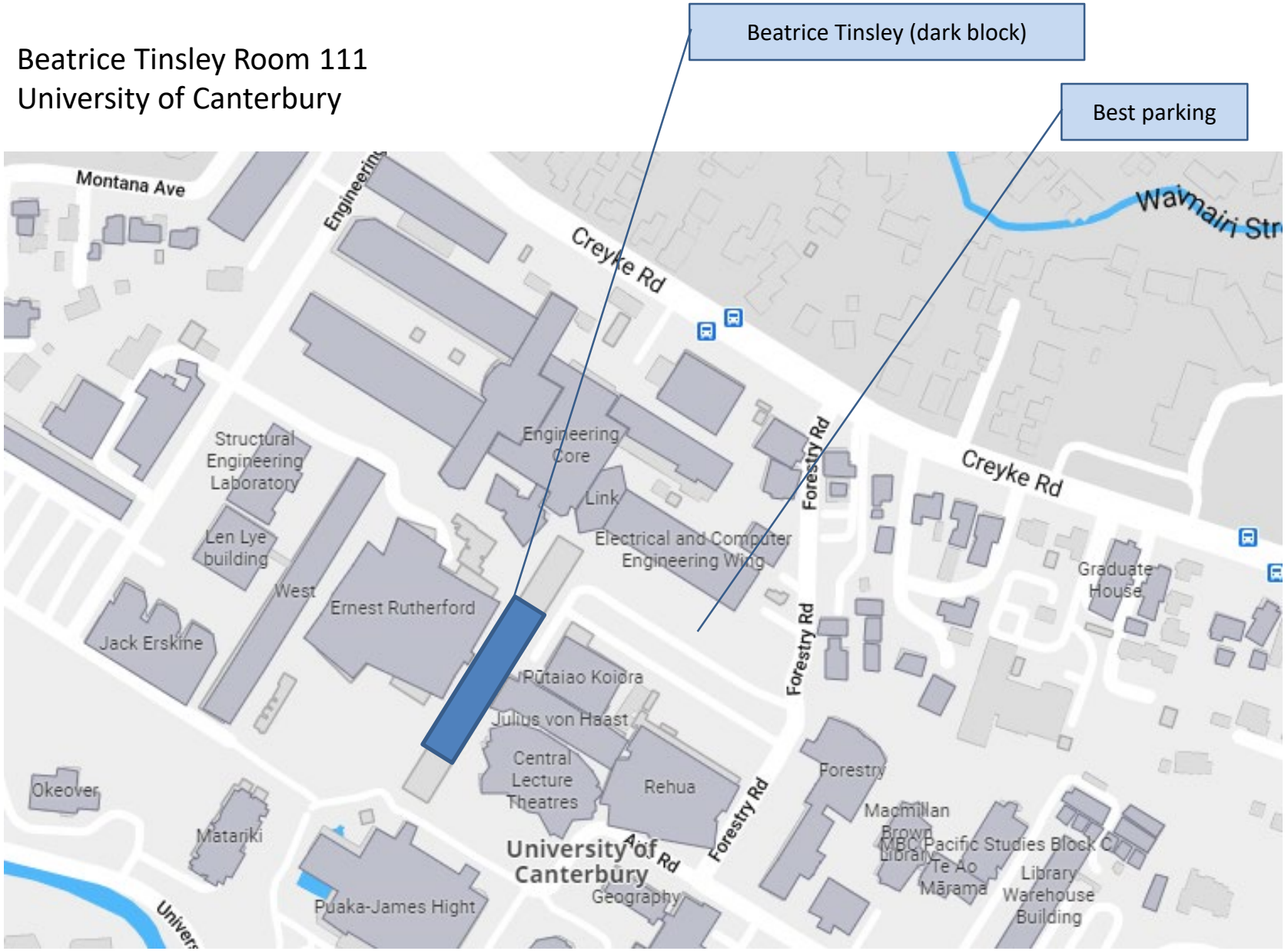
Iain Haycock

Iain is Group Manager and Project Director for specialised projects within NZ and the Pacific Islands at McMillan Drilling Group. He is a registered Senior Driller in the New Zealand Drillers Federation (NZDF). Since 2002, Iain has been a NZDF Councillor and President from 2010 to 2013.

Iain has 20 years of experience in New Zealand, Australia, Pacific Islands and England. He has been responsible for the investigation, design, project management and supervision of complex and challenging ground investigations and groundwater supply projects. He managed onshore and offshore drilling contracts and large-scale city municipal water supplies projects. He has used a wide number of conventional and bespoke drilling techniques for the investigation and construction facets. Iain has co-authored papers and is involved with industry groups and standard setting organisations.

See overleaf ➔

Beatrice Tinsley Room 111
University of Canterbury



Parking off Forestry Road from Creyke, entrance to building on West side