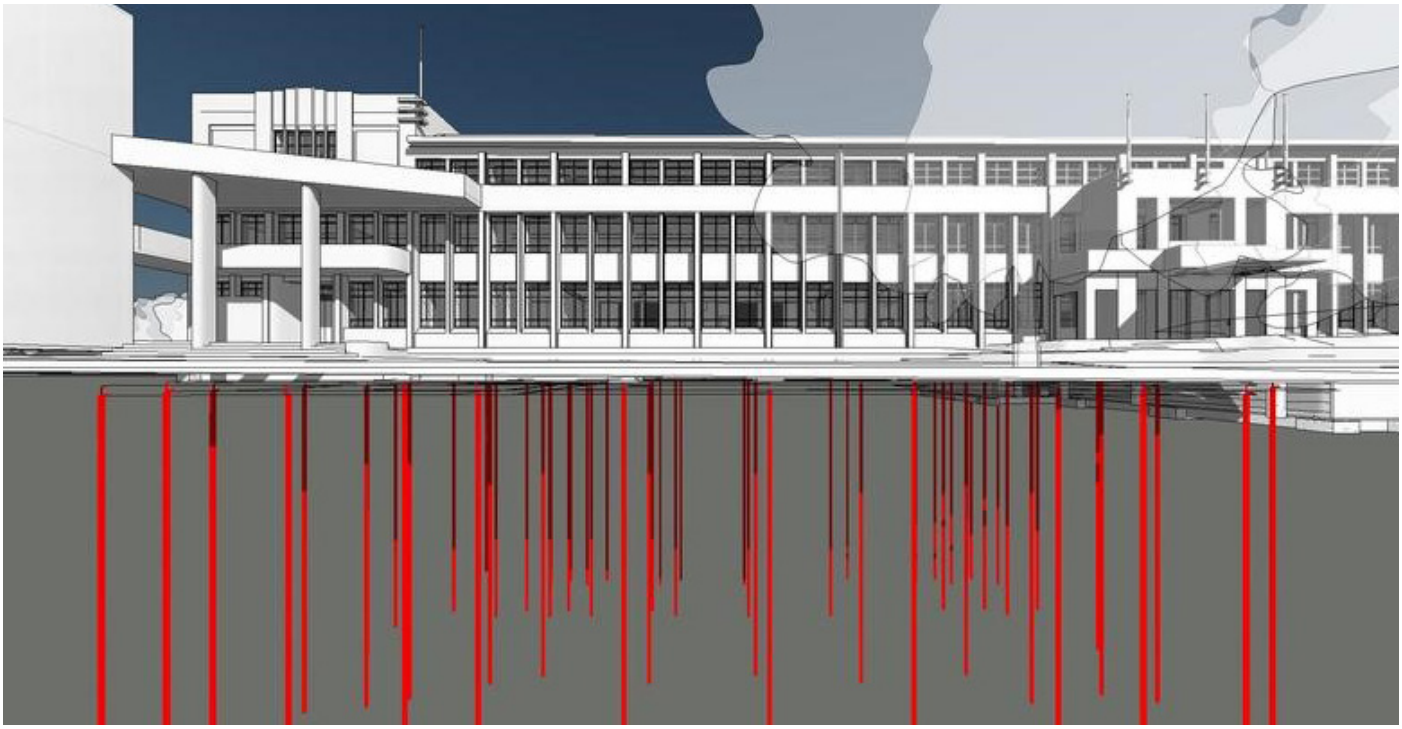
A New Zealand first: Geothermal heating loop built into structural piles

Central Heating NEW ZEALAND

CASE STUDY

Hutt City Council Administration Building



Architectural impression of Hutt City's administration building with geothermal piles

Credit: Stephenson & Turner NZ Ltd

Central Heating New Zealand's involvement:

- Consultancy and conductivity testing
- Ground loop design
- Provision of components and support

Contractors and Client

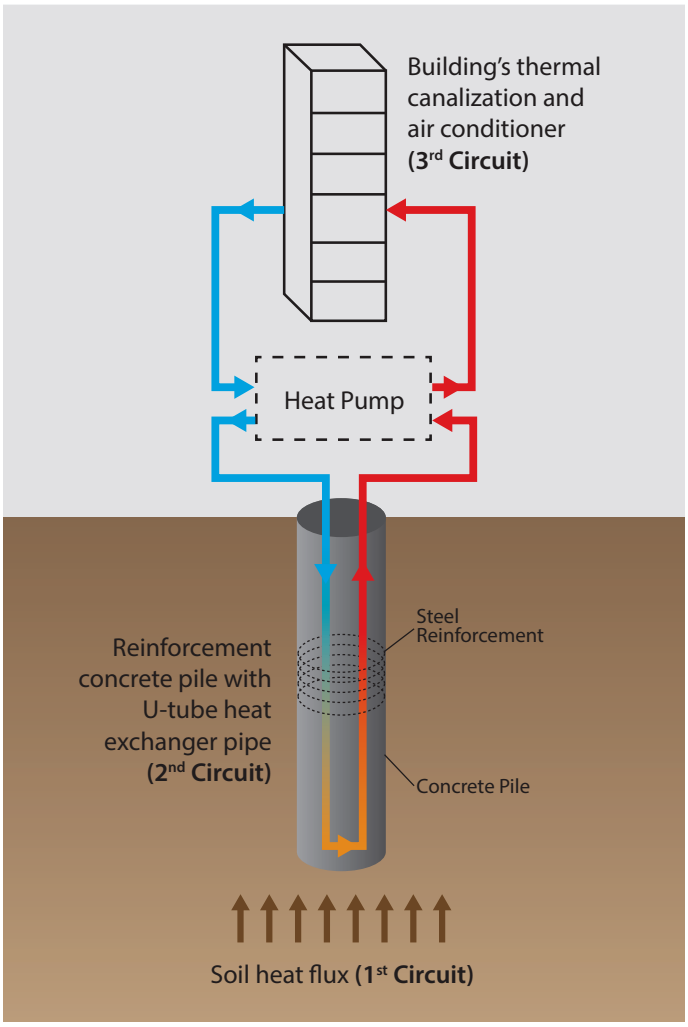
Hutt City Council
Stephenson & Turner NZ Ltd

The two-year, $20million refurbishment of Hutt City Council's administration building had to align with the Council's energy efficient and environmentally friendly long-term plan.

A number of leading edge technologies, designed to boost the sustainability features of the rebuild, included the use of structural geothermal piles. Thermal piles consist of pile foundations combined with a closed-loop ground source heat pump system. Their purpose is to provide structural support to the building, as well as exchange heat energy between the building and ground.

Geothermal energy is a clean and environmentally friendly energy source. Thermal energy generates minimal greenhouse gases because the conversion and utilisation process does not involve any chemical reaction or combustion.

The test pile being lowered into position



Geothermal heating in action

Central Heating New Zealand was engaged by consulting engineers, Stephenson & Turner NZ Ltd, to ensure the ground loop design would meet the required heating and cooling loads for the administration building.

A test loop within a structural pile was built to monitor and analyse ground temperature transfer over a 40-hour period. Thousands of data points were captured and uploaded into modelling software to determine operating parameters and efficiencies.

Central Heating New Zealand confirmed a closed loop design within 72 structural piles, at a depth of 20 metres, would boost the heating and cooling efficiency to twice that of a typical air sourced HVAC system.