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Report to Environment Committee
from Andrew Jones, Groundwater Scientist

Moera Gravel Aquifer Investigation

1. Purpose

To inform the Committee of the results of an investigation bore drilled into the Moera Gravel Aquifer under the Lower Hutt Valley.

2. Background

Three aquifers have been identified in the Lower Hutt Groundwater Zone:

- Taita Alluvium Aquifer
- Waiwhetu Artesian Aquifer
- Moera Gravel Aquifer

The Taita Alluvium/Waiwhetu Artesian system is fully allocated and the principal use of this resource is for public water supply. The only use of the Moera Gravel Aquifer is as an emergency fire-fighting supply at the IBM building on Victoria Street, Petone.

The latest estimate of the safe yield of the Moera Gravel Aquifer ranges between 5-10 ML/day for long-term use and up to 15 ML/day for short periods. However, this estimate is based on limited information as only eight bores have ever intercepted the aquifer. Of these eight bores only two still exist; both form part of the Council's water level monitoring network in the Hutt Valley. The two bores are located on either side of the valley close to the coastline.

To improve our knowledge of the structure and characteristics of the aquifer inland from the coast a dedicated investigation bore was drilled. Information obtained from the bore will be used to refine our estimate of the safe yield of the aquifer.

3. Details of the Bore

The investigation bore is located in the carpark of the Assembly of God on Marsden Street, Lower Hutt. The bore was drilled to a depth of 150m with a detailed geological log compiled for the entire depth. A geophysical log obtained by the Institute of Geological and Nuclear Sciences complements this log.

The bore successfully intercepted the Taita Alluvium and Waiwhetu Artesian Aquifers. The Moera Gravel Aquifer was also successfully intercepted and a possible additional aquifer was identified at a depth of 148m. The bore was subsequently backfilled to a productive water-bearing layer at a depth of 115m in the Moera Gravel Aquifer. Drilling operations took approximately four months to complete.

4. Results of the Investigation

A pump test was performed on the bore to assess the hydraulic characteristics of the aquifer. The bore yielded approximately 40 L/s for the duration of the seven-day test. The results of this test indicate a transmissivity of about 2000 m^2/day. This result is consistent with a smaller pump test performed on the aquifer in 1998 and supports the current estimate of safe yield.

A number of water quality samples were taken during the construction of the bore. The results of these samples show that the quality of the water is generally high with most parameters complying with the New Zealand Drinking Water Standard. The water fails to fully comply with the standard because of elevated levels of iron and manganese and a tendency to be slightly corrosive. Accordingly, some treatment would be necessary before the water could be used for public supply.

Four samples of water from the bore were dated using the isotope of tritium. These analyses show the age of the water to be approximately 60 years; significantly older than the water in the overlying Waiwhetu Artesian Aquifer that has been dated as 18 months old at the Waterloo wellfield.

Water level monitoring equipment has been installed in the bore and will be used to improve our knowledge of this aquifer. Ultimately this additional water level information should allow the existing model of the Waiwhetu Artesian Aquifer to be expanded to include the whole Lower Hutt Groundwater Zone.

5. Benefit of the Investigation

The results of this investigation greatly improve our understanding of the hydrogeology of the Lower Hutt Groundwater Zone. The information obtained will allow us to refine our conceptual and numerical models of the entire Hutt Valley aquifer system. Consequently more robust assessments of the safe yield of the aquifers can be made.

Because the overlying Waiwhetu Artesian Aquifer is fully allocated there is a potential demand for water from the Moera Gravel Aquifer for public supply or industrial use.

The information obtained from this investigation will assist prospective abstractors to decide whether to make use of the resource. Furthermore the results of the investigation, and the ongoing water level monitoring, will improve our ability to assess the potential effects of any proposed abstraction.

6. Communications

This investigation will expand the scope of the Council's groundwater database that is available to all interested parties.

The results of the investigation will also be provided to the Utility Services Division of the Council who provided financial assistance for the project.

7. Recommendation

That the report be received and its contents noted.

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