

# OBTAINING A SOCIAL LICENSE FOR GROUNDWATER ABSTRACTION AT KURIKKA AQUIFER, FINLAND USING A COMMUNITY ACCESSIBLE HYDROGEOLOGICAL DATA AND SOFTWARE PLATFORM

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Groundwater has a strategic importance in Finland, especially in western coastal areas that lack large groundwater bodies. The city of Vaasa is the capital of Ostrobothnia and struggles with sufficient access to clean drinking water, which is largely sourced from surface water. After the discovery in 2010 of a large buried valley aquifer system in the Kurikka region and from 2014 onwards research in the area is conducted in the collaboration the Water Services Public Utilities of Vaasa, (Vaasan Vesi), the Water Services Public Company of Kurikka, (Kurikan Vesi-huolto OY) and Centre for Economic Development, Transport and the Environment in South Ostrobothnia (Etelä-Pohjanmaan ELY-keskus) and Geological Survey of Finland (GTK).

Geological surveys in the region have proved hydrogeological units interlink between bedrock faults, fractures and other structures, the topography of the bedrock surface and glacial deposits above. Buried valley aquifers are connected to high standing groundwater recharge areas covered by sands and gravels formed under the shoreline processes. The 50 - 100 m deep bedrock palaeovalleys are filled by multiple thick sand and gravel beds (aquifers) with till (aquitards) between them, and a marine clay/silt deposit forms an impermeable cap for the aquifer system. Due to the hydrogeological setting and the long route from the recharge area to the valley bottom the clean groundwater circulation and storage is big enough for Kurikka and Vaasa cities.

Meanwhile, the region of Kurikka is an important agricultural centre in Finland, due to a presence of clean and sustainable groundwater resource. A wide variety of agricultural products come from here, including organically grown produce. The local community have a strong connection to, and deep pride in their natural environment. Water is important for everybody and geologists need to convince people that extracting groundwater is safe and sustainable. So, the future challenge for the water companies therefore is not water treatment, but to demonstrate to the local communities and landowners that large water use and drawdown of groundwater will not adversely affect the local environment.

To assist with this, the Geological Survey of Finland have developed the concept of an accessible web system which will enable geoscientists and stakeholders to interact with the data and the model. On the back-end, this system will store large volumes of time-series downhole water logger data ready for query, and support rapid queries into that data by location and by time via an API. In the user interface, the system will display live and historic groundwater level monitoring data in boreholes, cross-sections and maps, putting the data in context with real world geological features. The system will link to work done in collaboration with the British Geological Survey using the Groundhog software, which contains a useful modelling engine, and is now open source. The system API will be made compatible.