The beautiful town of Turku, the former capital of Finland, has had a long-term problem - low quality drinking water. Now, Turku Region Water Ltd has solved this issue, thanks to a significant large scale artificial ground water system.

**BACKGROUND**
Turku Region Water Ltd, the regional water works, provides clean water for the 300,000 inhabitants and industries of the city of Turku and its neighbouring municipalities.

Turku is situated at the mouth of the River Aura, which has been the raw water source for nearly a century. The main water works was built in 1923 and has undergone many changes and technical upgrades during the decades. A new solution was needed, and the decision to build a new water supply system was made in 1999. Construction works started in 2007, and the new system was serving the inhabitants in the Turku region by the autumn of 2011.

**CHALLENGE**
For decades, the main problem of the water supply in the Turku region has been the low quality of the raw water from the river Aura. The river contains a lot of peat, humus, mud, clay and microbes, giving Turku’s drinking water an unpalatable taste. Even the most effective chemical and mechanical purifying methods were unable to improve the water quality enough for the region’s inhabitants.

In the dry season, the availability of water is also a problem. The flow rate of the Aura decreases and there are no lakes in the Aura basin that could be used to balance the water resources between rainy and dry seasons.

**SUCCESS FACTORS**
“The management of this long and demanding project indicates that Pöyry has the experience and in-depth know-how of the water business. The environmental effects have been kept to a minimum and the architectural design has been convincing”, says Aki Artimo, Managing Director of Turku Region Water Ltd.
**SOLUTIONS**

Turku Region Water Ltd started searching for a suitable water supply that would help solve these issues. The only body of water in Southwest Finland that met their requirements was the River Kokemäenjoki, around 100 km away from Turku. Pöyry was recruited as the main consultant in the design of a unique system that would effectively bring this water to the area and improve the water supply.

The resulting solution is highly innovative, spreading out the water treatment process across the journey, and then creating a reliable, artificial groundwater infiltration system for the Turku region. At the beginning of the new system water is taken in from the river Kokemäenjoki and directed to a nearby pretreatment plant. Then, after removing the biggest particles using drum sieves, and a chemical coagulation and filtration, the water is transferred 30 km to the managed aquifer recharge plant. Here the water flows to infiltration ponds and through an esker, which separates the rest of the impurities from the water. The water is then placed into a clear water tank, before traveling another 60 km to two large reservoirs carved into rock, located in a suburb of Turku. The water gets a light chlorine treatment before being pumped to a local water works. A final chlorine treatment is performed before the water completes its long journey, arriving at the homes and industry in the Turku region.

Whilst the system is based on a technique used in many solutions for decades worldwide, it is exceptional because of its scale. The high amount of throughput of water the system transfers, but also the total 100 km long pipelines from the river Kokemäki to Turku make this solution out of the ordinary.

**KEY FACTS**

The artificially infiltrated ground water production and delivery solution of Turku Region Water Ltd. delivers fresh water to 300,000 inhabitants and the industries of the Turku region.

- The production capacity of the system is 75,000 and the transfer capacity 125,000 cubic metres of fresh water a day, enough for 1,000,000 bath tubs.
- The managed aquifer recharge area is 500 hectares, or 700 football fields.
- There is a total of 100 km of 1200 mm and 1000 mm transfer lines.
- There are 65,000 tons of fresh water in the longest, 60 km long, transfer line, weighing the same as a couple of dozen fully loaded cargo trains.

**BENEFITS**

The new system means that the quality of the artificially infiltrated ground water provided to Turku is the same as that of real ground water. This quality remains consistent throughout the year, so Turku’s inhabitants no longer have taste the distinct ‘clay-like’ flavour of the River Aura. Thanks to the large reservoir capacity in the esker, the availability of the water is guaranteed. The intake of water from the River Kokemäenjoki makes up only one to two per cent of the river’s total flow, so if the river were to significantly reduce, there would be no shortage of water for Turku region.