

# A Sustainable Distillery Water Supply

## Food & Beverage | Case Study

### The Client

Annandale Distillery Annan, Dumfries & Galloway, was closed in 1920, but in 2010 it was bought by Prof David Thomson, a Scientist and Teresa Church, a Nutritionist. After a three year refurbishment, it has now re-opened and its first Lowland Malt Scotch whisky was produced in December 2014.



### Key Figures

- 550 l/h of spirit reduction water
- 200 l/h of boiler feed water
- Quality <10mg/l TDS plus
- Recovery RO recycles 125 l/h
- Bespoke boiler water conditioning chemical

### The Client's Needs

High quality water is critical to the Distillery. It feeds the boilers that produce the steam to drive the stills and dilutes the raw spirit from 72% ABV to 63.5% ABV before being filled into casks. The quality of the water used to produce the wash from which the spirit is distilled has a significant effect on the taste of the whisky, so a water supply of consistent quality is vital.

The new owners wanted the distillery to be sustainable and as far as possible, self-sufficient in water. They had the choice of using mains water which would be expensive and potentially of variable quality, or its own onsite borehole which would be of consistent quality, but would require more extensive treatment. Veolia Water Technologies carried out a detailed economic evaluation which confirmed that treating the borehole water would be the best option; ensuring a consistent source quality, whilst avoiding the added cost of installing a mains supply.

### The Solution

Distillery Manager Malcolm Rennie worked closely with Veolia's engineers to develop a water strategy for the distillery. Filtered borehole water, fully compliant with drinking water standards, is used as brewing liquor for the wash and is also softened prior to demineralisation in a Sirion™ Maxi 14-1000 reverse osmosis plant. Veolia's online RecoBLUE calculator showed that 50% of the reject stream from the RO could be economically recovered, reducing the distillery's water footprint.

## Process Description

The distillery needs up to 750 litres of high purity water per hour and Veolia's solution went over and above this figure to filter and soften approximately 1000 litres per hour of the borehole water prior to demineralisation in a Sirion™ Maxi 14-1000 reverse osmosis plant. This removes 99% of the natural organic matter that causes taste, colour and odour, and 95% of dissolved impurities, easily meeting the target of less than 10mg/l of dissolved salts required for spirit reduction water.

## Removing the impurities

The impurities are concentrated into a waste stream of around 25% of the reverse osmosis feed. About 550 litres per hour of the treated water, or permeate, is used directly for spirit reduction, whilst the remaining 200 litres per hour is fed to the boiler as make-up water.

To ensure a reliable and efficient boiler operation, and to minimise fuel consumption, the boiler make-up water is conditioned by the addition of a custom formulated Veolia Hydrex chemical, which combines oxygen removal and pH control for corrosion prevention together with scale inhibition.

The 250 litres per hour of wastewater from the Sirion™ Maxi 14-1000 reverse osmosis (RO) plant is collected and treated by a small Sirion™ recovery RO, reducing the discharge volume by 125 litres per hour. The permeate produced by the Sirion Midi is then returned to the front end of the treatment train, saving some 125 litres per hour in raw borehole water abstraction.

## Results

Since commissioning in November 2014, the distillery water system has met all the design criteria.



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