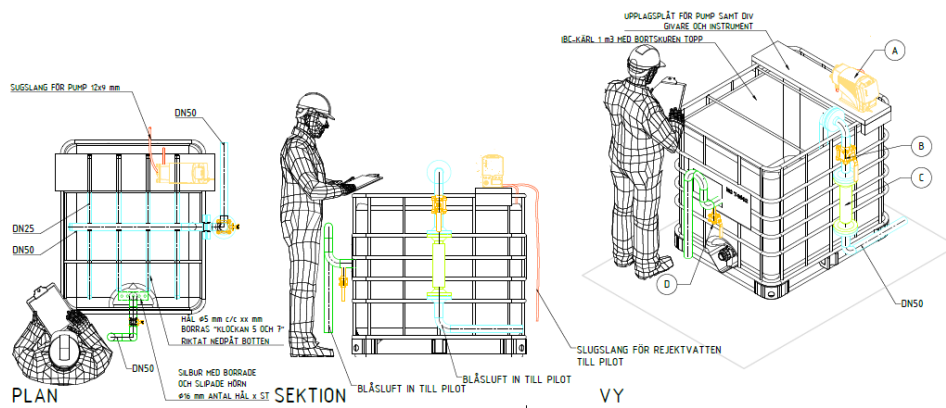


## Master thesis



## Pilot trials regarding sludge liquor treatment at Arvidtorps WWTP in Trollhättan

### Background

The city of Trollhättan expands relatively quickly and the wastewater treatment plant (WWTP) of Trollhättan is today loaded up to its maximum capacity and now facing the biggest refurbishment for many decades. Stricter discharge limits have to be achieved in line with the new permit from the county board. A completely new treatment line will be built to strengthen the nitrogen removal capacity. Because the treatment plant is built underground in the rock, the expansion is complicated and time consuming. First in five years, the new line can be taken in operation. Meanwhile, the discharge limits for nitrogen have to be fulfilled with the existing plant under re-construction.

To enhance the nitrogen removal capacity relatively quickly, separate nitrogen removal from sludge liquor can be implemented because sludge liquor contains a lot of nitrogen (typically around 15 % of the total nitrogen load if digestion is applied) in a relatively small flow.

Trollhättan Energi is now interested in pilot-plant trials to investigate different ways of sludge liquor treatment.

### Pilot trials

Two aerated pilot reactors, with a water volume of 700 l each, will be operated in parallel. One reactor is operated with activated sludge without sludge retention at high temperatures (30-35 °C) and the other with carriers (MBBR-Moving Bed BioReactor) at lower temperatures (20-25 °C). Different hydraulic retention times, nitrogen loads, and pH-values are applied.

The systems are compared in relation to their suitability for nitrification of the sludge liquor from the Arvidstorps WWTP. Day samples are taken several times a week and analyzed on ammonium, nitrate, nitrite, pH, alkalinity, etc. All the results, calculations and conclusions are summarized in a report which Trollhättan Energi will use as a base to decide on which technique is the most suitable for sludge liquor treatment at Arvidstorp.

### Requested student (master thesis)

We would like to man this project with a committed student, who operates the pilot plant (by sampling, calibration of the instruments, doing measurements, inspection, etc.), processes the data and writes a final report which Trollhättan can base their decisions on.

The student will be guided by a very experienced team from Chalmers (Britt-Marie Wilén, official supervisor, Professor, Head of Division Water Environment Technology), Trollhättan Energi (Per Rundahl, Linus Lesser), H2OLAND (Mark de Blois, co-supervisor on process) and Sweco Environment (Erik Sönegård, Andreas Tengström)

The pilot tests will be started in the end of January 2022 and be finished in May 2022

Partly, new ideas will be tested and therefore a secrecy agreement has to be signed of the involved parties/persons.

For more information and registration of interest, please contact Britt-Marie Wilén, [britt-marie.wilen@chalmers.se](mailto:britt-marie.wilen@chalmers.se).