TAMPERE REGION CENTRAL WASTEWATER TREATMENT PLANT

A wastewater treatment plant that uses the latest treatment technologies will be implemented inside the rock in Sulkavuori, Tampere. The aim is to reduce the load placed on the discharge water system, even when the volume of treated water will increase. The Tampere Region Central Wastewater Treatment Plant is a joint project of several municipalities. The participating municipalities are Kangasala, Lempäälä, Pirkkala, Tampere, Vesilahti, and Ylöjärvi. With the budget of around 300 million euros, the project is the largest single environmental investment in the Tampere region. The construction of the Sulkavuori Central Wastewater Treatment Plant started in 2018 and it will be commenced in 2024.

Figure 1. The main entrance to the central wastewater treatment plant (visualisation).

New land use in the plots of the existing wastewater treatment plants

In addition to wastewater generated by Tampere, wastewater generated by Kangasala, Pirkkala, and the inner city of Ylöjärvi are also currently being treated in wastewater treatment plants in Tampere. The sewer network that covers Lempäälä and Vesilahti is connected to the Lempäälä wastewater treatment plant. The three current wastewater treatment plants are reaching the end of their technical lifespan and are in need of major renovations.

The current wastewater treatment plants are located in valuable shore areas surrounded by existing community structure. Once the new central wastewater treatment plant is complete, their plots will enable significant infill development planning in both Tampere and Lempäälä.

Dimensioning of the treatment plant takes account of future needs

The capacity of the wastewater treatment plant is dimensioned to meet the needs of the region until 2040 or later. The estimated population equivalent in 2040 is 420,000. Population equivalent is a technical term used in dimensioning that expresses the ratio between the total organic loading produced by the treatment plant and the average population that generates a corresponding loading. It is estimated in the loading estimate of the master plan for the treatment plant that in 2040, the average wastewater flow will be 100,000 m^3/d and the maximum flow 222,700 m^3/d. The treatment of wastewater, on average 100,000 m^3 a day, is implemented by using four treatment lines. However, a spatial reservation will be made for two additional lines, among others, which enables increasing the estimated population equivalent to 600,000 or higher. In addition to household wastewater, preparations have also been made to use the plant for treating wastewater generated by e.g. industrial operations and services.

With the central wastewater treatment plant project, the participating municipalities ensure the high quality and economical treatment of wastewater collected in their sewer networks far into the future. The hydraulic capacity of the wastewater treatment plant is dimensioned to remain sufficient for a minimum of 100 years.

The process

The treatment plant will be an active sludge plant based on simultaneous precipitation, where wastewater is treated mechanically, chemically, and biologically. The wastewater treatment process includes the following phases: racking, aerated sand removal, primary sedimentation, active sludge process dimensioned for total nitrogen removal, secondary sedimentation, and sand filtration as post treatment. Treated wastewater is disinfected by UV radiation. Anaerobic treatment (decomposition) has been selected as the sludge treatment solution. Sludge is decomposed in bioreactors by means of bacteria that act in anaerobic conditions. The process produces water, carbon dioxide, and biogas. Biogas is used for running gas engines that produce nearly 60% of the electricity and 90% of the heat needed by the treatment plant each year.

Figure 2. A view along a corridor inside the rock (visualisation).

Wastewater transfer systems

The required wastewater transfer systems will be implemented inside the rock at the same time with the wastewater treatment plant. These include two pumping stations, a sewage tunnel for leading wastewater to the treatment plant, and a discharge tunnel for leading the treated wastewater into the discharge pipe, and a transfer sewer network to street and road areas and the water system.

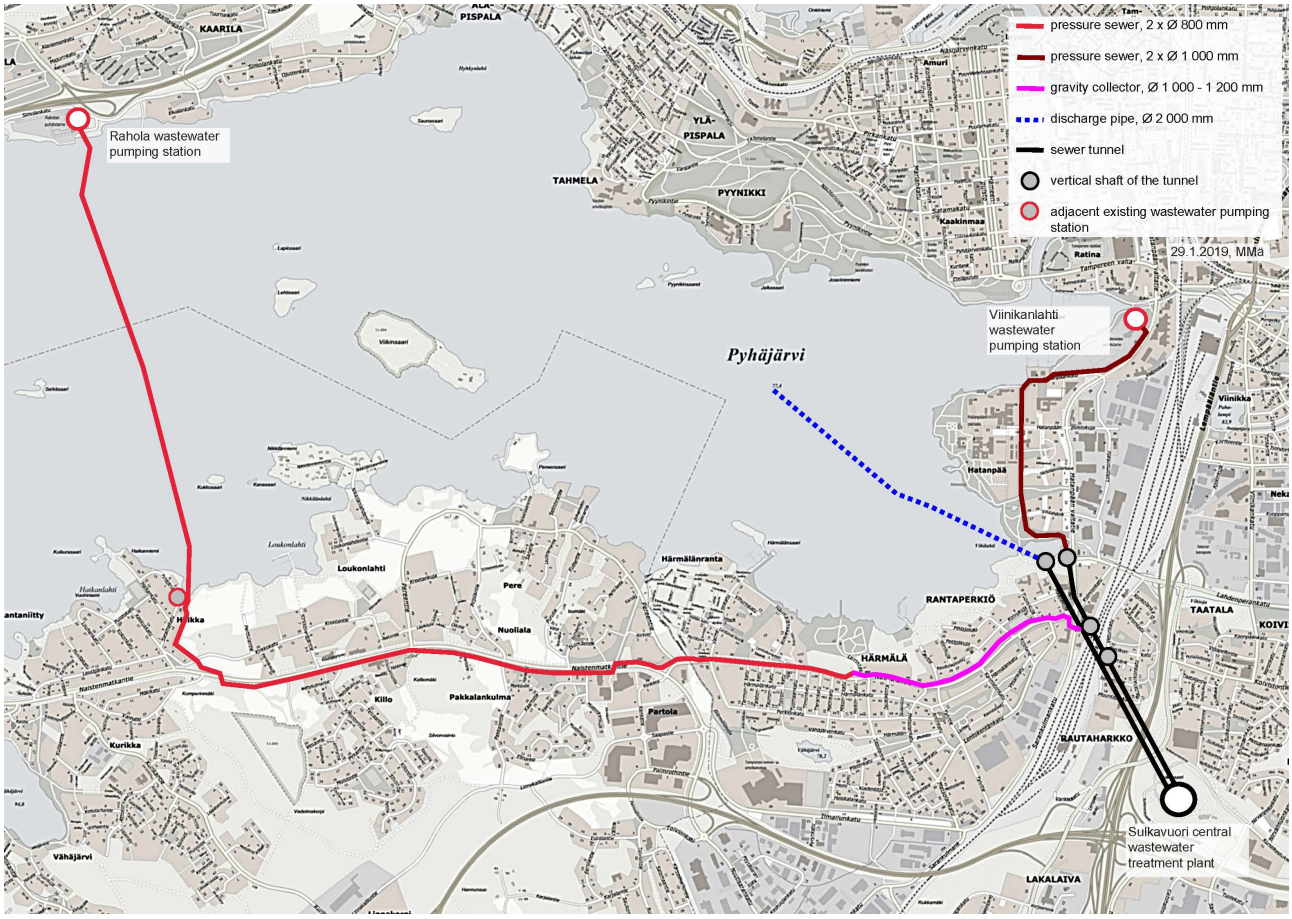

Figure 3. The wastewater transfer systems of the Central Wastewater Treatment Plant project.