

## SUMMARY

On 1 st January 2008 a new water act will be in force. It means that all permits to drain wastewater into surface water or groundwater will be canceled. The drainage of mechanically treated wastewater will be prohibited, too. It is probably due to the effort to save the quality of surface water and groundwater. The aim of this thesis is to show that this step is too strict. Under good conditions drained wastewater need not contaminate groundwater, on the contrary it can be treated to the quality level of surface water.

The locality Měděnec in Krušné hory in western Bohemia was chosen for this work. This municipality uses a septic tank with three chambers to mechanically treat and then the wastewater is drained into soil. It has been used for a long time and for quite large volumes of sewage (about 0,15l/s) without changes in the groundwater quality. The process takes place in the south of the municipality. The northern part of the town is in the 3rd degree of hygienic protection zone of the Přísečnice water-supply reservoir. Between these two parts there is a watershed. The direction of groundwater in the service area flows to the south.

Měděnec is situated in the Krušné hory crystalline complex. The geological base is built of metamorphic rocks, mainly paragneiss with eclogite lenticles. On the north of the locality there are mica schist layers and the hill Mědník is made of scarn. Below the infiltration area the paragneiss layers are changed by orthogneiss. At a lot of places metamorphic rocks are disrupted by magmatic lodes, e.g.: granitic porphyry, granodioritic porphyry and porphyrite. This locality was a mining area in the past, there are lots of drifts and antropogenic formations. The surface is covered by unpaved quaternary sediments, mainly detritus and deluviofluvic sediments next to the brook. The soil system is created by cryptopodzols, which are shallow, very acid, with a high content of humus. The sorptive abilities are low but there are a lot of free ferrum and aluminium oxides that help to clean the phosphorus from the wastewater.

Two cycles of sampling were made for chemical and bacteriological analysis. Each sampling was taken in different conditions. In spring the weather was wet and cold, late-summer samples were taken in dry and hot weather. Field scanning was done at 13 places a field scanning for water conductivity and pH values, including the groundwater sample from a well for the comparison of the concentrations of wastewater contaminants with groundwater quality. For the chemical and bacteriological analysis only 5 samples were taken at the places where the biggest changes were expected.

The infiltration area is about 250 m long and water is drained into soil layers at two different places. During the first seepage the concentration values get lower mostly under the limit set by the Orders in Council of the Czech republic No. 61/2003. In the ground the filtration of dissolved pollutants, dying of coliform bacteria, sorption of phosphorus and aerobic degradation of ammonia nitrogen is proceeded. All these biodegradation processes are supplemented by the additional dilution by groundwater, which has been traced by the chloride method.

The total concentration of wastewater contamination in spring was lower and its elimination was slower. But the concentration of all contaminants decreased during the infiltration. Only the concentration of total phosphorus was too slow and before the dilution at the end of the infiltration area the phosphorus concentration was higher than the set limit. On the other hand, the bacteriological contamination was reduced in the septic tank to one third of the total amount and after infiltration was completely eliminated.

Last-summer sampling analysis had the same findings, only the concentrations were much higher.

Very important discovery was that more concentrated phosphorus in the summer was treated more quickly and to a lower level. At the end of the infiltration area the water was diluted and the concentration of phosphates increased because of the groundwater background pollution.

The results of this work show that wastewater drainage could be used in small municipalities. It depends on the amount of inhabitants, on the surroundings of the locality, on its geological and hydrological conditions. With regard to wastewater quality and its hydraulic load pressure the method of wastewater drainage supported by natural attenuation processes could be used with success.