MOTEL – COFFEE HOUSE „NIKOLA" WWTP

S1…S4 – septic tanks; PS – pump shaft; VF – sub-surface vertical flow constructed wetland

The motel – coffee house „Nikola" is located at 192.5 km highway Vilnius-Klaipėda (Yliai village, Raseiniai district municipality). Wastewater treatment plant of motel was arranged in 2003.

Description of the treatment process

After the purification in septic tanks, wastewater is directed into sub-surface vertical flow constructed wetland (SSVF CW) for secondary (biological) treatment. Wastewater discharge is 3,3 m^3/day.

Surface area of CW is 300 m^2. SSVF CW contains a 20-cm thick layer of fine breakstone with distribution pipes arranged at the spacing of 1 m. With the help of a pump, wastewater is distributed from the pump-house into the distribution pipes. Further wastewater is spread throughout the breakstone layer and is filtered downwards in a vertical direction via a 0.8-m deep sand layer into the collecting pipes arranged on the bottom of the CW. Sand filtration coefficient is 35.5 ± 5.9 m d^{-1}. CW is planted up with common reed (*Phragmites australis*).

After the treatment process, wastewater is directed into a water recipient.

The treatment efficiency of motel – coffee house „Nikola" WWTP (2004-2006) according to
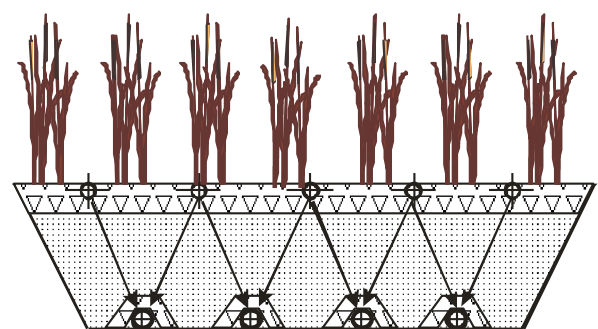BOD$_5$ – 97,9%;
TN – 27,9%,
TP – 59,3%.

Installation of SSVF CW

Sub-surface vertical flow constructed wetland

Sheme of SSVF CW

RECONSTRUCTED LEITGIRIAI WWTP

„AUGUST IR KO" wastewater treatment technology and biological reactor was used for reconstruction of old Leitgiriai WWTP. Model – AT250. The process technology covers all the most advanced active sludge processes of prolonged aeration, including the nitrification, denitrification, phosphorus removal, filtration via the submersible level in one compact reactor. Projected discharge of wastewater – 37 m^3/day.

Description of the treatment process

The anaerobic and anoxic chambers are divided by a series of overflowed and under flowed baffles into compartments. The inflow of wastewater and circulation of the active sludge as well as the particular arrangement of the baffles (patented Vertical Flow Labyrinth system) creates an upward and downward flow in the compartments, which ensures an effective mixing of the content in each compartment. In these chambers nitrogen and phosphorus removal takes place.

The activated sludge-wastewater mixture from the anoxic chamber flows to the aeration chamber. At the bottom of the aeration chamber air diffusers are installed. The diffusers provide fine-bubble aeration ensuring the content is in suspension and the amount of oxygen necessary for biological processes is dissolved, perforated elastic membrane is used in the air diffusers, which allow a long-term operation.

After the aeration chamber the activated sludge-wastewater mixture flows to the final clarification chamber. The operation is based on vertical settling process. The active sludge flows through an opening above the bottom of the tank and filters through a thickened sludge layer. That is when the particles of the active sludge are separated and the treated water flows through the collection system to the outlet.
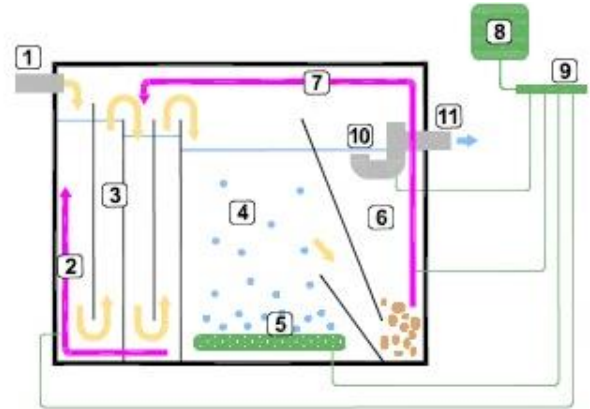
Technological scheme of the biological reactor

1 – inflow, 2 – airlift No.1, 3 – non-aerated chambers (anaerobic/anoxic), 4 – aerated chamber (oxic), 5 – aeration system, 6 – final clarification chamber, 7 – airlift No.2, 8 – air blower, 9 – air distribution system, 10 – flow regulator, 11 – outflow.

New installation of pre-treatment step

New biological treatment step

USĖNAI SETTLEMENT WWTP

Usėnai_is a settlement with 632 inhabitants in Šilutė district municipality, near the road Kaunas-Jurbarkas-Šilutė-Klaipėda.

<u>Usėnai WWTP</u> was reconstructed in 2015.

Design inflow:
Q_{averag} – 110 m^3/d;
Q_{hmax} – 22 m^3/h.

Design inflowing pollution	
Parameter	Value
BOD$_5$	545 mgO$_2$/l
Suspended solids	636 mg/l
Total phosphorus	25 mg/l
Total nitrogen	109 mg/l

Design treatment efficiency	
Parameter	Value
BOD$_5$/BOD$_7$	10/12 mgO$_2$/l
Total phosphorus	2 mg/l
Total nitrogen	20 mg/l

Description of the treatment process

„AUGUST IR KO" wastewater treatment technology was implemented.
The makeup of the WWTP:
- Pre-treatment step. An integrated coarse pre-treatment unit consisting of a self-cleaning screen and a grit separator;
- Biological treatment step. Three parallel technological lines consisting of anaerobic, anoxic, aeration and final clarification zones.
- Excess sludge management. Aerobic sludge stabilization/thickening tank.
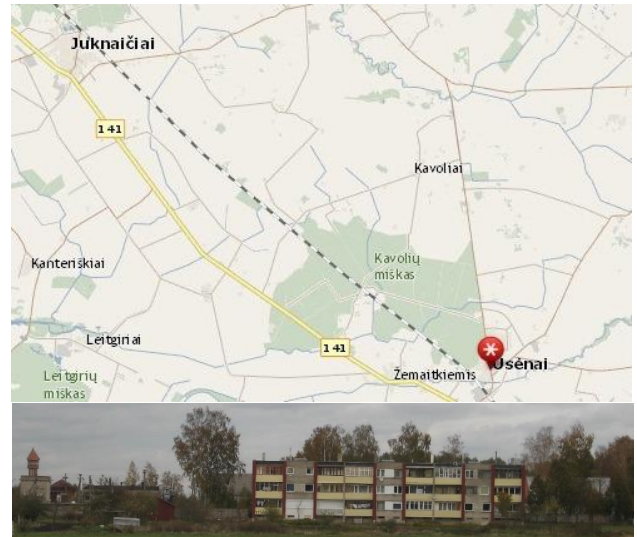
SKIRSNEMUNĖ VILLAGE WWTP

Skirsnemunė is a village in Jurbarkas district municipality, Tauragė County, Lithuania. It is situated on the Neman River about 9 km from Jurbarkas. It has 772 residents.

The village traces its history to Christmemel, a fortress built by the Teutonic Knights on a nearby hill fort in 1313. The fortress was abandoned in 1328.

Skirsnemunė WWTP was constructed in 2015.

Design inflow:
Q_{averag} - 187m^3/d;
Q_{max} – 248m^3/d;
Q_{hmax} – 27,6 m^3/h.

Design inflowing pollution	
Parameter	Value
BOD$_7$	684 mgO$_2$/l
Suspended solids	694 mg/l
Total phosphorus	26,8 mg/l
Total nitrogen	119 mg/l

Design treatment efficiency	
Parameter	Value
BOD$_5$/BOD$_7$	10/12 mgO$_2$/l
Total phosphorus	2 mg/l
Total nitrogen	20 mg/l

Description of the treatment process

„AUGUST IR KO" wastewater treatment technology was implemented.
The makeup of the WWTP:
- Pre-treatment step. An integrated coarse pre-treatment unit consisting of a self-cleaning screen and a grit separator;
- Biological treatment step. Two parallel technological lines consisting of anaerobic, anoxic, aeration and final clarification zones.
- Excess sludge management. Aerobic sludge stabilization/thickening tank.