



WWTP for Maillen Belgium for 900 PE with John Cockerill Balteau for the Belgium public service intercommunal water supplier INASEP in Namur

BACKGROUND:

The Belgium public service intercommunal water supplier INASEP in Namur

Nitrogen discharge concentration were a major design considerations.

CHALLENGES

Design Flows and loads:

Daily flow: 180 m³/d. Design flow: 10 m³/h.
Peak flowrate: 30 m³/h.

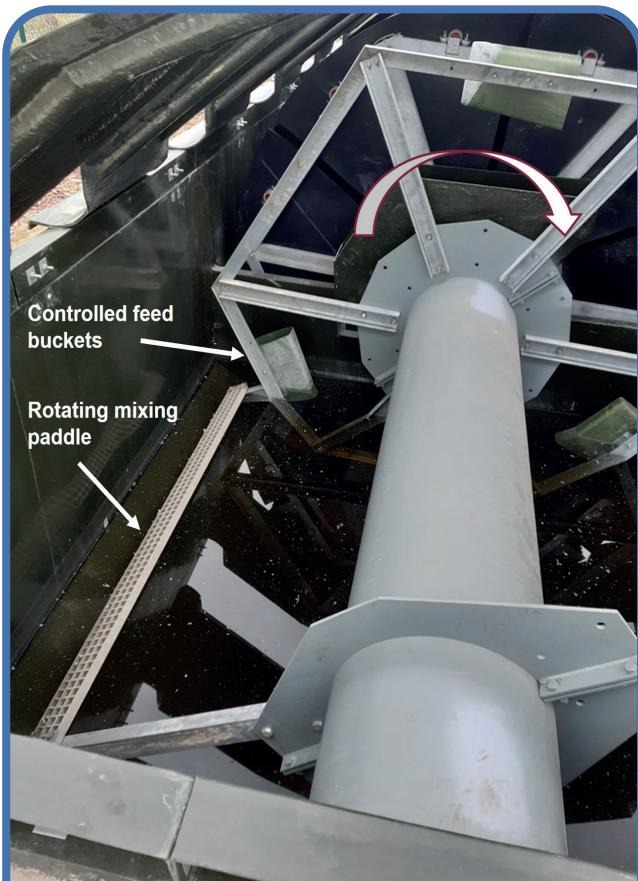
BOD₅ – 300 mg BOD₅/l (54 kg BOD₅/d)
COD – 667 mg COD/l (120 kg COD/d)
TSS – 361 mg/l (64.98 kg TSS/d)
TKN – 61 mg TKN-N/l (10.98 kg TKN-N/d)

The system has no attenuation capability upstream of the RBC or within the primary settlement tank.

Inlet screen upstream of the PST is 6 mm 2D screen.

Discharge Consent:

TSS – 361 mg/l (64.98 kg TSS/d)
BOD₅ – 30 mg O₂/l
COD – 125 mg O₂/l
TSS – 35 mg/l
NH₄ – 5 mg N/l



NIFAS® reactor with intergral flow attenuation stage, MLSS mixing and controlled forward flow bucket feed system upstream of the RBC stage in the RBC tank.

SOLUTIONS:

EWwS Ltd were required to deal with high peak flows and maintain consistent treatment performance with full nitrification and total nitrogen treatment.

EWwS proposed to use their new NIFAS® technology specifically aimed at regulating flows, mass transfer and process kinetics. EWwS included an integral NIFAS® reactor within the RBC housing

and upstream of the RBC. This would provide nitrogen control and flow attenuation. EWwS also incorporated vital features such as integral mixing of the NIFAS® reactor contents without any additional mechanical items.

At the end of this compartment rotating buckets transfer the effluent to the RBC 1st stage at a controlled rate.

RESULTS

Discharge values at the Maillen WWTP.

Flow to the plant = 850 m³/day (this site is 40 miles from Aachen, Germany, and the flow relates to July 2021 heavy rain period).

Inlet to the plant	Outlet from the plant	Removal Efficiency (overall)
BOD ₅ – 125 mg O ₂ /l (106.25 kg BOD ₅ /d)	BOD ₅ – 11 mg O ₂ /l	91.2%
COD – 291 mg O ₂ /l (247.35 kg COD/d)	COD – 49 mg O ₂ /l	83.1%
TSS – 182 mg/l (154.7 kg TSS/d)	TSS – 9 mg/l	95.0%
TKN – 52.5 mg TKN-N/l (44.6 kg TKN-N/d)	TKN – 8.4 mg N/l	84.0%
NH ₄ -N – 40.9 mg NH ₄ -N/l (34.76 kg NH ₄ -N/d)	NH ₄ -N – 0.4 mg N/l	99.0%

This site already has a requirement for full nitrification but the local EA regulators have informed INASEP (water utility company) of the impending tighter regulation to be introduced within 24 months of the plant installation during August 2020.

EWwS therefore introduced their NIFAS® enhancement with the RBCs to reduce TN at the start and to ensure that the system is NIFAS® ready for further enhancements for tighter nitrogen control with minor non-invasive upgrade.

EWwS Ltd have developed their unique NIFAS® technology for tighter nitrogen concentrations in the discharge.

EWwS will assist their client and the end client with technical support and process considerations.

A major advantage of the NIFAS® system is to deliver improved discharge effluent quality at lower capital cost and energy consumption.



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