

CASE STUDY

WASTEWATER TREATMENT WORKS

Municipal wastewater works, Highveld — treating a plant with no functioning disinfection or solids return

Highveld region, South Africa



RESULT

COD was reduced from 2,903 mg/L to 181 mg/L (93.8% reduction). Turbidity was reduced from 1,371 NTU to 60 NTU (95.6% reduction). This was achieved out of a tank that was effectively solid at the start of the programme.

OVERVIEW

A 7 ML/day municipal wastewater treatment works, treated in a condition where both clarifiers were out

of service and the main tank was filled with solid sludge.

THE CHALLENGE

This works had no disinfection stage and no functioning solids return, meaning nutrient removal and full bacterial compliance were never physically achievable given the plant's condition. Nitrification was not achievable at this works — with both clarifiers out of service, solids retention time was a fraction of what nitrifying bacteria require. That limitation is reported openly. What biological treatment could do, and did, was reduce the organic load and the sludge inventory.

TREATMENT

Biological treatment was applied to reduce organic load and sludge inventory within the existing, largely non-functional plant.

Duration: Not specified in source brief

OBJECTIVES

- Reduce organic load (COD) despite non-functional plant infrastructure
- Reduce turbidity
- Reduce the sludge inventory in the main treatment tank

SITE CONDITIONS

- Both clarifiers were out of service.
- The main treatment tank was filled with solid sludge requiring excavator access.
- Downstream ponds carried four years of accumulated material.
- Plant flow was approximately 7 ML/day.

RESULTS IN DETAIL

**INLET**

COD 2,903 mg/L, turbidity 1,371 NTU.

**OUTLET**

COD 181 mg/L (93.8% reduction), turbidity 60 NTU (95.6% reduction).

VERIFICATION

COD and turbidity figures only. Do not publish any ammonia figure, any E. coli figure, or any claim about the river downstream of this works — these are not cleared.

WHY THIS MATTERS

Publishing this plant's infrastructure limitation alongside its results is what makes them credible to a technical reader: biological treatment achieved a real reduction in organic load and sludge inventory despite a plant that was not physically capable of full nutrient or bacterial compliance.

DISCLAIMER

This works must remain anonymous — described only as "a Highveld municipal wastewater treatment works," with no name, signage, gate boards, vehicle livery or recognisable landmarks in any photography. The same anonymity applies to a second works discharging downstream of it, which is not part of this case study. Do not publish ammonia figures, E. coli figures, or any claim about the downstream river.

Operating an overloaded municipal works?

Discuss plant condition, flow and current process limitations with Baczyme.

Gary Hinde, Director · gary@baczyme.org.za · +27 82 552 7484