

THE CHALLENGE:

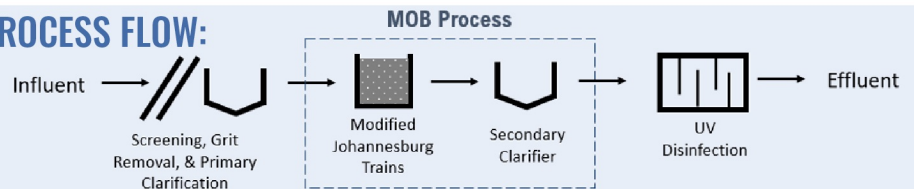
Carbonaceous to nitrification conversion is a classic wastewater challenge, usually involving breaking ground and breaking the bank. The Saskatoon WWTP in Saskatchewan, Canada, operates as a modified Johannesburg process for biological phosphorus removal and BOD treatment. With an anticipated year-round ammonia permit limit of less than 3.0 mg/L, Saskatoon WWTP began evaluating a plant expansion, but the costs of a traditional expansion were very high. Nitrification at Saskatoon has historically been limited to the warmer months, when operating SRT is sufficient to sustain a nitrifying population. Attempts to achieve ammonia removal into winter by increasing SRT have repeatedly run up against clarifier constraints, as the combination of a higher biomass inventory and poor, cold weather settleability pushes solids loading beyond what the secondary clarifiers can reliably support. The Saskatoon WWTP needed a solution to achieve winter nitrification without risking biological washout while keeping capital costs down.



FACILITY OVERVIEW:

Facility Flows	94 MLD (25 MGD) Average Flow 190 MLD High Flow Event Simulated
Effluent Goals	- Ammonia: < 3.0 mg/L - Maintain treatment
Project Goals	- Cold weather nitrification - Improve settleability for capacity increase and wet weather resilience - Monitor O&M Costs

PROCESS FLOW:



WHY THE MOB PROCESS WAS CHOSEN:

The demonstration began in the heart of the Canadian winter, retrofitting one of the two trains with the MOB Process and leaving the other as a conventional control train for direct comparison. The MOB Process was selected for its ability to decouple SRT, maintaining a short SRT in the flocculant sludge to keep clarifier loading manageable while retaining slow-growing nitrifiers within the biofilm. Both trains were deliberately operated at or below the nitrifier washout SRT to test this principle. The results were unambiguous. The MOB train achieved complete nitrification with effluent ammonia below the 3.0 mg/L target and ultimately below 1.0 mg/L at wastewater temperatures as low as 12°C. Meanwhile, the control train effectively lost nitrification, with effluent ammonia reaching up to 45 mg/L. This stark divergence demonstrates that the MOB Process can meet stringent nitrification goals through process intensification with a straightforward, no-downtime retrofit rather than a major capital expansion.

WHAT WAS ACHIEVED:

✓	Complete, cold weather nitrification with SRT at or below theoretical washout
✓	Achieved effluent ammonia < 1.0 mg/L in winter
✓	Simulated high flow events showed increased clarifier capacity
✓	Retrofit installation without facility downtime
✓	O&M comparison showed no increase in operational costs

WHAT THE MOB PROCESS CAN DO FOR YOU:

- ✓ Increased Clarifier Capacity
- ✓ Stabilized Settling Performance
- ✓ High Loading Process Stability
- ✓ Full-Scale Demonstrations and Retrofits

