

THE CITY OF MARENGO, IL UTILIZES BCR'S EXPERTISE TO SIGNIFICANTLY IMPROVE OPERATION AND THROUGHPUT CAPACITY

This case study reviews the significant impact the newly installed CleanB® system — commissioned in July 2022 — has had on operational performance and operating costs, with a detailed comparison to the facility's previous Class B process; two-phase anaerobic digestion (TPAD).

The main benefits the CleanB® has provided the City of Marengo are outlined below:

- Disinfection
- Vector attraction reduction (VAR)
- Processing performance/throughput
- Significantly reduced ammonia, nitrogen, and phosphorus centrate concentrations
- Simpler process (thickening, digestion and centrate aeration eliminated)
- Significant capital avoidance
- Significant operating cost reduction

Prior to the City's purchase of the CleanB® system, a 1-week full-scale demonstration was deployed to assess its performance. The City was facing significant capital expenditures estimated at \$2.1M to repair and upgrade the aging TPAD process. Due to operational difficulties, throughput constraints and operating costs associated with the TPAD process, the City was looking for an alternative disinfection and stabilization process.

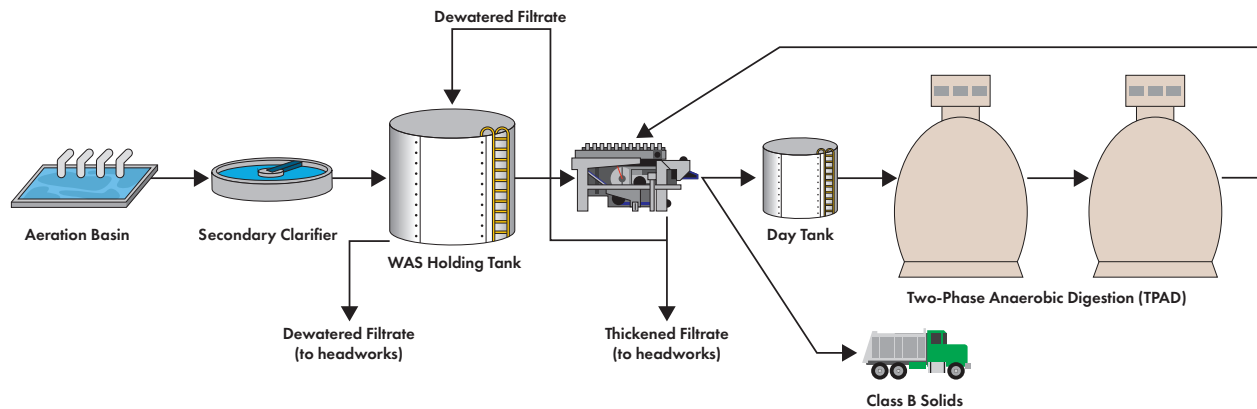


CASE STUDY:

Marengo, IL WWTP

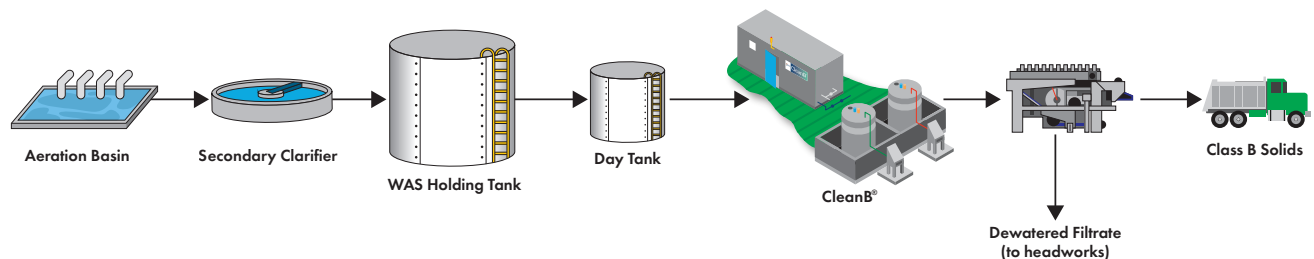
FACILITY & FORMER TPAD PROCESS OVERVIEW

CITY OF MARENGO — PROCESS FLOW DIAGRAM (BEFORE): TPAD PROCESS



Dewatered filtrate needed aeration before being sent to headworks due to very high ammonia content.

CITY OF MARENGO — PROCESS FLOW DIAGRAM (AFTER): CLEANB® PROCESS



Process flow significantly simplified, reducing multiple unit processes; thickening, filtrate aeration, and two digesters.

CLEANB® INSTALLATION SUMMARY & OPERATIONAL IMPROVEMENTS

Permanent CleanB® Installation

About one (1) year after the successful demonstration, the City of Marengo purchased the CleanB® system to replace their TPAD process. The CleanB® was successfully commissioned in early 2022 and has provided a simple and effective process that meets and exceeds regulatory requirements, improves cake solids, reduces odors, decreases polymer consumption, reduces nutrient return and significantly improves facility capacity.

A small corner space existed inside the dewatering building where the CleanB® system components were seamlessly installed in an area of ~28' x 10' (280 ft²), and chemical storage was placed along the adjacent wall. CleanB®'s modular components allowed for installation without significant construction and/or capital improvements – this translated the system to be purchased and installed within a few months versus 12+ months that it would take to rehab the two digesters.

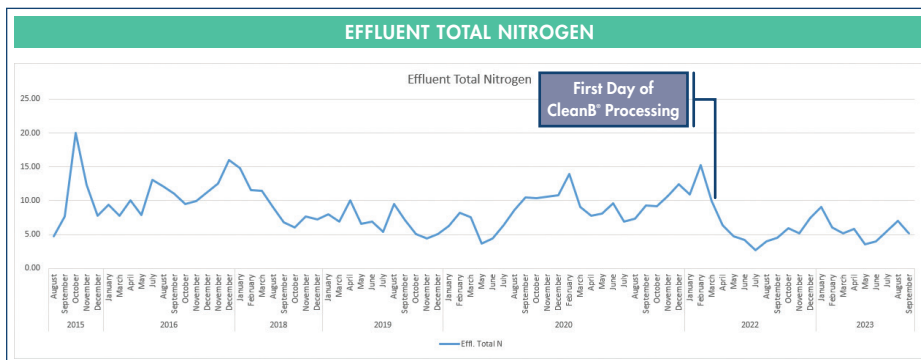
CUSTOM DESIGNED AND INSTALLED IN A TIGHT AND CONFINED SPACE:



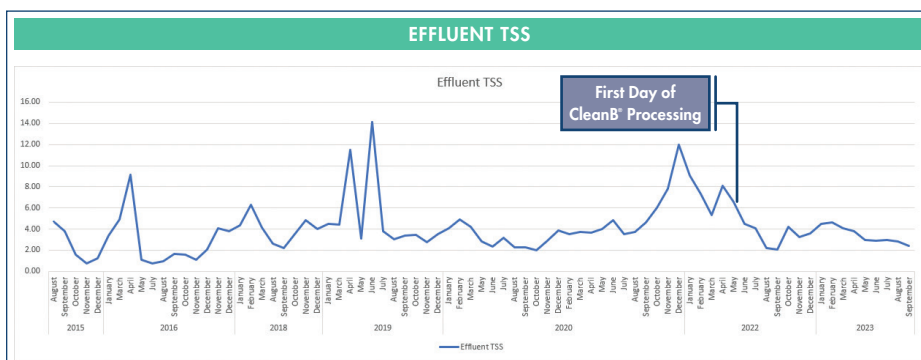
FILTRATE & EFFLUENT IMPROVEMENTS

The demonstration results showed that total nitrogen, total phosphorus, and ammonia concentrations in the centrate were significantly improved with 73+%, 72% and 99% reductions, respectively.

Immediately after the CleanB® installation, the effluent TN concentrations began to decrease. Available discharge manifest reports that date back to 2015 were analyzed. Within several weeks, effluent TN concentrations hit the lowest value reported since (at least) 2015.



Shown in the below/left chart, total suspended solids (TSS) are also trending down, and in August, have averaged the lowest concentration since 2016.



These effluent reductions are in line with the centrate results from the demonstration and are expected to continue. BCR will continue to monitor and analyze the DMR reports, and report findings after having more CleanB® operating history.

CASE STUDY: Marengo, IL WWTP



SUMMARY & CONCLUSIONS

The CleanB® installation at Marengo WWTP has provided the following benefits:

- Consistently meets Class B disinfection requirements
- Consistently meets VAR option #4, soluble oxygen uptake rate (SOUR)
- Odor reduction (100% reduction in cake hydrogen sulfide mercaptans and ammonia, 99+% reduction in centrate ammonia)
- Significantly improved operations and throughput capacity (up to 5x more throughput)
- Significantly reduced polymer consumption (47%)
- Safer working environment for facility operators (99+% reduction in ammonia concentrations in building)

In addition to the process improvements stated above, the City of Marengo was able to avoid \$2.1M in repair and upgrade costs to their existing TPAD process. The CleanB® system provided an immediate payback from net capital avoidance (~\$1.5M avoidance), and the process has also resulted in appreciable operating savings compared to the TPAD process (~\$30k annually). The process has consistently met Class B® disinfection and VAR requirements and has significantly improved repair & maintenance, energy, and polymer costs. Odors at the facility have also been significantly improved, both on-site and at the disposition site. Additionally, due to the reduction in nutrient return compared to the TPAD process, effluent nutrient concentrations continue to decline, and the CleanB® will allow the City to meet and exceed regulatory requirements not only for biosolids compliance, but for effluent compliance as well.

BCR appreciates the opportunity to be a long-term partner with the City of Marengo. For more information, please contact **marketing@bcrinc.com** and scan the QR code below to read the complete and detailed case study:



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