CambridgeWaterTechnology

The Next Generation of Clarification Filtration & Biological Treatment

Town of Sturbridge POTW

BioMag™ and CoMag™

Application
Extended Aeration Activated Sludge

Capacity
Existing
0.75 MGD
Expansion To
1.6 MGD

Trial Period
November 2007
To May 2008

Full Scale Construction to Start Summer 2009

Location
Sturbridge, Massachusetts

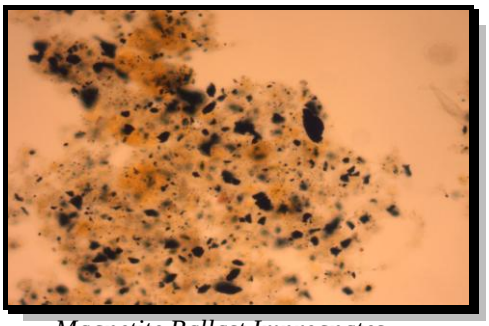
Sturbridge, Massachusetts has historically suffered from periodic blooms of filamentous bacteria that have caused bulking in the secondary clarifiers of their three activated sludge package plants. The elevated clarifier solids loadings during high flow events have often caused excessive backwash cycle times of their sand filter, and occasional diversion of excess flow to a neighboring POTW. The Town's need for additional treatment capacity in a highly constricted footprint, coupled with tighter permit limits for BOD, TSS, total nitrogen and phosphorus, created the need to upgrade the wastewater treatment plant.

The Town's initial solution was to install a membrane bioreactor (MBR) to achieve the required limits on contaminant removal and deliver the additional capacity needed without expanding the footprint of the plant.

Faced with the high capital and operating costs of the MBR solution, the Town agreed to pilot CWT's innovative BioMag™ technology on one of its three activated sludge trains. The primary goals of the trial was to demonstrate that BioMag™ is a cost effective alternative to MBRs, and that converting the activated sludge system to BioMag™ would increase the overall plant capacity from 0.75 MGD to 1.6 MGD without adding additional bioreactor or clarifier capacity while meeting all permit limits and achieving <10 mg/L total Nitrogen and <0.2 mg/L total Phosphorus. As shown in the accompanying tables, BioMag™ exceeds all expectations.

BioMag™ Process Overview

BioMag™ enhances biological wastewater treatment processes by using magnetite to ballast biological floc. With a specific gravity of 5.2 and a strong affinity for biological solids, magnetite substantially increases the settling rate of the biomass. Increasing settling rates of the biological floc provides the opportunity to increase mixed liquor suspended solids (MLSS) concentration. Higher MLSS concentration enables the treatment of increased hydraulic flows or surges and loadings, all within the same tankage. BioMag™ is a perfect application for activated sludge plants



Magnetite Ballast Impregnates Biological Floc

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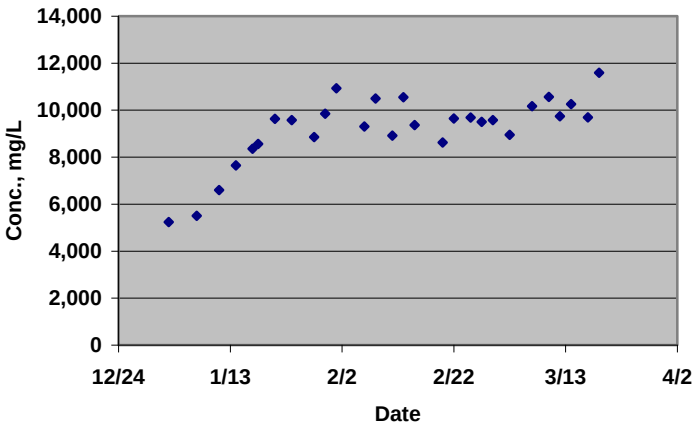
needing more treatment capacity or enhanced nutrient removal capability, at a cost far less than MBR technology.

Sturbridge Adds CoMag™

Concerned by the expected tightening of Phosphorus limits coupled with a desire to have a reliable tertiary treatment system to follow BioMag™, the Town initially focused on expanding their conventional media filtration system. CWT successfully demonstrated that the installed cost of an expanded sand filter would be greater than that of a smaller and higher performing CoMag™ system. The advantages of a smaller foot print, no losses of productivity to clogging, plugging or backwashing, and CWT's process guarantee of <0.05 mg/L of effluent phosphorus sealed the deal.

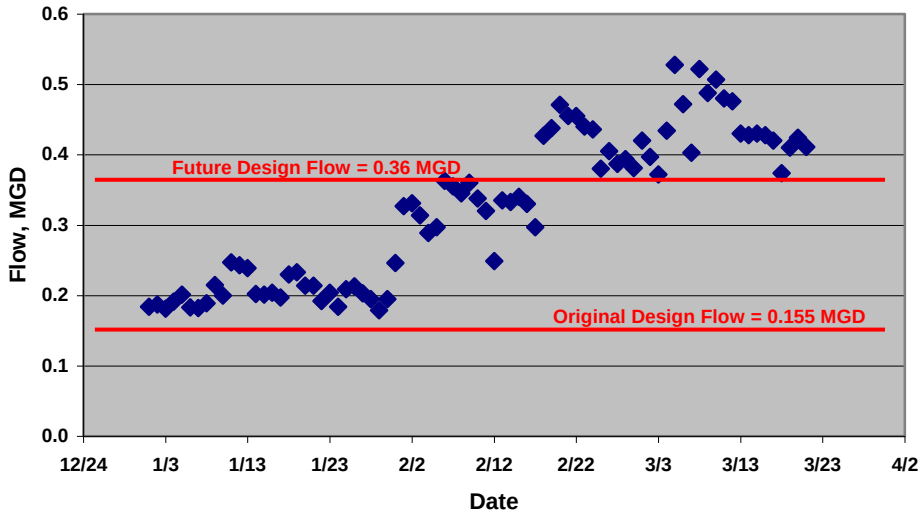
BioMag MLSS Concentration



Performance Results

MLSS	>10,000 mg/l
Clarifier Solids Loading	>90 lb/day-ft^2
SVI	<40 ml/g
BOD_5	<2 mg/l
TSS	<5 mg/l
NH_3-N	ND
Total Nitrogen	<5 mg/l
Total Phosphorus	<0.1 mg/l
Ortho Phosphate	<0.05 mg/l
Turbidity	<0.5 NTU

Flow to BioMag Train



To learn more about the Sturbridge Trial and how CWT can help solve your water and wastewater treatment challenges contact Bob Backman in our Cambridge office at 617-871-1353 x114 or email Bob at rbackman@cambridgewatertech.com.