

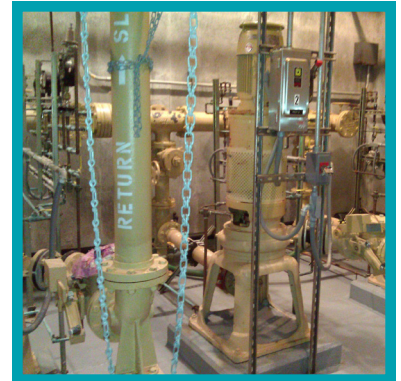
# Case Study: Upton

## NITROGEN REMOVAL UPTON, MASSACHUSETTS (POPULATION 8,000)

Effluent nitrogen of 6.0 mg/L at a facility not designed for total-N removal. Biological P removal reduces chemical use - effluent total -P 0.2 mg/L.

Equipment Cost: ZERO

Annual Savings: less electricity, fewer chemicals



The air flow to the first two passes of the four pass 0.4 MGD extended aeration facility was reduced to create a habitat for nitrate reduction. The return activated sludge pumps are operated at 200% of the influent flow rate to bring nitrate rich flow into the pre-anoxic tank.

Twice daily, staff opens the aeration headers for a period of 30 minutes to resuspend any solids that may settle in the low-oxygen portions of the aeration tanks. For ammonia removal, sufficient air is provided to the final two passes. Mixed liquor targets of 2,700 mg/L during the summer and 3,600 mg/L during the winter are maintained.

In addition to reducing effluent nitrogen from 22 to 6 mg/L in a facility not designed for nitrogen removal, the new operating strategy improved biological phosphorus removal so that fewer chemicals are used. Has reduced operating costs: less electricity is used, less sodium bicarbonate is used to buffer the pH loss associated with ammonia removal, and slightly less waste sludge is produced.

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"Using the process control strategy that CleanWaterOps developed, we reduced nitrogen by 75% without a costly Facility Upgrade and simultaneously reduced our treatment costs."



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