



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION
MILLVILLE WWTP - PANAMA CITY, FL

DESIGN DAILY FLOW / PEAK FLOW
5 MGD (18,928 M³/DAY) / 12.5 MGD (47,320 M³/DAY)

AQUA-AEROBIC SOLUTION
3-BASIN AquaSBR® SYSTEM, (4) AquaABF® FILTERS

AquaSBR® SYSTEM ACCOMODATES MILLVILLE'S LIMITED LAND SPACE

Millville WWTP located in Panama City, Florida first went online in 1948 with a trickling filter system and had an average daily design flow of 3.0 MGD. By the 1990s, the system could not meet the tightened effluent requirements for denitrification and phosphorus removal as required for discharge into the bay. To bring the plant back into compliance, an upgrade was in order. Panama City decided to research alternative treatment technologies and consulted a local engineer. The City compared a 5-stage continuous flow system and an AquaSBR sequencing batch reactor system (SBR).

The City ultimately chose a 3-basin AquaSBR system due to its small footprint, which could accommodate the project site's land space, low installation cost, reduced operation and maintenance costs, and capability for future increased flow capacity. The new SBR system provides a design average daily flow of 5.0 MGD and peak flow of 12.5 MGD. Since the permit only allowed for 4.0 MGD, the City decided to purchase just the aeration equipment needed to meet that capacity and would expand in the future. The AquaSBR system started up in June of 1999 and has consistently met effluent requirements for nitrification, denitrification and phosphorus removal.

Millville also installed (4) AquaABF® traveling bridge sand filters and a UV disinfection process as part of the upgrade to meet effluent requirements for total suspended solids (TSS) and phosphorus levels.



Millville's 3-basin AquaSBR® system is shown on the right and the (4) AquaABF® sand filters are shown adjacent to the post aeration basins.

Millville WWTP currently serves a population of approximately 37,000, which includes Tyndall Air Force Base, a U.S. navy base, and a community college. The city is also a well-known resort town abundant with retirees and college students on spring break so the plant serves a supplemental population as well.

AquaSBR® SYSTEM PROCESS

The AquaSBR system operates on a simple concept of introducing a quantity of waste to a reactor, treating the waste in a pre-determined time period, and subsequently discharging a volume of clear effluent. This "Fill and Draw" principle of operation involves the basic steps of Fill, React, Settle, Decant, and Sludge Waste. Each system is designed to include these five primary phases of operation, with the duration of each individual phase based upon specific waste characteristics and effluent objectives.

Where nutrient removal is required, a simple adjustment to the SBR's operating strategy permits nitrification, denitrification, and biological phosphorus removal without the need for separate anaerobic or anoxic reactors.

DESIGN CHARACTERISTICS

Millville's treatment scheme includes: screen and grit removal, AquaSBR system, post EQ basin, AquaABF sand filters, post-aeration and UV disinfection. The AquaSBR system consists of (3) 130' diameter basins and is followed by (4) AquaABF sand filters (each 12.5' wide x 38' long). The SBR system and sand filters began operation in June 1999 with a design average daily flow of 5.0 MGD and peak flow of 12.5 MGD to accommodate future growth. In spring 2007, the plant requested an increased permit capacity from 4.0 MGD to 5.0 MGD. A minimal addition of treatment equipment will be required to meet this.

Millville's treatment objective is nitrification, denitrification and phosphorus removal. Following biological treatment, effluent is sent to the sand filters to further reduce TSS and phosphorus prior to UV disinfection.



AquaABF® Filters at Millville WWTP

AVERAGE OPERATING DATA (2006)

LOADING	DESIGN INFLUENT	AVG INFLUENT	DESIGN EFFLUENT	AVG EFFLUENT
Avg Flow mgd	5.0	2.5	----	----
Peak Flow mgd	10.0	----	----	----
BOD ₅ mg/l	175	216	5	2.5
TSS mg/l	200	314	5	2
TKN mg/l	45	25.8	----	----
Total N mg/l	----	----	3	1.2
Total P mg/l	10	4.5	1	0.4

AquaSBR® SYSTEM ADVANTAGES

- All components available as retrievable
- Tolerates variable hydraulic loads
- Controls filamentous growth
- Tolerates variable organic loads
- Provides quiescent settling
- Separation of aeration and mixing
- Lower installation costs
- Return activated sludge pumping eliminated
- Small footprint
- Simple to expand or upgrade
- One company accountability

AquaABF® FILTER ADVANTAGES

- Continuous filtration, even during backwash
- No backwash or washwater holding tanks
- As little as 6" headloss through filter; will not force solids through media
- Surface mat filtration - no mudball formation
- Continuous static head above media prevents air entrapment under porous plate
- Only 1-2% of daily flow required for backwash
- Low maintenance; no pipe galleries or air blowers
- Lower capital cost and installation cost
- Fully automatic / minimal operator attention