



AQUA-AEROBIC SYSTEMS, INC.
A Metawater Company

SUCCESS STORIES

PLANT NAME AND LOCATION

ABBOTTSTOWN-PARADISE JOINT SEWER AUTHORITY - ABBOTTSTOWN, PA

DESIGN DAILY FLOW / PEAK FLOW

0.35 MGD (1325 M³/DAY) / 0.79 MGD (2990 M³/DAY)

AQUA-AEROBIC SOLUTION

DUAL-BASIN AquaSBR[®] SYSTEM, Aqua SCADA SYSTEM

ABBOTTSTOWN RETROFITTED A FLOW-THROUGH SYSTEM WITH AN AquaSBR[®] SYSTEM TO MEET STRINGENT EFFLUENT REQUIREMENTS

The Abbottstown-Paradise Joint Sewer Authority was incorporated in 1973 and utilized a continuous flow activated sludge system with an average daily design flow of 0.21 MGD. At that time the plant was only required to reduce total suspended solids (TSS) and effluent ammonia to required levels to serve the area population of about 2000. Due to urban growth and increased storm flow runoffs, the plant was in need of an expansion and upgrade by the late 1990s. The existing plant had reached its hydraulic capacity and was subject to solids carryover during high flows. The plant was also having difficulty in meeting its ammonia limits. To find a solution to its problem, Abbottstown turned to the local consultant, C.S. Davidson, Inc. to perform an evaluation on upgrade and expansion options and provide a recommendation.

C.S. Davidson considered several options in their evaluation. These options included the expansion of the existing flow-through system, installation of a new AquaSBR sequencing batch reactor system, and installation of a flow-through activated sludge process with sequenced anoxic and aerobic phases. C.S. Davidson visited numerous installations utilizing the alternative technologies and completed an appraisal of Abbottstown before presenting their recommendation. The ultimate solution was to purchase a dual-basin AquaSBR system, which was to be retrofitted into the existing continuous flow-through system. The AquaSBR system was the most cost-

effective alternative and the system would accommodate the future stringent effluent requirements for ammonia and phosphorus.



Abbottstown's dual-basin AquaSBR[®] system is shown to the right.

Design for the plant upgrade was initiated in 2000 and construction began in 2002. The new AquaSBR system went into operation in 2003 and has consistently produced effluent quality well below Abbottstown's permit limits. To optimize process control and plan for future nutrient removal requirements, expected to be mandated by the state within five years after startup, an Aqua SCADA control system was also incorporated into the design.

AquaSBR® SYSTEM PROCESS

The AquaSBR system operates on a simple concept of introducing a quantity of waste to a reactor, treating the waste in an adequate time period, and subsequently discharging a volume of effluent plus waste sludge that is equal to the original volume of waste introduced to the reactor. This “Fill and Draw” principle of operation involves the basic steps of Fill, React, Settle, Decant, and Sludge Waste. The system may be designed to include seven individual phases of operation but the inclusion or duration of any individual phase is based upon specific waste characteristics and effluent objectives.

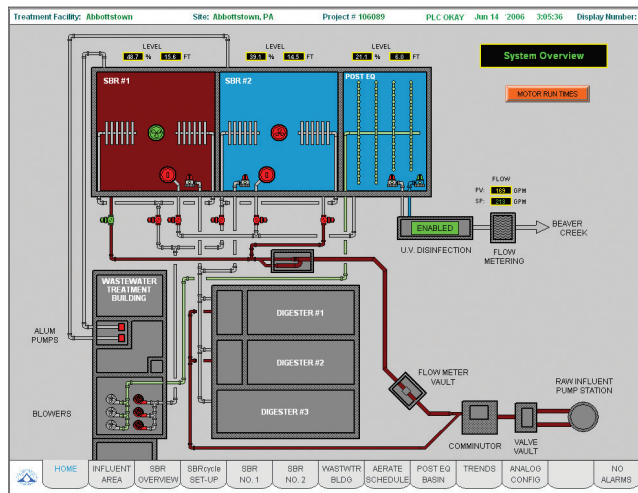
Where nutrient removal is required, a simple adjustment to the SBR’s operating strategies permits nitrification, denitrification, and biological phosphorus removal.

DESIGN CHARACTERISTICS

The upgraded AquaSBR system allows the plant to meet the state’s stringent effluent requirements for ammonia and phosphorus and to handle the storm flows experienced by the plant.

To optimize the plant’s process control with the upgraded system, an Aqua SCADA control system was also incorporated into the design. The system allows for data trending and provides additional process control functions such as on-line analyzers for key process control parameters.

Chief Operator, John Scrivens says, “The AquaSBR system works great and is user-friendly.”



SCADA screen for AquaSBR® system overview.

AVERAGE OPERATING DATA (2010)

LOADING	DESIGN INFLUENT	AVG INFLUENT	AVG EFFLUENT	PERMIT EFFLUENT
AVG Flow mgd	0.35	0.15	NA	NA
Peak Flow mgd	0.79	NA	NA	NA
BOD ₅ mg/l	265	308.08	> 1.0	15 (May-Oct) 25 (Nov-Apr)
TSS mg/l	250	230.92	2.75	30
NH ₃ -N mg/l	40	36.88	0.38	1.5 (May-Oct) 4.5 (Nov-Apr)
Total P mg/l	8	8.23	1.53	2.0

AquaSBR® SYSTEM ADVANTAGES

- All components retrievable and accessible
- Tolerates variable hydraulic and organic loads
- Controls filamentous growth
- Provides quiescent settling
- Saves energy via separation of aeration and mixing
- Lower installation costs
- Eliminates return activated sludge pumping and secondary clarifiers
- Small footprint
- Simple to expand or upgrade
- One company accountability

Aqua SCADA SYSTEM ADVANTAGES

- Plant optimization
- Single point of control for plant-wide monitoring
- Detailed, dynamic graphics depicting equipment status and PLC command status
- Simple, intuitive navigation between screens
- Historical trending and logging of data
- Consolidated alarming of all SCADA accessed areas
- Remote access for operations personnel and/or Aqua-Aerobic support
- Optional electronic O&M Manual
- Upgrade capabilities for existing controls