PLANT NAME AND LOCATION
RUSHVILLE WWTP - RUSHVILLE, IN

DESIGN DAILY FLOW / PEAK FLOW
1.0 MGD / 12.6 MGD

AQUA-AEROBIC SOLUTION
(2) 14-DISK AquaPrime® CLOTH MEDIA FILTERS UTILIZING OptiFiber PF-14® MICROFIBER CLOTH MEDIA

Rushville Installs AquaPrime® Cloth Media Filter to Treat Combined Sewer Overflow Discharge Instead of Conventional Wet Weather Storage Tank

The City of Rushville, Indiana had to remedy a consent order filed in 2007 for its untreated combined sewer overflow (CSO) discharges that were polluting the Flatrock River, a violation of the Clean Water Act. The city originally planned to install a 1 MGD stormwater storage tank, but was approached by Aqua-Aerobic representatives with a pilot test proposal utilizing a new technology. The pilot proposal featured the AquaPrime® Cloth Media Filter utilizing 5-micron microfiber cloth media, which would be tested during five wet weather events. This study captured events from May-July 2015, and produced impressive results. The successful pilot test prompted the city to request a design for an AquaPrime filtration system in February 2016. The request came with two stipulations, the filters were to treat both dry and wet weather conditions, and alum coagulant was to be injected upstream of the filters to meet future effluent phosphorus limits and eliminate fine CSO particles.

Start-up of the (2) 14-disk AquaPrime filtration system began in July 2017 with a design average flow rate of 1 MGD in dry conditions and peak wet weather flow rate of 12.6 MGD. Each cloth media disk is 6.6 ft in diameter and provides an effective filtration area of 53.8 ft^2, for a total filtration area of 1506.4 ft^2. The filters were retrofitted into the plant's existing, abandoned sand media filter structures, saving the city considerable capital costs. In addition, the new filtration system was $1 million less than the original, conventional storage tank design.

The AquaPrime cloth media filters experienced the first wet weather events shortly after start-up in October and November 2017. Due to the continuous treatment capacity, no untreated overflows have occured.

Rushville's new tertiary/wet weather filtration system also included replacement of its existing gas chlorine disinfection system with a UV disinfection system. The UV system was installed in the existing tank, which also provided significant project cost savings.

Covered AquaPrime® cloth media filters were retrofitted into the abandoned sand media filter structures.

Completion of the filtration/disinfection phase of the city's upgrade project was achieved five years earlier than required by the state regulation agency. This project is the first AquaPrime filter installation in the nation for dual tertiary/ wet weather treatment and will keep approximately 50 million gallons of raw sewage from entering the nearby Flatrock River, annually.

Utilitiies Director, Les Day states,"*With the addition of the AquaPrime Filter System and new UV disinfection system, Rushville is discharging the best quality of water to our receiving stream, Flatrock River, then in years past.*"

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AquaPrime® FILTER PROCESS

The AquaPrime filter features a disk configuration and an outside-in flow path, which allows for three zones of solids removal. These zones are especially critical in wet weather applications due to the high solids typically associated with the first flush after wet weather events.

The top zone is the "floatable zone" where surface materials such as fats, oils and grease are allowed to collect on the water surface. Solids are removed from this zone by allowing floating material to overflow a scum weir a couple of times each day. The middle zone is the "filtration zone" where solids are removed through filtration. Here, solids deposit on the outside of the cloth media forming a mat as filtrate flows through the media. This buildup of solids on the media creates hydraulic resistance to flow through the media and causes the water level in the tank to rise. Once a predetermined liquid level or time setting is attained, the disks begin to rotate and the backwash pump starts, which draws filtered water from the inside of the disk through the media and removes solids from the filter media's surface. This process fluidizes fibers to provide an efficient release of stored solids deep within the fiber. The bottom or "solids zone" permits heavier solids to settle to the bottom of the tank for intermittent removal. The solids are evacuated from the hopper through collection laterals using the solids/backwash pump.
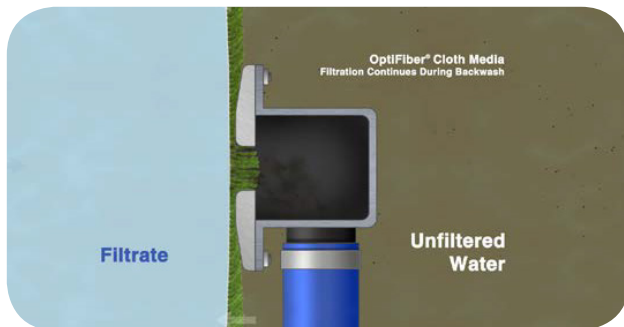
Solids are removed from the cloth media during the backwash mode.

DESIGN CHARACTERISTICS

In order to remove 85% or more of TSS and $CBOD_5$ in CSO discharges, and comply with future permit requirements for phosphorus, the AquaPrime filters are designed for upstream alum addition.

The system is also designed to treat for the duration of a wet weather event, which can last for several days. This ability to provide continuous filtration capacity prevents overflow occurences.

WET WEATHER EVENT PERFORMANCE

PARAMETER	NOV. 5-8 2017	FEB. 21-MAR 2 2018	MAR 27-31 2018
Rainfall	3.8 in.	4.98 in.	2.38 in.
Rainfall Duration	Most in 2 hours	Off/On over 10 days	Off/On over 4 days
Event Peak Flow	13.53 mgd	14+ mgd	9.25 mgd
Avg. Daily Flow	6.5-3.9 mgd	7.7-3.0 mgd	3.0-6.3 mgd
Inf/Eff $CBOD_5$	28/3 mg/L	31/3 mg/L	25/1 mg/L
Inf/Eff TSS	45/5 mg/L	40/4 mg/L	125/2 mg/L
Inf/Eff Ammonia	3.2/0.33 mg/L	2.4/0.33 mg/L	2.0/0.32 mg/L
Inf/Eff Total P	1.5/0.43 mg/L	2.7/0.34 mg/L	1.7/0.39mg/L

AquaPrime® FILTER ADVANTAGES

- Utilizes engineered OptiFiber PF-14® cloth filtration media
- Produces extremely consistent, high quality effluent
- Designed to handle extreme variation in TSS loadings
- Instant startup and instant high quality effluent
- Eliminates need for chemical addition in many applications
- Low waste volumes
- Simple to operate and maintain
- Unmanned operation at remote sites
- Vertical oriented disks reduce footprint