CASE STUDY

Armathwaite

Aerated vertical flow reed bed

PROCESS WASTE WATER

Project
Armathwaite, Eden Valley Mineral Water Company

Location
Armathwaite, Cumbria

Project type
Refurbishment

Wastewater type
Industrial and sewage effluent

Treatment
Aerated vertical flow

Need

The Eden Valley Mineral Water Company (EVMWC), based at Armathwaite in Cumbria, treat and bottle locally sourced spring water for sale and distribution into the potable water retail market. This process generates effluent waste water based on regular plant line wash-downs. There is no sewer nearby and this trade waste water along with a second stream, comprised of the foul water generated on site, needs to be treated to a standard set by the regulator (Environment Agency) prior to discharge to a local water course.

Waste water treatment is based upon blending the two streams in a tank followed by screening through Copa Sacs from which effluent flows through a passive horizontal subsurface flow reed bed and then a covered lagoon before discharge to water course (The River Beck). Regular monitoring allows for any out of specification water to be recycled or stored in the lagoon until within consent.

The frequency of out of specification discharges had been increasing, particularly with respect to ammonia, and as a consequence a Packaged Treatment Plant was installed to treat the foul waste from site prior to blending with the pH adjusted trade waste and delivery forward to the reed bed/lagoon system.

Demand based production is increasing on site at a rate of 15-20% annually which the existing production lines have managed, however, it is likely that additional production lines will be needed resulting in an increase in flow and loads to the treatment system.

natural wastewater treatment

CASE STUDY continued

Armathwaite

EVMWC requested a refurbishment of the reed bed system to provide added security to their water management and treatment system based on potential additional production.

Influent loads and consent parameters

PARAMETER	INFLUENT	CONSENT
Flow (m^3/d)	31	60
Biological Oxygen Demand (mg/l)	20	20
Total Suspended Solids (mg/l)	30	30
Ammonia (mg/l)	20	5

ARM undertook a thorough site survey which identified hydraulic capacity issues linked to the reed bed horizontal flow operating aspect, position of the distribution system and grade of media. Also, the passive horizontal flow operation limited increased load handling capacity.

Solution

A refurbishment was undertaken which included converting the system to vertical flow operation to improve hydraulic capacity. This included the installation of a new surface distribution system and effluent collection system at the bottom of the bed. In addition the media size was increased slightly for the same purpose. Aeration was added to the reed bed to maximise the potential treatment capacity. Additional improvements were also made to the level control mechanism in the lagoon. Operating parameters such as effluent depths were optimised and operating instruction provided to the client.

Benefits

EVMWC had an existing reed bed asset which due to changes in production loads was not operating optimally. They also had concerns that the existing waste water management and treatment system was vulnerable to further planned increased production loads. The modifications undertaken as outlined above:

- Maximise the treatment capacity of their existing asset
- Secure discharge consent achievement from the site against future increased production loads.

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