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Mobile reed bed benefits Heathrow

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A new mobile reed bed system - the first of its kind in the UK - is playing a key role in treating effluent water. Mark Clayton, managing director of environmental practice Aardvark, which designed the system, reports on its development and various installations, including one at Heathrow Airport

Reed beds are now widely recognised as a green, clean way of dealing with wastewater, and are proving a successful solution to effluent treatment. But one obvious limitation to traditional constructed gravel reed beds is that they are static, tend to occupy large areas of ground, and can therefore only ever be deployed on a limited number of sites.

To address these shortcomings, environmental practice Aardvark has designed and developed a mobile reed bed, the first of its kind, to allow for greater use and take up of this kind of technology as a wastewater treatment system. Called Rentareedbed, the project has taken three years to develop and was shortlisted for this year's Business Commitment to the Environment awards.

As the name suggests, these mobile, modular reed bed units (MRU) are for hiring or hire purchase for use in commercial, domestic and agricultural wastewater treatment. They have already been deployed at a number of commercial sites.

At Heathrow Airport, a mobile MRU treats 700,000 litres of wastewater from BAA's green waste composting site - part of an ongoing contract for Aardvark. The geography of the Heathrow site presented significant difficulties for a static reed bed.

The composting site is located close to the airport's surface water catchment lagoons.

As such, the only option was to install a small lightweight reed bed system down the existing slip ramp to the lagoon. The reed bed has been on site for 18 months and performed well, lowering suspended solids and ammonia and reducing nutrients being carried off the composting site in the effluent stream.

The mobile beds are also in use at Styles ice cream factory in Somerset, Plymouth-based X-FAB (a leading foundry group for mixed-signal semiconductor applicants) and on Exmoor National Park where they underwent rigorous trials on four sites treating up to 1,000l/d of effluent from each site.

The results of the Exmoor trials showed there was a substantial improvement in effluent quality, and the modules prevented about 28 tonnes of pollutants entering Exmoor's surface waters.

Each MRU can be used either as a single, stand-alone unit or coupled together in parallel or series for larger volume or higher-strength effluent treatment. Each MRU is fabricated

from galvanised steel to provide strength and durability in repeated lifts and moves.

The units are designed with an internal floor slope of 1%, which allows for a hydraulic gradient through the system preventing laminar flow, with flow controlled by internal adjustable monks' weirs. The internal void is filled with an artificial matrix on an interchangeable cartridge system. This allows poorly performing areas to be replaced as well as incorporating additional systems such as cartridge filters, aerators and pH correctors.

The matrix comprises tightly fitting, very lightweight filamentous blocks of about 40kg/m³ compared with gravel at 2,000kg/m³. These allow flow through the system but no short-circuiting of wastewaters.

The matrix is planted with the *Phragmites australis* variety of reeds, the most common type used, at a rate of 16 plants per square meter. All pipe work and connections have been designed into recesses in the structure to prevent damage during transport and installation.

The matrix also acts as an effective medium for plant and microbial colonisation providing a high surface-to-volume weight ratio.

The set-up time takes about an hour for a typical three-unit system and, once in place and the internal weirs adjusted to control the height of wastewater across the MRU, the system can be left unattended.

Units are monitored regularly by Aardvark to assess performance. Depending on the waste streams, this is likely to reduce pollutants to between 70% to 80%.