

# Newham STW improved Nitrogen Removal pre-fab package denitrification Biostyr® plant provides solution

by  
**Paul Cooper**

**N**ewham STW is located near Truro on a peninsula of land adjacent to the Truro River. The treatment works handles flows from a 25,000 residential population before discharging by gravity into the river, which is a tributary of the Falmouth estuary. The existing process stream includes biological treatment comprising activated sludge, carbonaceous BAFF and nitrifying towers, together with UV disinfection. Following implementation in early 2006 of interim (Phase 1) modifications to the existing works to reduce the effluent Total-N, Veolia Water Solutions & Technologies were awarded the £1.4m Phase 2 contract to supply, install and commission the denitrification Biostyr® together with methanol storage and dosing.



Newham STW: Completed Denitrification Biostyr Plant at Newham STW

*courtesy Veolia Water Solutions & Technologies*

## **Contract**

The contract was awarded by Edmund Nuttall as part of a £5m contract for various improvements at Newham STW over the last year. Edmund Nuttall is part of the K4 One delivery team partnership with South West Water.

With the existing works being congested and very little available land for construction of the new denitrification plant, the compact nature of the stainless steel *Biostyr*® filter cells enabled the entire process plant to be located on a new concrete slab constructed by Edmund Nuttall above the existing tertiary plant filter structure, which was refurbished and utilised as the dirty washwater storage tank.

A key factor governing the successful project execution was the constraint imposed by a very short contract programme, with the over-riding imperative to ensure that the plant was operationally compliant to the consent standard for the start of 2007.

To comply with the Total N discharge consent South West Water required the hand-over of the new plant before the end of December 2006, a period of only 28 weeks from placement of the order.

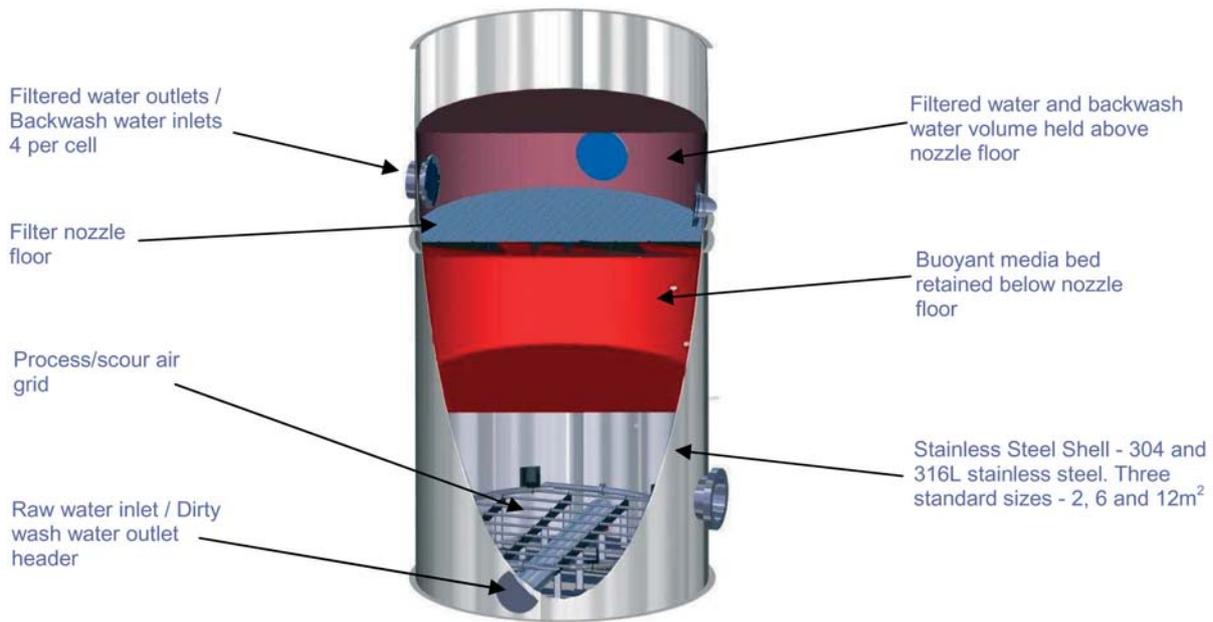
Through the process units being pre-fabricated and tested off-site prior to positioning on to the pre-cast concrete base slab, VWS were able to reduce the overall programme duration and, accordingly, the associated project costs.

## **Works scope**

The works scope for VWS comprised the design, fabrication and construction, commissioning and testing of a 3-No. 12m<sup>2</sup> cell *Biostyr* plant. The process was based on our proprietary stainless steel *Package Biostyr system* utilising methanol as the required external carbon source. The design of the methanol system was carried out in house, with prior group experience being drawn upon to accommodate the hazardous nature of methanol and the necessary adherence to various governing regulations and requirement for full ATEX compliance.

The *Biostyr Package Plant* was sized to treat partial works flow from existing nitrifying tower filters up to 120l/sec (90l/s design average) to an annual average total organic nitrogen standard of 5mg/l. The total organic nitrogen being defined as nitrate + nitrite (NO<sub>3</sub> + NO<sub>2</sub>).

### Biostyr Cell Schematic Diagram



Newham STW: Biostyr Cell Schematic Diagram

courtesy Veolia Water Solutions & Technologies

The *Biostyr*® is a highly compact process, which in a single structure allows for the biodegradation of all carbonaceous and nitrogenous pollution together with clarification of the effluent by filtration through the compact buoyant *Biostyrene*® media bed. Through the introduction of either process air or an external carbon source at the base of each unit the media bed sustains the ideal environment for

biological activity in carbonaceous, nitrification, combined nit/denit and post denitrification configurations. ■

**Note:** *The Editor & Publishers wish to thank Paul Cooper, Biostyr Product Manager - Veolia Water Solutions and Technologies for providing the above article for publication.*

### A-Consult Ltd

#### Tanks and storage vessels: Aqua-Tank

A-Consult Agri-tanken A/S was established in Denmark in 1986. The company has designed and developed *Aqua-Tank*, a precast concrete tank used in the water industry. Over 6500 tanks have been installed in Denmark, Britain and Germany.

#### • Precast concrete tanks

*Aqua-Tank* can be adapted to suit most water industry applications, including primary and final settlement, thickening, aeration / digestion, contact / mixing, attenuation and filtration, as well as the storage of stormwater, sludge, effluent and potable water.

The tanks are sealed using a patented EPDM rubber strip, enabling quick installation as grouting is not required. The strip absorbs the natural movement caused by weather changes, variations in liquid level and external pressures from back-fill.

#### Composition and manufacture

Manufactured under factory conditions, the tanks are constructed using high specification concrete panels held together by a series of circumferential high-yield steel tendons. The tendons lie within a duct system embedded in the panels and are protected against corrosion by a plastic sleeve.

The tanks have a 60-year life expectancy.

#### Dimensions

Tanks are manufactured in diameters ranging from 4.5 to over 50m, and in heights from 2 to 12m in 0.1m increments.



Two 45m diameter x 8m high stormtanks for Wessex Water at Bristol Wastewater Treatment Works



*Aqua-Tanks* being installed at Inverness – the concrete panels are held together by means of a high-yield steel tendon system



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## WATER

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