AquaticEngineering

Working Above Water, On Water & Under Water

An Overview of AquaticEngineering's Floating Systems

AquaticEngineering is the UK's leading designer, fabricator and installer of:
Living Filters, Floating Reedrafts & Reedbeds and Floating Nesting Rafts

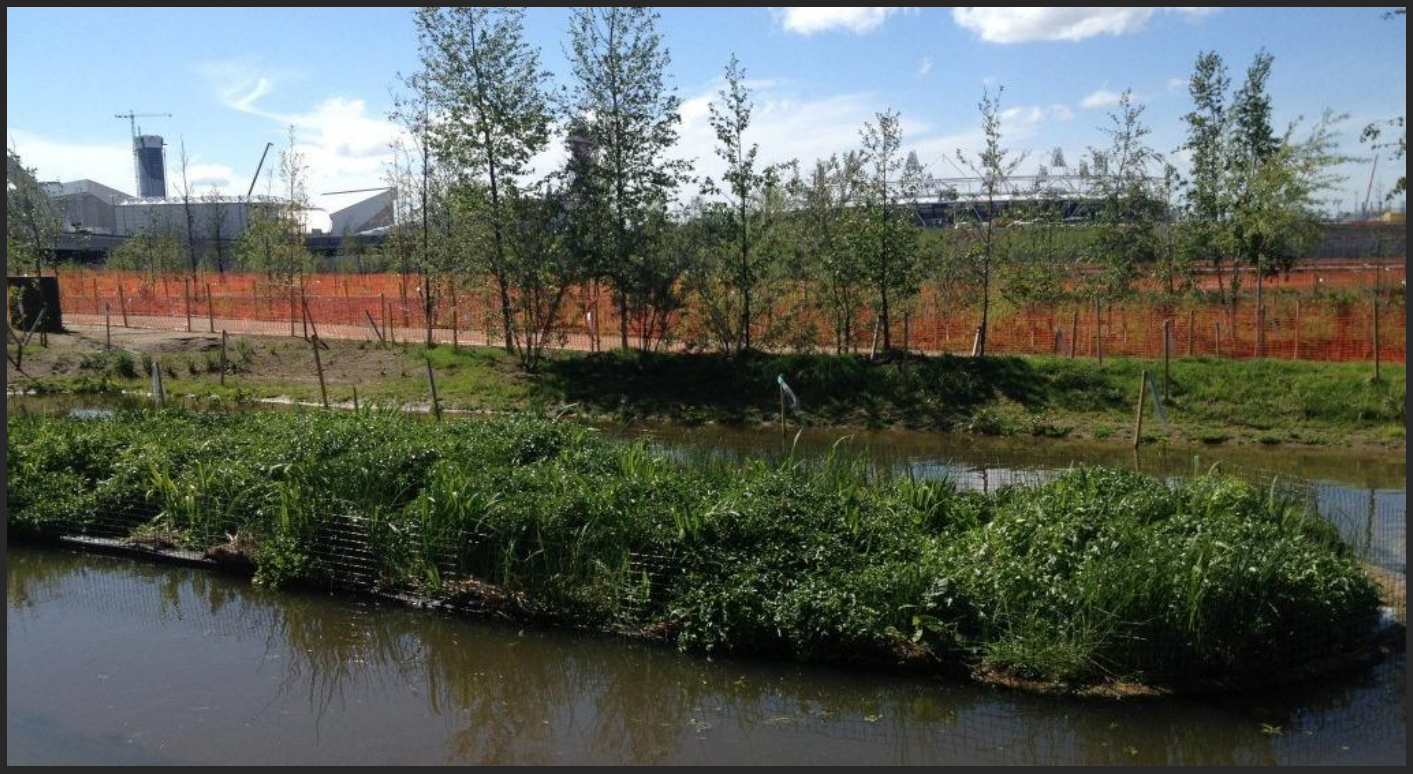
Our floating systems are deployed for a wide range of applications and benefits:

Biosequestration & Phytoremediation

AquaticEngineering's floating systems are designed to cost effectively, efficiently and yet powerfully optimize the ecological treatment processes of natural wetlands. Replicating naturally occurring floating Islands they provide a submerged matrix which supports a biodiverse and biocomplex range of bacteria, fungi, algae, protozoa, molluscs & bivalves and invertebrates etc.

Floating reedrafts designed, fabricated and installed at the 2012 Olympic Constructed Wetlands.

Through biofiltration and sequestration processes, floating systems remove and stabilize nutrients; breakdown complex chemical compounds, pathogens and toxins; filter out suspended solids and dramatically reduce BOD and COD. With added aeration they are very effective at removing nitrates and ammonia, whilst increasing the dissolved oxygen in a water body. A solar aeration system is currently under trial.



2012 Olympic Constructed Wetlands – 6 months on

Floating Island Systems are versatile and many faceted; Large or small; Used in phytoremediation silt containment; fish refuges; biomanipulation; erosion control; wildlife refuges; improving biodiversity; aesthetic & leisure; algae baffles and flow deflectors etc.

Scottish Water, Cartland Low Carbon STW – Installation of Floating Reedraft Cover

Floating treatment wetlands are a powerful biomimic of naturally occurring floating islands, thus creating a 'condensed' wetland filter. Systems can be designed to provide effective treatment of high strength waste - from human sewage to landfill leachates - and are an inexpensive option to retro-fit to existing systems if required.

Working in partnership with Thames Water – above, part of the Living Filter installed on Farmoor Reservoir during the summer of 2012; a PhD student was selected in October who is being supervised by the University of Oxford (Dept. Engineering Science) and Thames Water for 3yrs to monitor the process.

Our unique design means that the 210m^2 Living Filter has equivalent to over a 1ha wetland surface area. The suspended root biomass and integral submerged matrix with its all-important biofilm attachment are key to the effectiveness of the system.

Biofilms are the first vital link of food chains in aqueous environments; they are complex in structure and consist of colonies of microbes and bacteria that excrete sticky proteins, which entrapment nutrient rich sediment 'food'. Biofilms (predominantly) adhere to submerged surfaces where they are in turn grazed upon by aquatic invertebrates.
Due to natural and constructed floating islands vast submerged 'living' surface area microbial and bacterial communities are able to proliferate in numbers far beyond even those found in aggregate based subsurface filter reedbeds and consequently are responsible for a number of important treatment processes. The greater the 'attachment' surface area of the root biomass & submerged growing matrix, the greater the 'sticky mucilage' biofilm and microbes 'population' and consequently the greater the bio-sequestration capabilities of the islands. These extremely important microbes convert nutrients and some of what we would regard as pollutants, to an available food source for both the plants and grazing invertebrates.

The key pathways for nutrient & contaminant removal by floating islands is believed to occur via the sequential processes of release of extracellular enzymes, development of biofilms and promotion of flocculation of suspended matter, at the surface of the submerged plant organs (Oliveira and Fernandes, 1998).

AquaticEngineering are the UK's only designers, manufacturers and installers of 'Floating Island Systems' and 'Living Filters'… we understand the complexities of lake ecology and management.

Wave attenuation resulting from wind & boat wash - floating systems effectively stabilise and in fact reverse the process of erosion so that natural silt accretion proceeds.

Serious erosion of one of the few remaining reed islands in the Norfolk Broads resulted in this R&D installation by AquaticEngineering. Within 18months a marked improvement was noticed and silt accretion rather than erosion was beginning with obvious results.

Beneath the surface, a dynamic process has begun... suspended solids in the water column are attracted to the sticky biofilm growing on the root biomass and 1000m^2 of submerged matrix held within the fabric of the rafts structure. In most systems on the market the valuable organic root biomass would seasonally slough off into the benthic zone below, where its valuable surface area would be lost. AquaticEngineering foresaw this design flaw and have designed it out in their system so as to retain this valuable and vital asset.

Habitat & bird nesting platforms: Swans, grebes and terns etc

2 tern nesting rafts designed to be both mink and otter proof, with Perspex sides for ‘birders’ – installation at the Nene Park Trust Peterborough March 2013.

Whatever your floating requirements contact us in the first instance for free and impartial advice.

WWT CONSULTING | Environment Agency | Broads Authority – The Broads - a member of the National Park family | SCOTTISH WATER solutions | THE ROYAL PARKS

CANARY WHARF GROUP PLC | The Wildlife Trusts Nottinghamshire | Norfolk Wildlife Trust | London | Thames Water | Innovation

AquaticEngineering - Working Above Water, On Water & Under Water

Kingarth Lodge, Church Road, Binstead, Isle of Wight PO33 3SZ www.aquaticengineering.co.uk

Tel No 1: 01983 616668 Mob No: 07891 438666 caroline@aquaticengineering.co.uk

The AquaticGroup : AquaticEngineering : AquaticResponse : AquaticConsultancy