

# CASE HISTORY

## Anglian Water, Various Nitrate Removal Projects

**End User** Anglian Water  
**Process** Nitreat™  
**Application** Nitrate Removal



### Introduction

Nitrate levels in many Anglian Water groundwater sources have been increasing in recent years. To overcome this problem, Anglian Water selected ACWA's Nitreat™ technology to reduce nitrate levels on all high nitrate sites where blending with other low nitrate water sources was not an option or would not reduce the nitrate levels sufficiently.

The Nitreat™ system is based on true counter current™ continuous ion exchange utilising a unique multiport valve for distribution of feed and regeneration flows to multiple resin vessels. Unlike other similar systems Nitreat™ does not require a turntable as the resin vessels remain stationary.

ACWA developed a standard design that could be utilized for all sites, which incorporated two Ion exchange skids that are capable of handling 100% of the flow to cater for maintenance of the plant. The resin regeneration and backwash take place in-situ without interruption to the nitrate adsorption process, thereby eliminating the need for long periods of shutdown or extra cost. The system offers a high degree of flexibility as it can cope with large variations in flow and nitrate levels and produces far less quantities of waste regenerants compared with conventional plants.

The treated water from the Nitreat™ plant typically has a nitrate level concentration of less than 5mg/l as NO<sub>3</sub> and when blended with untreated water provides a final water with a nitrate level concentration below 43 mg/l as NO<sub>3</sub>.

## Design Information

The following table indicates the flow, Influent nitrate level and final effluent nitrate quality achieved from each of the Nitreat™ plants presently in operation or under construction for Anglian Water, there are others in the design phase.

Project Name	Works Flow (m <sup>3</sup> /hr)	Nitrate Level Influent flow mg/l	Nitrate Level Blended discharge mg/l maximum	Project Status
Lyng Forge	129.2	92.50	43.00	In Service Feb 06
Isleham	237.5	110.50	43.00	In Service Apr 06
Birchmoor	122.9	98.00	30.00	In Service May 06
Ringstead	250.0	102.00	43.00	In Service Oct 06
Westerfield	142.1	120.00	43.00	In Service Dec 06
Riddlesworth	333.3	105.00	43.00	In Service Jul 07
Nunnery Lodge	235.8	90.00	43.00	In Service Mar 08
Moulton	191.7	73.60	43.00	In Service Feb 08
Caister & Bixley	416.7	62.50	36.00	In Service Apr 09
Lower Links	116.7	56.40	43.00	In Service Mar 08
Eriswell	140.4	75.00	18.5	In Service July, 09
Fring	291.7	95.8	43.00	In Service Aug, 09

Due to the success of the operational plants in terms of performance and reliability, Anglian Water are assessing reducing the number of skids down from two to one on future schemes.

## Description

### Each system comprises:

- Variable speed Booster Pumps, associated pipework & valves
- In-Line Strainers on feed line
- 2 No 100% Ion exchange skids complete with indexing valve, ion exchange resin vessels, pipework and valves
- Salt Saturator, pipework and valves
- Duplex Base Exchange Water Softener
- Softened Water Storage Tank
- Duty / Standby Regeneration Pumps, pipework and valves
- Effluent Storage Tank
- Interconnecting pipework & valves
- MCC and interconnecting cabling
- Instrumentation and Controls
- Access ladders, platforms and handrailing