

# Syleham Water Treatment Works

## £1.8 million reservoir to safeguard supply

By Mark Hopwood

**S**yleham Water Treatment Works was originally constructed in 1940. Raw water is abstracted from three bores located within the site boundary. The 125 metre deep limestone chalk bore was commissioned c1940, whilst later bores c1950's abstract from 45m deep crag deposits that are common across East Anglia and include gravels, shelly sands, silts and some laminar clays. All borehole water is abstracted, aerated and pumped to four upflow filters. The filtered water passes to a 0.9MI reservoir. Partially treated water is drawn from the storage tank and pumped through five secondary pressure filters, following which chlorine is injected. From here it can be pumped into the network.



Syleham WTW::Under construction - in the snow

*courtesy: Essex & Suffolk Water*

**Key investment drivers for Syleham can be split into two key areas.**

- \* **Resource Shortfall;**
- \* **Process Improvements.**

### **Resource shortfall**

The shortfall in headroom in the supply zone, which Syleham WTW supplies, comprises 1.0 MI/d actual during a dry year. In addition there is a target headroom (or security margin) requirement of 0.7 MI/d calculated using the industry standard UKWIR methodology. This gives a current total shortfall of 1.7 MI/d, which is likely to rise to 2.0 MI/d in the next 10 years.

The availability of such a small quantity of storage, both on and off-site, means that even minor plant failures have the ability to escalate into nil supply conditions within a few hours.

### **Process improvements**

Investment in process improvements are highly restrictive, as any shutdown window is limited to a few hours during the night. This

presented a large constraint not only to any future process investment, but also to routine plant maintenance.

### **Solution**

A suitably sized treated water reservoir with dedicated pumping facilities to two supply zones was designed. The proposed structure also improved disinfection control and increased site storage capacity from under three and half hours to twelve hours during peak summer demand.

Surrounding arable land was procured to allow the reservoir to be built off line, thus eliminating supply risks and process disruptions.

### **Contractor selection**

A shortlist of three tenderers were assessed using our balanced scorecard method of assessment of performance management by weighting their submissions 70-30 on a price:quality ratio. The winning tenderer was *Mowlem*, based on a design and construct contract to build a 2MI reservoir and an adjoining pumping station at Syleham WTW.

The award was given using an ECC Option C target cost contract



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Aquazone are pleased to be associated with the successful Process and Engineering upgrades at Syleham and Fressingfield WTW for Essex & Suffolk Water Company.

Our involvement in this work included, but was not limited to, the design, supply, and installation of equipment associated with conversion of the existing primary upflow filters system to downflow while maintaining reliable operational output from the works at all times.

Aquazone have a good reputation for Quality, Safety, Value and Delivery of a cost effective programme on all our work and as a result of this we have recently been awarded two 5 year Framework contracts with Northumbrian Water Group for the AMP4 period. These are Minor Works Civil South and Minor Works Process & Mechanical South. We have a high level of understanding of the CDM regulations and the proposed changes. We are accredited with the Achilles Verify scheme and are currently working towards the New ISO Integrated Management System for Quality, Environment and Health & Safety.

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for £1.8 million. Mowlem's site management team transferred from a successful project at Ormesby WTW to complete the construction works in an 11 month programme of works. The heavy civil works were constructed through the winter months with minimal impact on the surrounding rural landscape. Despite harsh weather conditions the asset was successfully commissioned and put into supply on time.

**Key construction achievements**

\* a reusable formwork liner (*Zemdrain*) was used with particular effectiveness,

The technique was cost neutral, as the material costs balance the labour cost of post pour concrete preparations for water retaining faces. Most importantly the programme gains were considerable. This technique will be formally specified by *ESW* on all future water retaining concrete finishes.

\* Simplified formwork to support the slender tall walls allowed *Mowlem* to efficiently remove shuttering and keep to programme.

\* Regular weekly meetings of the project team encouraged excellent communication, which set up a positive pro-active problem solving culture within the team. As *Mowlem's* project manager stated: "a lot can happen in a week" so a monthly meeting with the client would not have been frequent enough.

\* Close liaison with local residents and the parish council. *ESW* and *Mowlem* proactively agreed traffic routes and gave advance warnings of possible inconveniences, normally by letter drop. *ESW* received a number of letters giving very positive feedback on the project team's performance further demonstrated by praise in the parish council magazine.

*ESW* and *Mowlem's* experienced project team proactively gave attention to operational health and safety requirements (as required under CDM), where a safe system of decanting sludge from the replacement washwater lagoon was incorporated.

\* The relationships built up between *ESW* and *Mowlem* on the first project at Ormesby contributed to a harmonious and thoroughly professional site culture, the contractors site team of locally based staff has kept together.

**Additional benefits**

The existing site washwater lagoon was considered to require very minor funding. However, further site investigation revealed the existing lagoon to be in a far worse condition than originally believed, and a large and more complex scope of works was compiled. *Essex & Suffolk Water's* procurement strategy was to utilise *Mowlem* and issue this work as a compensation event through the main contract. *Mowlem & ESW*, working together, produced a simple design that incorporates a dedicated sump with fixed external bower couplings to provide a safe connection point for tankering disposal. A series of valves, which on selection, would allow drain down of the structure to a pre-defined limit, and an injection point for the addition of polymer.

To the credit of the site team all parties agreed that with hindsight there was very little they would change. The same *Mowlem* team are currently constructing a fast track rapid gravity filter conversion at *ESW's* Layer WTW. ■



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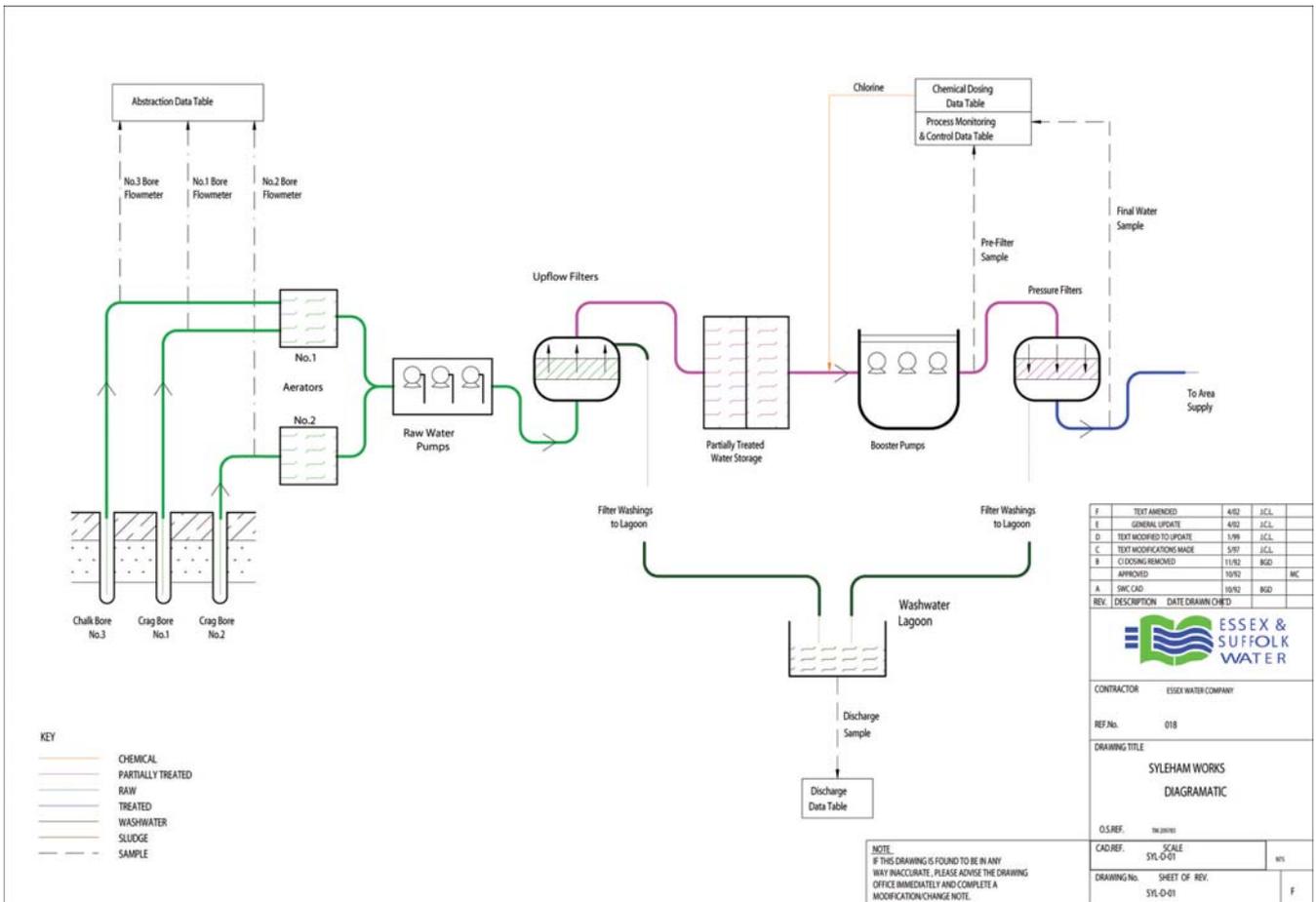
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Syleham WTW: Schematic of upgrade scheme

courtesy: Essex & Suffolk Water



Syleham WTW: Under construction in the sun!

courtesy: Essex & Suffolk Water