

Ratfyn STW

upgrade of the STW which serves village & nearby communities

by
Scott Hughes & Shaun Milligan

Ratfyn STW (NGR: 415812, 142881) is a medium sized Sewage Treatment Works located 0.5km north east of the village of Ratfyn and 700m north of the A303. The project is contained within the existing boundary of the STW. Summer population equivalent for 2005 is 12,627 and for 2029 is 18,735. Winter population equivalent for 2005 is 12,602 and for 2029 is 18,707. Hydraulic design is up to year 2029.



Ratfyn STW under construction

courtesy of Wessex Engineering & Construction Services

Current facilities

The site receives flows via three rising mains then to the screens and discharge in to the balancing tank. There are six upward flow square primary settlement tanks, five filter beds, four upward flow square humus tanks which take 40% of the flow and radial flow humus tank which take 60% of the flow.

Need for the scheme

Wessex Water carried out an upgrade of the Ratfyn STW which serves the village of Ratfyn and neighbouring communities, and the construction of additional treatment facilities. This upgrade will enable the STW to increase its sewage treatment capacity to cater for a population growth. Effluent quality being treated to a higher standard ensuring that future Environment Agency consents for phosphorus to an annual average of 1 mg/l consents are met as well as adhering to the Habitats Directive. The phosphorous removal scheme is also part of the National Environment Programme for AMP4. In addition, the scheme will increase the capacity for sludge and liquor treatment.

Description of works taking place

The works involved the construction of:

- * a reinforced concrete primary settlement tank;
- * a secondary plastic media filter bed;
- * a reinforced concrete humus settlement tank;
- * 8 No. tertiary aerated dyna-oxo sand filters;

- * a sludge reception tank with integral roof;
- * a sludge blending tank with integral roof;
- * a sludge centrifuge, complete with a polymer make-up and dosing system, powder polymer preparation unit, mixing tank, duty/standby transfer pumps and storage tank;
- * a new discharge conveyor system from the centrifuge;
- * submersible pumping station and pumps;
- * new flow measurement channel and flume;
- * associated minor civil works such as roads, paths, pipe work, manhole chambers etc;
- * associated pipelines to connect the system into existing pipelines and process stream;
- * associated mechanical and electrical works.

At just over £5m this is one of the largest and most complex capital projects that WECS has delivered to date and has involved over 20 workers at peak times on site, along with several sub-contractors. The project is extremely complex in nature due to all the process integration of the new process stream and tertiary treatment, coupled with the new sludge storage and treatment stream. Many construction activities impact on another and a complex project programme had to be developed using Primavera P3e to highlight the critical path and the logical relationships between activities. This has helped the site team to manage and plan the works ensuring that the key pipeline's and structures are in place when required by the commissioning process.



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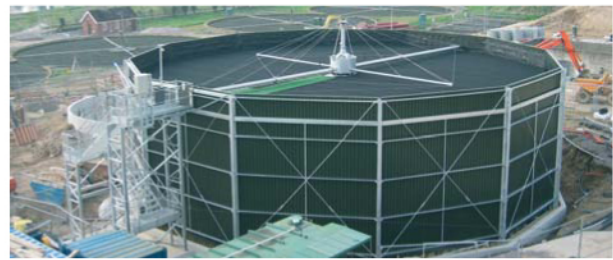
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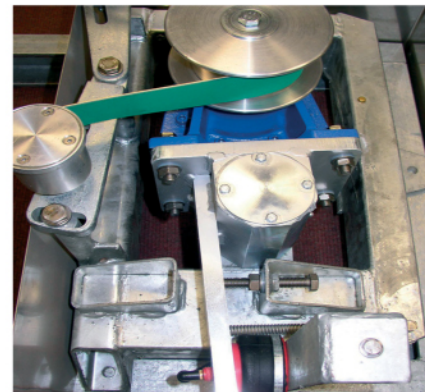
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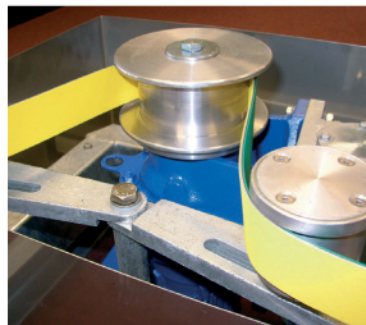
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Due to the process improvements taking place the increased flow into the works as a consequence of future local development up to 2029 will have no impact on the receiving water as the new process will insure that the suspended solids, biological oxygen demand, ammonia and phosphorous load per litre will remain unchanged.

Progress to date

The project commenced on 1st August 2007 and is nearing completion. All the main reinforced concrete structures are complete.

The project has used the three main pipe work materials for different types of fluid pipelines.

- 1000 lin/m of Cement line ductile iron size 100mm to 500mm;
- 800 lin/m of Polyethylene pumping main 63mm to 250mm;
- 400 lin/m of Supersleeve drainage 100mm to 300mm;
- 2500 lin/m of Electrical ducting.

The project produced approximately 6500m³ of inert spoil (virgin flinty chalk) which was taken 15 miles to Thruxton waste transfer site where it is processed for re-use. When excavating on sewage treatment works it is common to come across non-hazardous material due to high levels of organics or metals, hence any excavated spoil on site that was not classified as inert waste and which was not classified as hazardous waste was used to fill existing sludge lagoons on site.

Anticipated completion

The construction phase of the works will be substantially complete at the end of June 2008, with commissioning of the process plant ongoing until September 2008.

Commissioning of the Dyna-oxy sand filters and new plastic media filter will require the use of the permanently installed pumps coupled with temporary pumps for a period of approximately eight weeks to seed the process. Both of the process items of plant require a nitrifying bio-mass present to remove ammonia from the system. Upon completion of the seeding the temporary pumps will be removed and the treated effluent will be allowed to flow from the works via a new final effluent sampling chamber.

The final phase of the construction project involves the removal of the existing hydrobrake in the inlet works balancing tank and a replacement installed which will allow a full flow to treatment of 128l/s. This work is scheduled to take place in October 2008 and will involve a temporary wall being installed in the existing balancing tank, with three 150mm pumps and 200 lin/m of pipework to over pump from the balancing tank to the Primary settlement distribution chamber.

Main Stakeholders

Client: Wessex Water (WW).

CDM co-ordinator: Wessex Engineering & Construction Services (WECS); Lead Designers: WECS (Preliminary Design) and Pell Frischmann (Detail Design).

Contractors & Sub-contractors: WECS (Principal Contractor); Sewaco (Design & Installation of new plastic media filter); Hydro International (Design & Installation of new tertiary aerated sand filter and associated pipework); Exline (Design & Installation of new access steelwork and staircases); CEES (Design & installation of new half bridge scrapers); SEC (Electrical installation); GPS (Design & Manufacture of control panels); and Industrial GRP (Design & installation of GRP kiosks).

Note: *The Editor & Publishers wish to thank Scott Hughes, Construction Manager & Shaun Milligan, Site Manager for the Ratfyn project. Both are with Wessex Engineering Construction Services.* ■



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