

New WwTW on banks of River Tay

ensuring estuary bound effluent meets new SEPA requirement

by Mark Biddle BEng., & Dyson Davies

The existing plant for this area includes works at Newport which are storm tank arrangements that treat raw sewage and surface water from Newport and Wormit in two circular storm tanks. The plant then discharges the treated effluent directly, unscreened into the Tay Estuary via a 300mm diameter pipeline. The Tayport Headworks treats raw sewage and surface water from Tayport using treatment that includes coarse screening at the inlet channel to the works, degritting facility and fine screening and maceration before the treated effluent is pumped to the 300mm diameter outfall in the Tay Estuary. The Scottish Environment Protection Agency (SEPA) has classified the River Tay as estuarine recreational waters and has set the required water quality standards accordingly.



Tayport: SBR's & final effluent balance tank

courtesy: Purac & Scottish Water

The combined plant discharge and estuary dispersion consents must also achieve the Urban Waste Water Treatment Directive (UWWTD) effluent consent standard. As both existing outfalls into the estuary serve a population exceeding 2,000, secondary treatment of the effluent is required to meet new standards that will achieve an effluent quality of 25mg/l Biochemical Oxygen Demand (BOD) prior to discharge.

Solution to the problem is being provided by *Purac*, as part of the *Purac Leslie Consortium* with Scottish Water Solutions which is working on this important project to treat the waste water flow and loads from the towns of Newport, Wormit and Tayport on the banks of the River Tay in Eastern Scotland.

Solution

The solution provided by *Purac* is to design, construct and commission a new treatment works, located at a greenfield site between the two existing plants, that can provide secondary

treatment to the combined crude sewage from the two existing plants. The project will see modification at both the existing sites to provide a pumping stations capable of transferring 3DWF (70l/s) to the new Tayport works and supplying storm storage. The existing Tayport Harbour pumping outfall will continue to be used to discharge the treated effluent.

Modification work at the existing Newport site will see the existing septic tank arrangement converted to a two hour storm retention tank, with a new 6mm screen constructed at the storm overflow. The existing dry well sump; will be modified to house duty/standby pumps to transfer up to 3DWF (42 l/s) to the new waste water treatment works.

Decommissioned

At the existing Tayport site, the existing headworks will be decommissioned. A new pumping station, complete with duty/standby pumps will be installed to transfer up to 3DWF (28 l/s)



Tayport SBR's and final effluent balance tanks

courtesy: Purac and Scottish Water

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to the new waste water treatment works. A new storm tank to provide two hour retention will be installed with a 6mm screen and chamber constructed at the existing storm overflow. The new treatment works pumping station will discharge the treated effluent to the existing outfall in the Tay estuary.

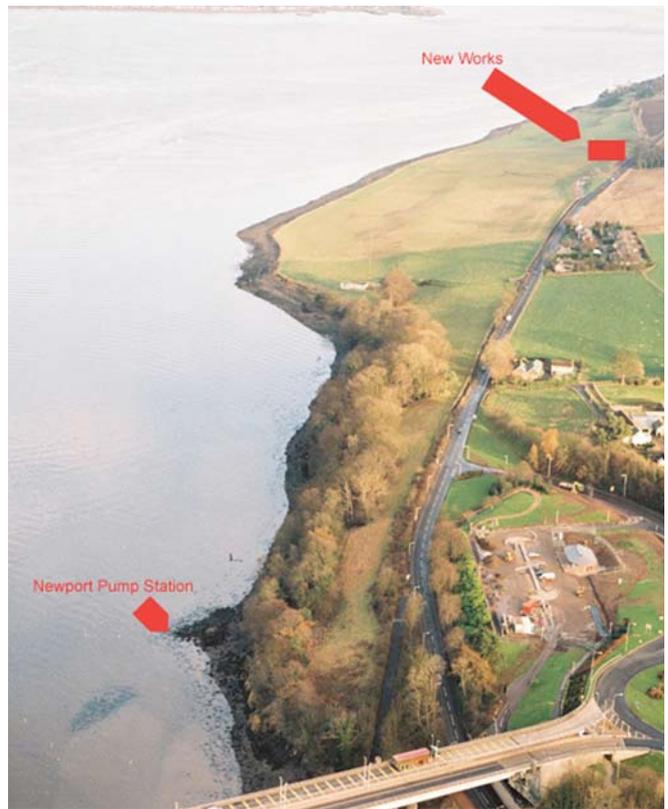
The new Tayport wastewater treatment works, designed to service a year 2020 p.e of 9230, will provide preliminary treatment, secondary treatment, a final effluent balance tank and a sludge storage and thickening facility. The site has a relatively small footprint and will provide a compact treatment works that will benefit from the use of Sequencing Batch Reactors (SBRs) to optimise the flow through the works utilising the SBRs cycling system to reduce the area of the plant that needs to be allocated to these processes.

New plant

The new plant will comprise a new inlet works providing automated duty/duty screens, complete with a screenings handling, washing & covered discharge skip. A grit trap complete with classifier and a collection skip for disposal.

Provision will be made for three above ground SBRs each complete with automated valve arrangement, a motorised decant system and aeration diffusers providing oxygen for biological treatment of influent. Four new air blowers will be installed to supply air to the SBRs operating on a 3 duty/one standby basis.

A balance tank will be provided to limit the maximum instantaneous final effluent discharge rate to 84.4l/sec with a normal rate of 69.9 l/sec. New duty/standby centrifugal pumps will be installed to discharge effluent to Tayport. Final effluent booster pumps will also be installed within the final effluent balance tank.



Tayport general view of site

courtesy: Purac and Scottish Water

Sludge generated by the works will be held in a new sludge storage tank complete with mixing system. New duty/standby pumps will transfer the sludge to a mechanical thickening plant complete with thickened sludge discharge pumps and a polyelectrolyte dosing package. The thickened sludge will be stored in a newly constructed tank complete with a mixer, decant connections and tanker off loading connections.

An odour abatement unit will be provided complete with duty/standby extraction fans, vent stack and all the necessary ductwork, valves and connections to odorous process operations.

A new process control building will be provided to house the MCC and control system to operate the wastewater treatment works, changing facilities, potable water booster set and the sludge thickening plant. A potable water break tank will be included external to the building. New MCC system with telemetry interfaces, process control instrumentation and quality instrumentation will also be installed for the new plant. There is currently no main electricity supply to the site, so a new mains supply and a new potable water connection will be provided.

Planning permission for the works was granted during February 2005 and the contract started in April 2004 with major M & E works commencing in August 2004. Work has to take place around the bathing season – so modifications at the Tayport pumping station cannot take place before September 15th 2005. Anticipated handover date for the completed project is July 2006. ■

Note on the authors: Mark Biddle is Senior Process Engineer & Dyson Davies, Project Manager, both with Purac Limited.

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Faber Maunsell was pleased to provide civil and structural design services for the Tayport scheme



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