

Ballynacor, C.Armagh WwTW new regional sludge recycling centre

Ballynacor wastewater treatment works WwTW is located approximately 5km west of Lurgan in County Armagh, Northern Ireland. The existing works consist of a conventional extended aeration sewage treatment plant treating a population equivalent of 69,000. Historically, the indigenous sludge arising from the works has been stored in site lagoons and is currently being dewatered in a mobile centrifuge as a temporary arrangement. As part of the overall sewage sludge strategy for the province the Department for Regional Development Water Service identified Ballynacor as the optimum location for a regional sludge dewatering centre to receive and treat imported sludge from a number of WwTWs in the Southern and Western regional areas (previously defined



Aerial view of Ballynacor Sludge Treatment Centre (courtesy VA TECH Wabag UK Ltd).

The works range from small 2,000pe sites to larger 77,000pe sites and cover a variety of treatment processes from primary treatment only, secondary treatments of activated sludge nitrifying and non nitrifying, biological filters, sequence batch reactors and in some cases including phosphorous removal. The individual works also treated imported sludges from septic tanks. The majority of the sites will be upgrading their treatment stages during 2003-2005 as part of Water Service's Capital Works Programme.

The new sludge works at Ballynacor will treat approx 12,000 T dry solids per annum to produce 25% dewatered cake suitable for ultimate disposal by thermal option in the Duncrue Street Incinerator in Belfast.

The works briefly comprises the following areas:

Sludge reception area

Incoming tankers discharge unscreened sludge to a new reception

tank prior to passing through 6mm fine screens. Imported screened sludge discharge into a separate new reception tank. These new tanks may also receive sludge from the existing works holding tanks. Sludge from all sources, therefore, can be pumped to four large, mixed holding tanks before feeding forward to a buffer tank prior to dewatering.

Dewatering plant

A total of six mechanical dewatering belt presses will be housed in a purpose built building. Centrifuges were considered at an early stage in the tender design as they are presently used to dispose of sludge on a temporary basis at Ballynacor. However, after commercial appraisal on a whole life cost basis belt presses proved to be the preferred option. Each belt press line has its own feed pump, macerator, poly dosing and wash water pump.

Sludge cake handling

A horizontal collection conveyor system will collect cake discharges from the belt presses and convey them to a sludge transfer hopper.

This hopper will feed a radial conveyor which will fill external skips automatically in sequence. The skip area has been designed to accommodate the anticipated vehicle movements.

Dedicated liquor treatment plant

The existing sewage treatment plant discharges to Lough Neagh, which has substantial leisure and fishing interests. In order to protect current and future discharges, a liquor treatment plant is required to control the level of suspended solids, biological oxygen demand, chemical oxygen demand, ammonia and any associated phosphorous in the produced filtrates.

A two stage system was designed including the use of lamella settlement tanks, balancing system and sequence batch reactors. The fine bubble diffused aeration in the SBRs will be provided by a membrane disc system. Each cycle of the SBR will comprise of four phases namely; filling; aeration; settlement; decanting. The phases form a complete cycle which is continuously repeated and controlled by a plc system. At the start of the cycle the water level in the chosen tank rises as a result of inflow of a specified quantity or fill time. The aeration system fed by a set of air blowers enables the biological treatment process to commence. Any occurrence of denitrification will improve the biomass condition and restore some alkalinity. If this is not sufficient the pH can be controlled by dosing caustic soda. The filling and aeration cycle can be repeated and varied several times over the complete cycle. Sedimentation of the sludge will occur during the settlement phase with no mixing or aeration. The frequency of removal of surplus sludge is set during commissioning and start-up and the discharge rate is controlled by a modulating valve and flowmeter. Finally, the decanting phase

completes the cycle and the rate of decanting is maintained by the modulating control valve and flowmeter on each tank.

The control system specifies intelligent motor starters installed within the MCCs incorporating ASI communications network and a Profibus DP/PA control communications system to all field instruments and actuated valves. Four new PLCs are all interlinked and interfaced with the existing site *Wizcon* SCADA system via a redundant ethernet communications fibre optic ring.

Ferguson McIlveen LLP are acting as Project Managers for the scheme on behalf of the client DRD Water Service, Northern Ireland. The design and build project was awarded after competitive tender in accordance with EU Restricted Procedure, to *VA TECH WABAG Ltd*, based in Banbury Oxfordshire. *VA TECH WABAG LTD* act as Principal Contractor and are responsible for process, mechanical and electrical works along with their consortium partner *Dawson WAM Ltd*, based in Saintfield, Co. Down responsible for all civil and building works who are employing *WDR & RT Taggart* as civil designers.

Partnering, Value Engineering and Hazop workshops have been undertaken which included representatives from all parties including operations. These studies along with the team work ethos championed by Water Service, have generated a number of beneficial ideas that will be incorporated into the project. Site works have commenced and completion is expected by Autumn 2004.■

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