

Llangrannog WwTW, West Wales £1.3m investment at Cardigan Coast village

The picturesque village of Llangrannog located on the Cardigan Coast of West Wales, has a resident population of 150, which increases to a population equivalent of 550 during the summer when tourists and day visitors arrive. Sewage treatment facilities consisted of two settlement tanks under the beach front car park, one of which had been converted to accommodate aerated plastic media, and a discharge to the sea outfall, supported by pumping in the event of high tides. Upgrade of these facilities was needed to meet requirements of the Urban Waste Water Directive.



Llangrannog Interior view (courtesy Welsh Water Alliance).

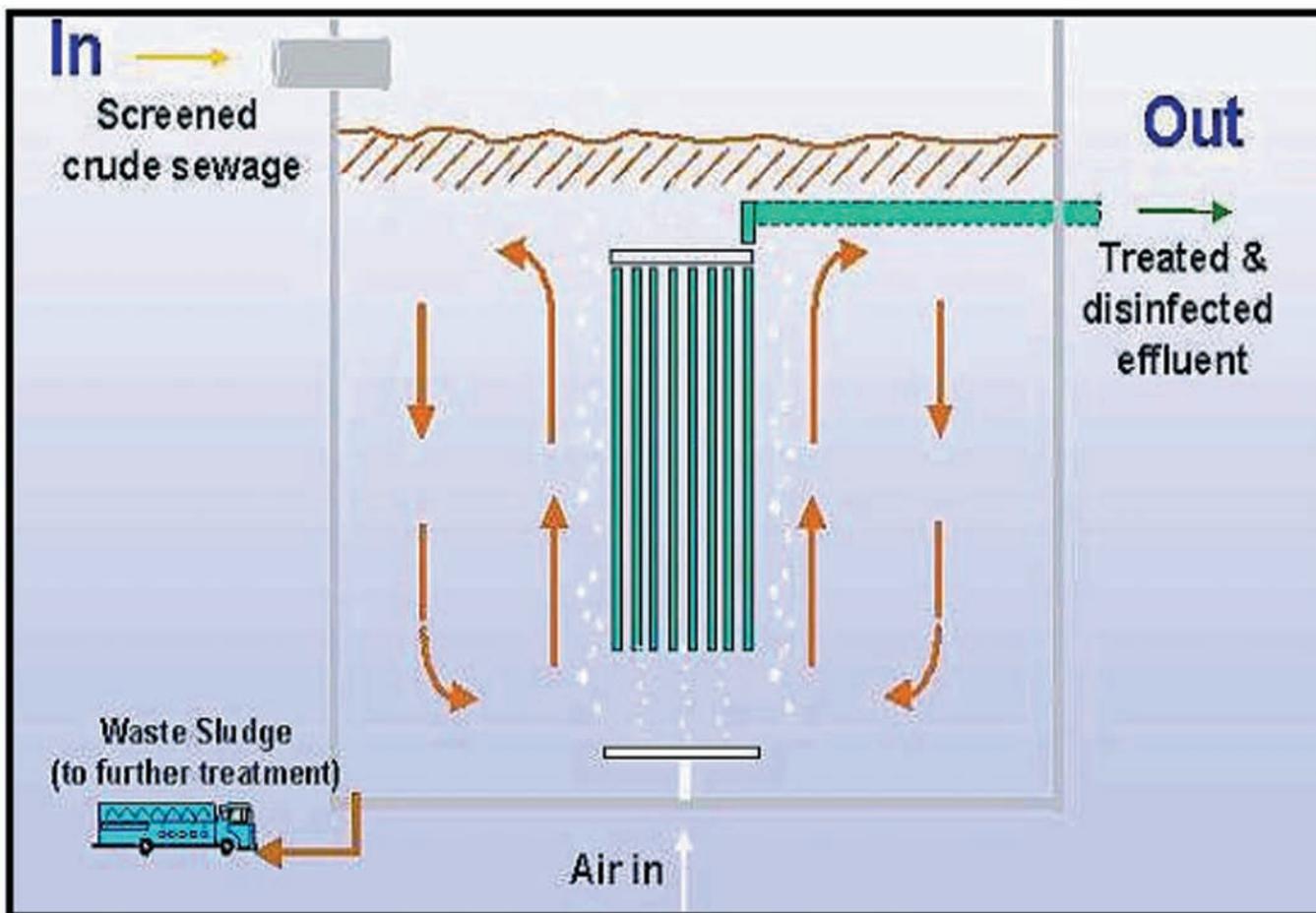
New works

A new treatment works has been provided, situated some 800m inland and approximately 55m above the level of the former treatment facilities that have now been converted into an underground pumping station and emergency storage tanks.

A new rising main and return gravity sewer convey crude sewage up to the works and treated effluent back down to the original sea outfall. Available head on the gravity drain is now such that high tide pump assisted discharge is no longer require.

Llangrannog WwTW, design population equivalent 550, is entirely enclosed within a low profile building which is only 11m x 7m on plan. This very compact design is achieved by utilising *Kobota* submerged flat sheet membranes supplied by *Aquator Group Ltd*.

The membrane bioreactor process was selected because it presented minimal environmental impact in respect of footprint, odour, noise, sludge handling and also because it provided least visual intrusion within the village. During the process and site location selection phases full consultation was maintained with representatives of the local community.



Llangrannog Process Chart (courtesy Welsh Water Alliance)



Llangrannog Pipework (courtesy Welsh Water Alliance).

The plant which has a design flow to full treatment of 3.7 l/sec, 320m³/d, treats all flows arising within Llangrannog, together with a small pumped flow from a nearby settlement which previously discharged from septic tanks. All incoming flows are effectively screened to 3mm. A total membrane surface area of 480m² is installed in two adjacent activated sludge compartments, which operate at a biomass solids level between 12,000 and 18,000 mg/l. Air is supplied to the bioreactors from duty and standby blowers which are submerged within the permeate (final effluent) tank in order to minimise superimposed noise levels within the locality. During peak season it is anticipated that sludge will be withdrawn on a three weekly frequency .

PLC controlled

The plant is controlled by plc software, which ensures that the key parameters by which permeate flow rate and trans membrane pressure drop are maintained within acceptable limits. This is expected to ensure that the requirement for membrane chemical cleaning, using low strength caustic soda, is limited to, typically, twice per annum.

The process was rapidly started up on imported membrane bioreactor sludge and was producing high quality effluent within 48 hours of seeding. Final effluent quality is consistently better than BOD:SS:NH₃::5:5:5, and the discharge of fully disinfected treated wastewater to Llangrannog sea outfall is an added bonus, which has already received favourable comment from local surfers.

The work undertaken at the beach front pumping station and car park has significantly improved the immediate area to the benefit of visitors to the village and local traders.

In order to accommodate requirements of the local tourist trade during the summer, project site work was started during early September 2002 and was completed during March 2003, in advance of the Easter influx of visitors.

The project, which has made effective use of the resources of *Meica Process Ltd* and *Morrison Construction Ltd.*, process and civil contractors respectively, is an example of the integrated catchment solution approach to delivery which is favoured by *Welsh Water's Capital Alliance*. ■

Note: The Editor & Publishers thank Welsh Water Alliance and the above contractors for their assistance in producing this article.