

Peak Flow Equivalent Treatment

Driver: In the AMP6 National Environmental Programme (NEP) National Resources Wales (NRW) applied L2 drivers (local drivers to Loughor Estuary) to the Combined Sewer Overflows (CSOs) at Northumberland Avenue Sewage Pumping Station, Llanelli Wastewater Treatment Works (WwTW) and Gowerton WwTW storm tanks which resulted in limiting the spills as follows over a 10 year period:

Site	Current Spills (per annum)	L2 Driver target (per annum)
Northumberland TSPS/CSO	76	≤10
Llanelli WwTW Storm Tanks	96	≤20
Gowerton WwTW Storm Tanks	51	≤20

Existing Position: Traditionally, Dŵr Cymru and the Capital Alliance have utilized both standard storm storage treatment options and the Rainscape approach to deal with significant flow management into our networks, combined sewer overflows (CSO) and arriving at our waste water treatment works (WWTW), to reduce spills to the environment. This is a priority for DCWW, particularly for the Loughor area.

Traditional solutions couldn't deliver required spill reductions in cost effective manner for Llanelli & Gowerton catchments, so other solutions had to be found. The Danish approach utilising blending of treated effluent and peak flow was taken forward. DCWW undertook a desktop review & sampling to research innovative technologies to allow Peak Flow Equivalent Treatment (PFET) to the WWTW permit requirements. This approach is new to both DCWW and UK (adjacent diagram).

Pilot Trial: Two Technologies were trialled at Gowerton WwTW across a number of scenarios in order to:

- Demonstrate reliability of the units, as intermittent treatment and the stability of the process across variations in flow
- Demonstrate that the technologies were able to achieve suitable effluent quality that when blended with WwTW Final Effluent, the blended effluent met the works discharge consent parameters

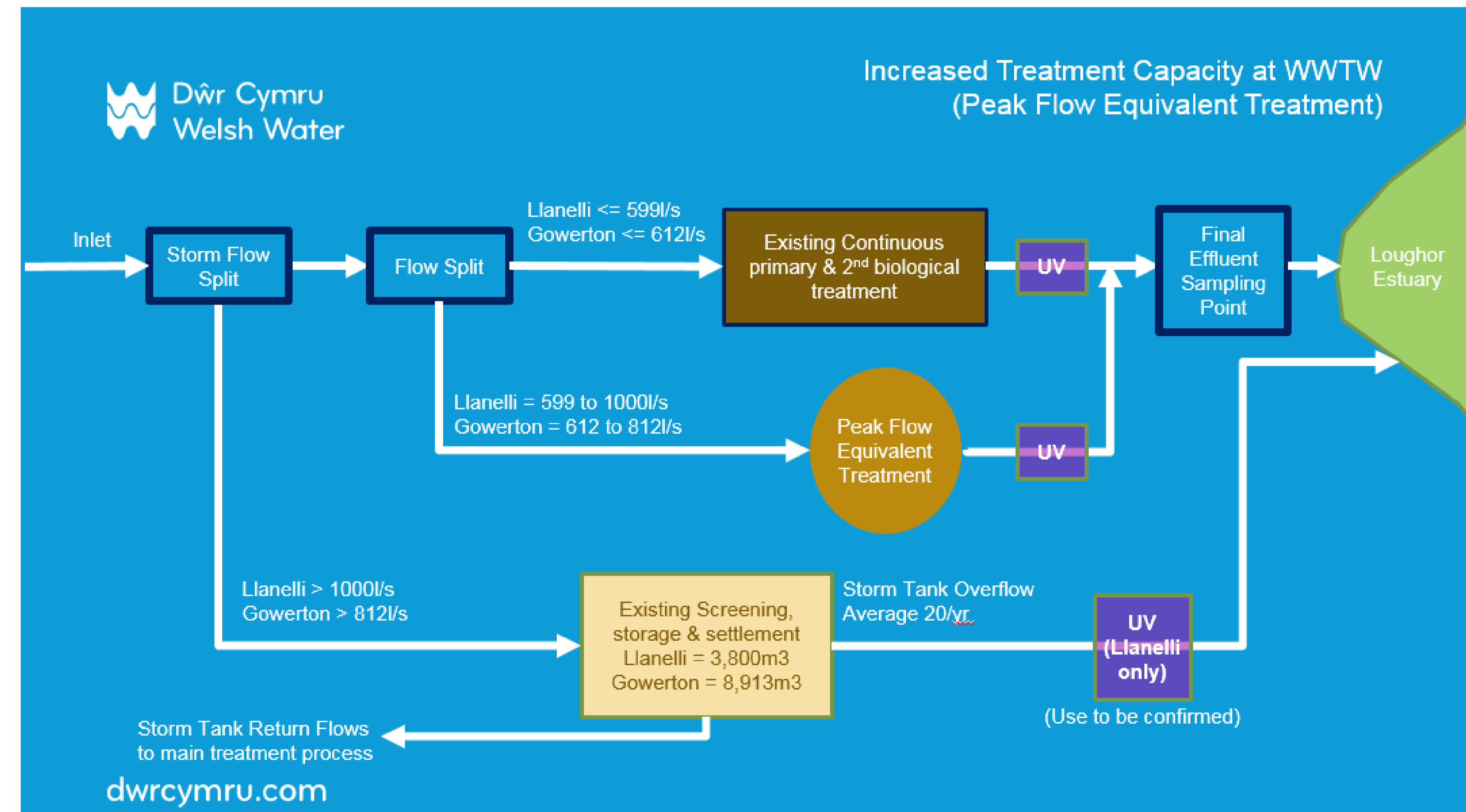
- Determine operating costs

The chosen technology was the **WWETCO FlexFilter**

How PFET meets the Project drivers: During conditions where flows arriving at the WwTWs exceeds full flow to treatment (FFT) capacity of the works, flows typically spill to storm tanks. The proposed solution treats the first portion of that spill flow up to a determined flow, by passing through the PFET unit. Liquors from the PFET backwash are fed into the main treatment stream for full treatment.

The PFET acts as a sidestream treatment, providing sufficient filtration of this portion of flow such that when treated with UV and blended with the final effluent from the main treatment works, combined flows to the outfall meet the works treatment consent.

Flows to the works that exceed the FFT plus PFET flow, pass to the existing storm tanks which will continue to overflow to the estuary once these tanks are full. The overall effect is to significantly reduce the number of spills at the works. Hydraulic modelling has demonstrated that the combination of surface water separation in the catchment, additional storage at upstream pump stations, the management of pumped flows and the additional PFET treatment at the works reduces the number of spills in the catchment to meet the project drivers.



By treating the additional stormwater arriving at the WwTW, it has enabled Welsh Water to enhance the treatment process, which is more cost effective than traditional options, such as storage. The PFET option has saved Welsh Water, along with Rainscape surface water removal in the catchments has saved circa £450M versus traditional storage. It has enabled Welsh Water to meet tight regulatory deadlines of December 2020. There will be a significant benefit to the environment through achieving these tightened targets.

Project Timeline



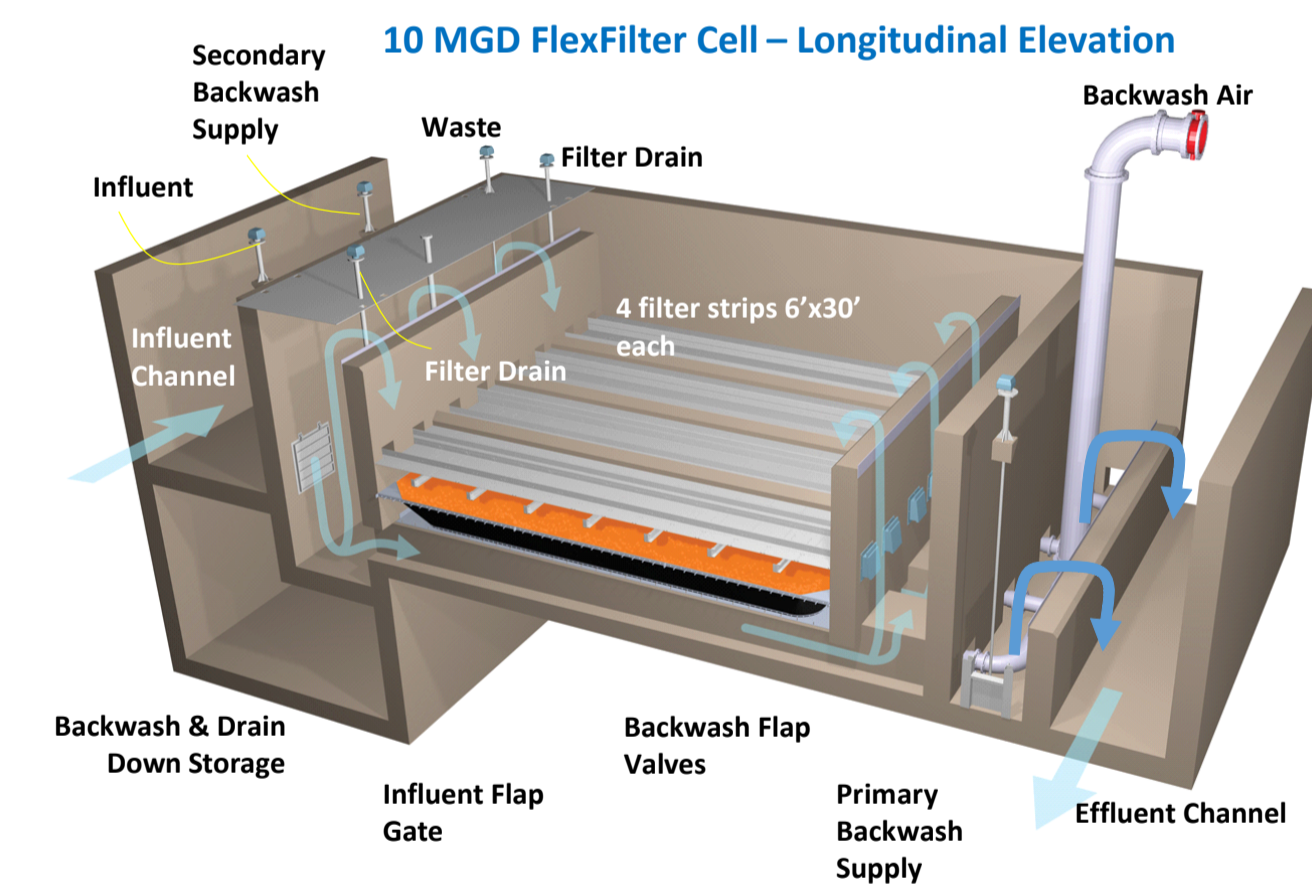
Current Progress: October'20

- Gowerton PFET Plant going through final process Commissioning
- Llanelli PFET Plant beginning wet Commissioning



Gowerton FlexFilter & UV Plant

WWETCO FLEXFILTER



Scheme	BPT	LBE
Northumberland L2	£23m	£16,828,867
Gowerton PFET	£13m	£15,586,844
Llanelli PFET	£16m	£20,484,211
Total	£52m	£52,899,922