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Bedford Pumps Delivers Ground Breaking Technology in Deep Shaft Project

Bedford Pumps Ltd, in collaboration with Morgan Farrans jv, recently contributed to the success of one of the biggest infrastructure projects in Northern Ireland with the installation of six 15 tonne Storm Water pumps.

The pumps, among the largest in Northern Ireland, are a crucial part of Northern Ireland Water's £160 million Belfast Sewers project, commissioned to overhaul the mainly Victorian sewer system.

The extreme weather conditions Belfast has been experiencing, in conjunction with the city's effluent on overburdened sewers, has resulted in major issues with flooding and pollution.

Bedford Pumps Ltd, a manufacturer of large, bespoke water and wastewater pumps, have made their installation 40 metres below ground level at the project's Terminal Pumping Station located within the Duncrue Street Wastewater Treatment Works.

The station lies at the end of a 10km network of new storm tunnels which have been constructed over the past three years. The main stormwater tunnel provides the city with protection against a one in 30 year storm event. The pumps are fundamental to the whole project to alleviate storm conditions and reduce the risk of flooding in the city.

Bedford Pumps were chosen for their knowledge and expertise in the field as well as their unique design specification.

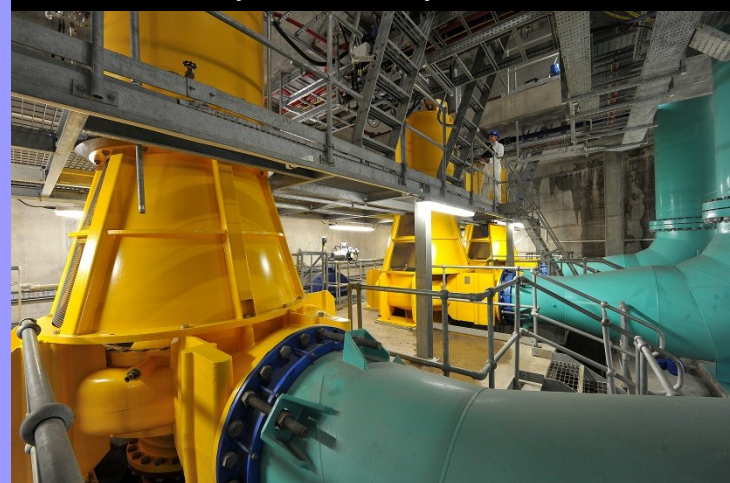
Each Storm Pump has the capacity to deliver 3,500 l/s which means that when all six pumps are running they could empty an Olympic sized swimming pool in less than two minutes. They are driven by close coupled, 950 kW, 3.3 kV, immersible, flameproof motors.

In addition to the six large Storm Pumps the station also includes two smaller FFT (Forward Flow to Treatment) pumps which will be used to discharge the lower, base load flows, to the treatment works. These pumps are also driven by immersible, flameproof motors.

(continued overleaf)



Bedford Pumps' Storm Pumps for Belfast WTW



Belfast Wastewater Treatment Works (continued)

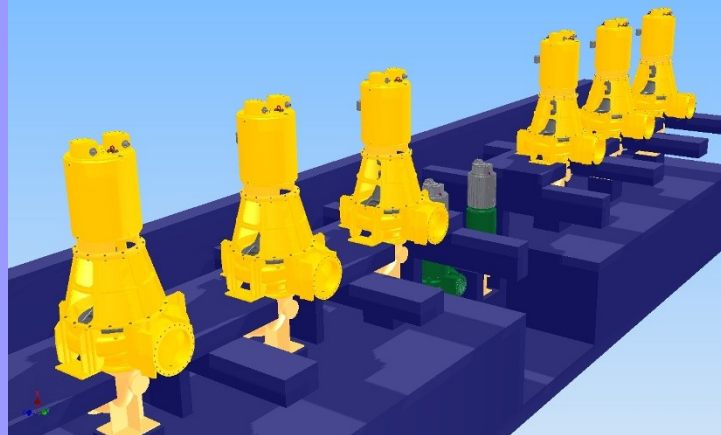
As FFT pumps always had to pass flows to the treatment works irrespective of the sump water levels, the following design criteria had to be met:-

- The ability of the pump to maintain a constant flow of 750 l/s over a static head range of 10 m to 36 m whilst remaining hydraulically stable and operating efficiently.
- Ensure a minimum self-cleansing velocity greater than 1.8 m/s.
- Minimise the possibility of valve slam by strategic positioning of the NRV.
- Construction materials to be capable of resisting severe abrasion due to the high levels of grit present in the pumpage.

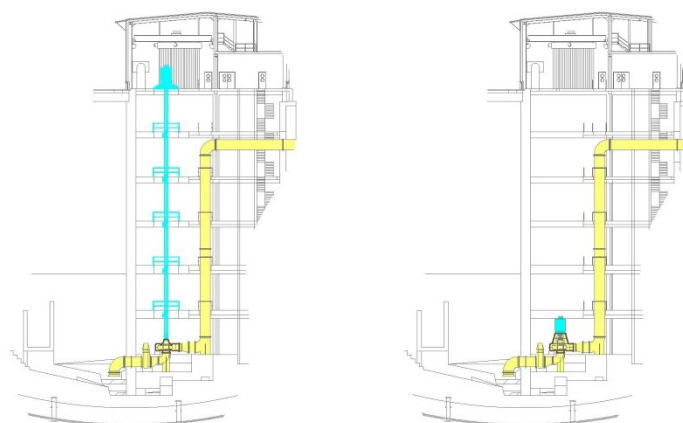
Bedford Pumps used an innovative new technique when designing their pumping solution, moving away from the traditional arrangement adopted for deep well stations. The norm for this type of application would be to install the drive motor at ground level thereby ensuring that it is kept dry in the event of a flood. This type of installation would add cost to both the mechanical and civil installation in addition to the ongoing maintenance requirements on long drive shafting needed to couple the motor to the basement-mounted pumps.

Bedford Pumps effectively “cut out the middle man” with a revolutionary concept. They eliminated the need for drive shafts, bearing and supporting structures by incorporating a motor fitted directly above the pump. The direct drive motor, manufactured by Bedford Pumps, is floodproof (IP68), flameproof and fully immersible. This was close coupled to the pump, minimising the overall cost of the installation whilst ensuring optimum reliability.

Both the FFT and the Storm Pump shaft sealing arrangement is of the conventional packed-gland type which affords the client low capital and maintenance cost.



Bedford Pumps' 6 Storm Pumps and 2 FFT Pumps



Traditional Pumping Method

Bedford Pumps' solution

Station Arrangement

For further information on this or any other of our applications please contact our Sales Team at:
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