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TE MAUNGA WWTP SLUDGE THICKENING AND DEWATERING – FROM PILOT TRIALS TO FULL SCALE

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ABSTRACT

Since the Te Maunga WWTP was constructed in the mid 1990's, waste activated sludge (WAS) has been pumped to an adjacent sludge holding pond for partial stabilisation, with desludging required about every five years. A resource consent condition in the latest consents for the WWTP required the pond had to be decommissioned as a sludge pond. Consequently, an options study was undertaken to select sludge thickening and dewatering equipment to be installed at the WWTP.

In conjunction with the TCC operations team, gravity belt thickeners (GBTs) and screw presses were chosen as the preferred thickening and dewatering equipment respectively. GBTs were well known to TCC, being used at their Chapel Street WWTP in a similar duty. Screw presses were preferred over traditional dewatering machines such as centrifuges due to much lower power consumption, operating speeds and maintenance requirements. As screw presses were a relatively new technology in New Zealand wastewater treatment plants and WAS without any primary sludge is more difficult to dewater, it was considered prudent to undertake WAS dewatering trials

Innovative Filtration Solutions (IFS) were able to provide a screw press pilot trial unit. WAS was pumped directly from the activated sludge bioreactor to plastic tanks to simulate sludge thickening prior to being fed through the screw press pilot plant. This paper describes the pilot plant trials including the key parameters that impacted on performance of the screw press being sludge feed % solids, age, VSS:TSS ratio, and use of coagulant.

Best dewatering performance was achieved with sludge feed solids between 1.5% and 3%, higher sludge age with a resultant VSS:TSS ratio which is less than 82%. The lower than expected optimum solids feed resulted in a re-think of the sludge thickening process to be adopted. Gravity tank picket fence thickeners (PFTs) were selected to provide better control of the thickened sludge solids % based on residence time in the tanks. Large thickened WAS tanks have been included in the design to provide a buffer for the screw press feed, with further destruction of volatiles to decrease the VSS:TSS ratio possible. To achieve the necessary 20% dewatered solids target, a coagulation injection system was implemented as part of the sludge conditioning process prior to dewatering.

The Te Maunga sludge thickening and dewatering plant is currently being commissioned. By June 2019, results from the full-size screw press dewatering will be available so an assessment will be presented in the final paper on how well these results replicate the pilot plant trials.

KEYWORDS

Waste activated sludge, thickening, dewatering, picket fence thickener, screw press