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AquaNereda® Aerobic Granular Sludge Technology

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Nereda® Aerobic Granular Sludge (AGS) Technology is an innovative biological wastewater system that provides advanced treatment using the unique features of aerobic granular biomass, comprised of granules. The Nereda process was created by a public-private partnership with Delft University, Dutch Water Authorities and Royal HaskoningDHV in the Netherlands. Used successfully for more than 12 years in full-scale wastewater treatment facilities – with over 50 plants around the world currently in operation or under design and construction – the technology offers several advantages when compared to conventional activated sludge systems, including significant footprint reduction and energy and chemical savings under a wide range of influent characteristics, applications, and climates. In North America, the technology has just recently become available under the brand AquaNereda® Aerobic Granular Sludge Technology.

As an introduction to the North American market, Aqua-Aerobic Systems opened a 757 m³/d (200,000 gpd) fully automated system at the Rock River Water Reclamation District (RRWRD) in Rockford, IL, in January 2018. The new AquaNereda demonstration facility is unique, with the capability of operating at a range of process water level depths, demonstrating the distinctive advantages of AGS at various process depths often seen in retrofit applications. Furthermore, it will provide a North American site to grow and store seed granules that can be used to accelerate biological nutrient removal during commissioning of new plants in Canada and the US.

Prior to construction of the demonstration facility, a four-week AGS pilot study was completed at RRWRD in the spring of 2017. The pilot unit was

Nereda® Installation, Epe, Netherlands.



AquaNereda® Demonstration Plant (RRWRD), Rockford, IL .



equipped with two independent AGS reactors, seeded to an MLSS strength of 8 g/L with aerobic granules obtained from a full-scale Nereda aerobic granular sludge plant shipped from overseas. One of the primary objectives of the pilot was to demonstrate the rapid acclimation of granules, which had been dormant in shipping containers for three months. Nitrification was observed within 2.5 weeks of start-up. Within four weeks, BOD₅ and total suspended solids (TSS) were both reduced to less than 10 mg/L, and total nitrogen (TN) and total phosphorous (TP) were reduced to < 3 mg/L and 0.8 mg/L, respectively. This same performance was observed during the demonstration plant

Table 1. AquaNereda® Demonstration Plant (RRWRD) Effluent Results

Parameter	Influent (mg/L)	Effluent (mg/L)
COD	262	18
BOD ₅	116	2
TSS	128	8
Total N	30	2.6
NH ₄ -N	11	<0.1
Total P	2.6	0.9

start-up, showing that pilot studies are representative of full-scale performance (see Table 1). Overall, the RRWRD demonstration plant produces the same excellent effluent quality as seen at the 50+ full-scale installations. Operation is now focused on varying process water depths, increased MLSS strength, solids handling, and various process control strategies. In addition, it will provide an easily accessible aerobic granular sludge site for engineers and plant operators to visit in North America and learn more about the technology. See www.aquanereda.com for more information. Aqua-Aerobic Systems Inc. is the exclusive US and Canada provider of Nereda® technology. ♦