

# Project Summary

**CLIENT:**

Townsville CitiWater

**LOCATION:**

Cleveland Bay, Townsville,  
QLD

**SERVICE:**

Brownfield Upgrade

**CAPACITY:**

126,000 EP

**CONTACT:**

Peter Ferrando

**ISSUES:**

Existing plant highly  
overloaded and unstable

**SOLUTIONS:**

Construction of new BNR  
facility within the existing  
clarifiers.

**BENEFITS:**

Re-use of structures  
reduced capital by over  
\$10M.

**PRODUCT:**

All mechanical process  
equipment.

**COMPLETION DATE:**

November, 2008

## Cleveland Bay (Water Matters Alliance)

The heavily overloaded oxidation ditch facility at Townsville's largest plant, Cleveland Bay WRP, was upgraded to 126,000 EP (29 ML/d) with biological nutrient reduction through the Water Matters Alliance in which Aquatec Maxcon partners GHD undertook the process design for the upgrade to achieve biological nutrient removal. To achieve a very high effluent quality, state-of-the-art biological processes were utilized by combining an oxidation ditch (to achieve a high level of nutrient removal) with membrane solids separation. This retained the simplicity and flexibility of the oxidation ditch while adding the exceptional solids separation capability of the membranes. This reduced the project capital expenditure by over \$10m and reduced the construction program. Reuse of existing infrastructure enabled a staged approach to construction and delivered high-quality treated effluent to the environment sooner.

The plant combines submerged mixers with AquaBlade fine bubble diffusers and anoxic zones around the membrane tank to form an oxidation ditch. The efficient diffusers and cross flow aeration delivered transfer efficiency of (27.4 -33.9) gms O<sub>2</sub>/Nm<sup>3</sup>.m comfortably exceeding the guaranteed value of 25 gms O<sub>2</sub>/Nm<sup>3</sup>.m and assisted the plant delivering energy savings of almost \$1m per annum.

The Cleveland Bay WTF was, at commissioning, the largest MBR in the Southern Hemisphere and one of the largest MBR plants in the world. Scum collection via a dewatering belt scum harvester was provided. A biosolids handling facility was undertaken also. The efficient equipment selections have resulted in the operating costs being substantially below the initial projections. The upgrade of the plants control, SCADA and telemetry systems was undertaken by MPA Engineering (a member of the Aquatec Maxcon Group).

Target Effluent COD < 200mg/L, TN < 4mg/L, TP < 0.8mg/L

- Effluent achieved:  
COD 16 mg/L, TN < 3.5 mg/L; Total P < 0.5mg/L meeting the discharge requirements to the sensitive Great Barrier Reef Marine Park.

The project was completed on time and won the "(Water Category) Innovation Award" at the Institute of Public Works Engineering Australia, Queensland Division Excellence Awards in 2008.



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