

CASE STUDY UNITYWATER ON SUNSHINE COAST
Noosa SPS NVL010 Odour Control System Renewal



Municipal Profile
Unitywater


Unitywater operates in one of the fastest growing regions of Australia, providing essential sewerage and water supply services for three council regions that are home to approximately 16% of Queensland’s population.

With the population of the Sunshine Coast, Moreton Bay and Noosa regions projected to grow from approximately 795,735 people in 2016 to 1.18 million in 2036, Unitywater is planning to meet the future needs of the region in an economically and environmentally sustainable way.

Their investment will cater for population growth and ensure their infrastructure meets strict standards for our unique and delicate environment.

They will continue to upgrade and invest in sewerage and water supply infrastructure in ways that keep us at the forefront of environmental practices and meet the challenges of climate change.



- Sewage Treatment Plants 
- Service Centres 
- Corporate Offices 

The Unitywater Water & Sewer Network

- Approximately 368,885 customer accounts
- 5223km² geographical area serviced
- 601km sewerage mains
- 800 sewage pump stations
- 17 sewage treatment plants
- 343,532 water connections
- 6290km water mains
- 70 water pump stations
- 103 water reservoirs
- 11 sewage treatment plants producing recycled water
- 704 team members

The Case Study

The System Requirements

Approximately two years ago Unitywater realized that a new Odour Control Filter would be required at this Wastewater Pump Station based on the high levels of odour being experienced by the neighbours living adjacent to the site and deterioration of other infrastructure.

After a full consultation process with Unitywater which included considering the Flow Dynamics through the station and the levels of H₂S (Hydrogen Sulphide) plus VOC and Mercaptan issues we were dealing with onsite it was determined the existing filter would need to be decommissioned.

McBarns Pty Ltd as a trusted company within the sewer and wastewater industry for 31 years, with a unique odour treatment system that maximises the efficiency and effectiveness of the filter in comparison to standard filtration techniques, were chosen to establish a Scope of Works to supply an alternative filter to Unitywater which would provide a renewed odour control system for the Pump Station.

The odour treatment resulted in 99% clean air to atmosphere at the filter outlet.

Three (3) key criteria which led to the McBarns Odour Control Filter being favoured were:

- Overall, the system works efficiently in using a mix media which includes using impregnated carbon (KOH) as an initial treatment, due to the high treatment

capacity and the preferential treatment of hydrogen sulphide.

- The proprietary combined media allows for the treatment of the residual hydrogen sulphide, mercaptans, and other VOC's, due to the redox reactions being instantaneous and effective for all odour producing compounds.
- The requirement for 24/7 emissions monitoring, i.e., the pump stations monitoring would continue to operate effectively and reliably in the event of communications or SCADA failure.
- Analogue Signals provide H₂S analyser status to the Unitywater RTU and in turn to their SCADA system. The H₂S analysers (PPM on the inlet/PPB on the outlet) as loggers would also work autonomously if the DC supply was lost to the analysers or the RTU/SCADA was not operational.



A number of teams at Unitywater worked together, including operations, electrical, maintenance, engineering and management to conduct an expression of interest process.

Unitywater entered into a development partnership with McBarns to develop a solution that would work at this site.

Concept Design Detail

Overall, the calculations for a suitable odour control facility would determine that the most suitable filter for this application would be the McBerns Odour Control Filter with a Prefilter, Extraction Fan, H₂S monitoring plus an acceptable media life expectancy.

Scope of Works

Section 1 – Preliminaries

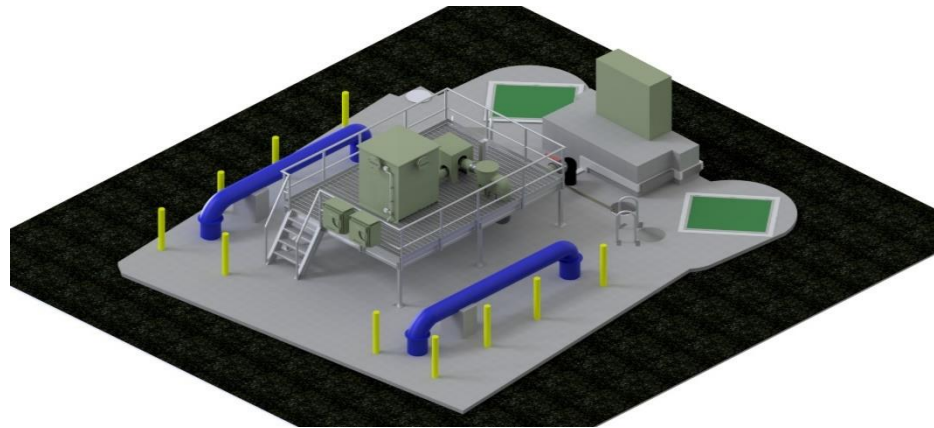
- All project management works for the project
- Construction program including updating monthly
- Provision of safety management
- Environment management plan
- Provision of quality management plan

Section 2 – Design & Construction

- Design & drafting works, which includes:
 - RPEQ design report for filter sizing and concrete/civil works (including pre concrete pour inspection),
 - Site layout plans and Electrical Drafting.
- Site establishment works,
- Supply & installation of:
 - McBerns Odour Control filter
 - McBerns prefiltration system,
 - Extraction fan with acoustic cover, plus control cabinet for extraction fan to Unitywater specifications.
 - Electrical installation of equipment,
 - Access and odour control system platform to bring equipment +1m from Finished Surface Level (FSL) to get above flood levels, and the design and Construction of the aluminium platform was deigned to meet the requirements to AS1657-2018.
 - Sealing of manholes & access covers.
- Supply & installation of:
 - H₂S sensors (1 x PPB & 1 x PPM)
 - Connection of equipment to odour control vessel
 - Mechanical installation
 - Connection of electrical power to instrumentation, and
 - Connection of analogue & digital signals from instruments to RTU.
- Stainless-steel pipe support brackets.
- Removal of ventilation poles, and
- Hire of crane to remove ventilation poles.

Section 3 – Commissioning & Handover Documentation

- Commissioning of odour control system by McBerns and Documentation Handover for all components supplied to Unitywater
- Commissioning of hydrogen sulphide sampling system.



**McBerns Odour Filter Site Layout
Odour Control System**

The Development Partnership (Unitywater)

Unitywater staff could view more information from their filters remotely than they could previously by visiting the site with the McBerns solution.

Within 12 months the Unity Water could see a continued benefit in the McBerns Odour Control Filter solution: reduction in callouts, the ability to reset fans remotely, comprehensive status announcement of the Fan Control & H₂S Analysers and Preventative Maintenance Indicators.

The same control panel and H₂S Analyser panels could be adapted to any of the McBerns ZC and HDPE ranges of filters for Unitywater Sewer Pump Stations and these could be monitored via their SCADA system templates.

There was the added benefit of standardisation across the whole system, a big help to the operations staff visiting the pump stations.

The Unitywater team have shown great initiative in utilizing the unique capabilities to greatly improve pump station network odour emissions monitoring and reliability. They have reduced the Unity Water operating costs through improved odour control and monitoring.

Challenges met in the project:

- Able to fit all the services (Electrical, PreFilter, Filter & Filter Fan, Platform with railing and stair access into a small existing concrete pad onsite.
- to maintain the air quality on the outlet of our filter to 99% clean to atmosphere. During the COVID lockdowns the odour complaints went up significantly as rate payers were working from home. This resulted in higher levels of activity through the Unitywater network and levels of odour manifesting itself in places where not experienced before.
- Access for the H₂S monitoring onto the Unitywater ClearSCADA platform for the McBerns Odour Control Filter.

Scope and Effectiveness of the System

By the end of 2021, 2 more similar sites were installed with this technology and connected to the SCADA system via analogue signals and digital status. The benefits of the McBerns solution:

- Unitywater reduced emissions related callouts to pump stations with the McBerns Mixed Media technology plus the Advanced H₂S condition monitoring, datalogging and reporting which allows preventative action to be taken, thus avoiding the issues preceding the installation.
- Due to the advanced control and monitoring, Unitywater staff are able to concentrate on decision making, rather than unwanted callouts and racing from site to site during critical periods.
- One of the other big benefits of the McBerns solution is that Unitywater's ongoing spending on the system is minimal and the Design criteria will give Unitywater an acceptable media life expectancy.

The comment was made at the Practical Completion stage of the project by the M&E Principal Project Manager/ Network Capital Delivery for Unitywater at the time that 'based on the size and magnitude of the Scope of Works the 2-month timeline from Concept Design to Handover was unprecedented'.

