Municipal Wastewater

CASE STUDY:
WESTERN SYDNEY REPLACEMENT FLOWS PROJECT FOR SYDNEY WATER

Delivering advanced water solutions to help secure Sydney’s water needs

**PROJECT OVERVIEW**
A key element of the Western Sydney Recycled Water Initiative is the Replacement Flows Project. This will see the Penrith, St Marys and Quakers Hill sewage treatment plants connected by pipes to allow treated wastewater from the three plants to be further treated at a new advanced water treatment plant at St Marys. The highly treated recycled water will be released into the Hawkesbury-Nepean River below Penrith Weir, substituting up to 18 gigalitres of drinking water currently being released from Warragamba Dam into the Hawkesbury-Nepean River, with highly treated recycled water. This will conserve drinking water, whilst maintaining environmental flows.

The objectives of the Replacement Flows Project were to:
- Save up to 18 gigalitres per year of current Warragamba Dam discharges by providing high quality recycled water to the Nepean River as a replacement for existing Warragamba Dam releases
- Reduce the discharge of nutrients from Penrith, Quakers Hill and St Marys STPs into the Hawkesbury-Nepean River and South Creek
- Ensure environmental values are maintained including aquatic ecosystems, primary industries, recreation and aesthetics and drinking water.

**THE SOLUTION**
The works consist of an Advanced Water Treatment Plant (AWTP) at the St Marys Sewage Treatment Plant (STP) for the treatment of tertiary treated effluent from Quakers Hill, Penrith and St Marys STPs. The AWTP produces 50 ML per day of highly treated recycled water for discharge to the Hawkesbury-Nepean River downstream of Penrith Weir using ultra filtration and reverse osmosis technologies.

The project also included the construction of large pipelines for the transfer of tertiary treated effluent, recycled water and concentrate between Penrith, St Mary’s and Quakers Hill STP and Vineyard Creek.

**Contract Value:**
- Construction $171 million
- Operations & Maintenance $64 million

**Project Duration:**
- Design & Construction August 2007 – February 2010
- Commissioning & Proving February 2010 – October 2010
- Operations & Maintenance August 2010 – August 2020

**Location:**
Western Sydney, New South Wales
UGL's scope of work in delivering this solution included project management, design management, design (process, civil/structural, mechanical, electrical, PLC/SCADA, IICATS), construction management, operation and maintenance.

KEY OUTCOMES AND BENEFITS

UGL's step-by-step collaborative approach to the project gave the Alliance certainty in achieving the necessary outcomes. This approach also ensured that the challenge of working with multiple stakeholders would be successfully managed to deliver an optimal outcome.

Key outcomes included:

• The client’s expectations throughout the project were met through positive and thorough technical reviews and design risk workshops.
• The construction phase of the project progressed ahead of schedule due largely to the detailed planning that took place during the design phase.
• 75% of construction was completed across more than 20 work sites in approximately 9 months keeping the project on track.
• The delivery of innovative design solutions that optimised the use of existing structures at the connecting STP’s reducing the requirement to build new structures.
• Completion of major circular concrete tanks in limited pours without vertical joints allowed faster construction and reduced potential for problems with hydro testing.