

Kyogle Water Supply Augmentation

2018 LGNSW Water Management Conference



Department of
Primary Industries



Office of
Environment
& Heritage



Recreational
Fishing Trusts

Background

- Original Water Supply System built in 1932
 - Gravity sand filters and sedimentation tanks with direct river extraction
- Additional parallel process added to WTP in 1955
 - “octopus” style pressure sand filters and round clarifier
- Weir added in the 1970s
- Issues;
 - Lack of supply security with small on-stream weir storage
 - WTP in very poor condition and a lack of reliability
 - Run of river pumping of highly variable raw water source
 - WTP waste discharged to stormwater
 - Options Report in 1998 had no affordable solution

Project Timeline

1999	Need for an affordable solution identified
2003 – 2006	Integrated Water Cycle Management Study
2005	Conversion to liquid dosing systems at WTP
2006	Concept Development Report
2007 - 2009	Off stream storage site investigation
2009	Flood Risk Management Study and Plan
2010- 2012	REF, approvals, and OSS Land Purchased
2014	Secure Yield Study
2012 - 2015	Detailed Designs completed
2015	Funding secured-Water Security for Regions et al
2015	Construction commenced-two main contracts
2018	Project completion

Adopted Solution

The project's major elements included:

- Modification of the existing in-stream weir and construction of an award winning, innovative fish-way
- Upgrade of the existing river extraction pumping station
- Construction of a 200ML off-stream storage (OSS) dam, preliminary treatment and pumping facility
- Upgrade of the Water Treatment Plant to meet current water quality standards and increased capacity for growth
- Flood modification works combined with the OSS civil works contract

Total cost - \$9.4 million

- \$6.4M Water Security for Regions
- \$2.3M Council
- \$507k CTWSSP (for pre-construction)
- \$100k NSW Environmental Trust
- \$40k NSW Recreational Fishing Trust
- \$70k LGNSW Climate Change Resilience



Project Outcomes

The project had five main objectives:

- **Improved drought resistance** for the Kyogle water supply, with the off-stream storage facility being capable of holding a year's worth of water for the town
- **Reduced operational costs** as a result of the new system being fully autonomous, meaning much less operator input
- **Increased water treatment plant capacity** from 3ML/day to 4.5ML/day, to cater for future growth
- **Improved water quality** through selective harvesting of raw water and real-time water quality monitoring and PLC process control
- **Increased resilience** to flooding and climate change impacts.

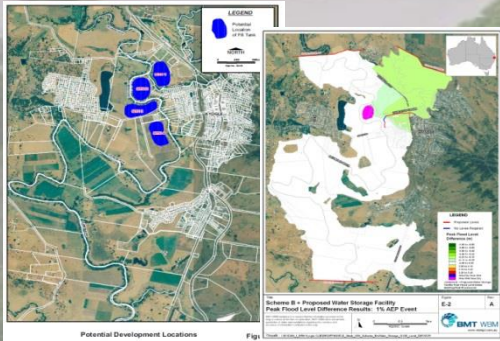
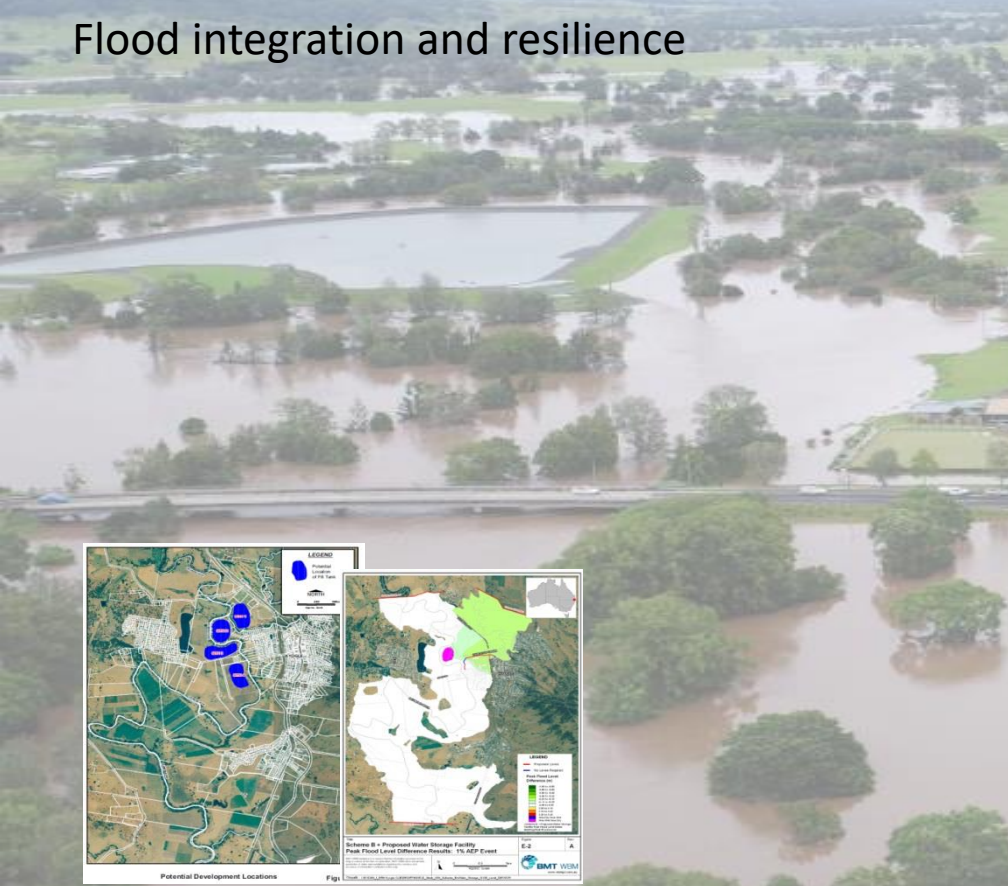


Off Stream Storage

- Provides drought security as well as consistent water quality through selective harvesting, and provides flood and climate change resilience to the water supply
- Four sites originally investigated, two ruled out on flood impact and the other two suitable after geotech
- Site chosen integrated with the flood modification works which offered costs savings when delivered together under one contract
- Includes pre-treatment process and pre dosing
- Solar powered destratification system

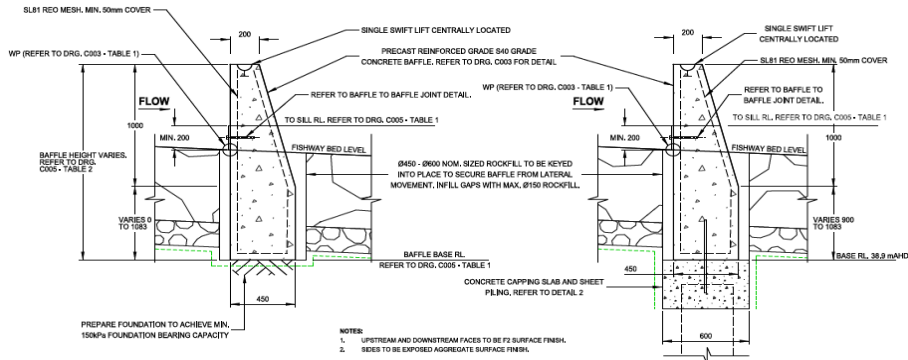
Off Stream Storage

Flood integration and resilience



Weir Modifications

Baffle design and fabrication



Weir Modifications

Diversion works for in stream construction



Weir Modifications

In stream construction



Weir Modifications

Completed fishway



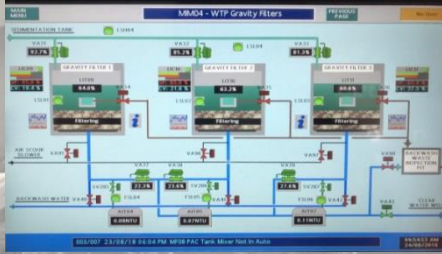
Water Treatment Plant

- Refurbishment and reuse of existing aged infrastructure
 - Circa 1930s gravity filter and sediment tank structure
 - Circa 1950s pressure filter and round clarifier structure
- Two separate treatment processes allowed for brownfields construction
- Design was undertaken by MWH with early tenderer involvement identifying further savings
- Automation through actuated valving, PLC control, on-line monitoring instrumentation and operator HMI interface

Gravity Filter Stream



Gravity Filter Stream



Pressure Filter Stream



Building Refurbishment



Building Refurbishment

Sedimentation Tanks



Building Refurbishment

Sedimentation Tanks



Building Refurbishment

Clarifier



Building Refurbishment

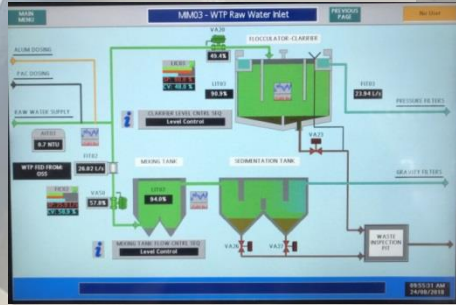
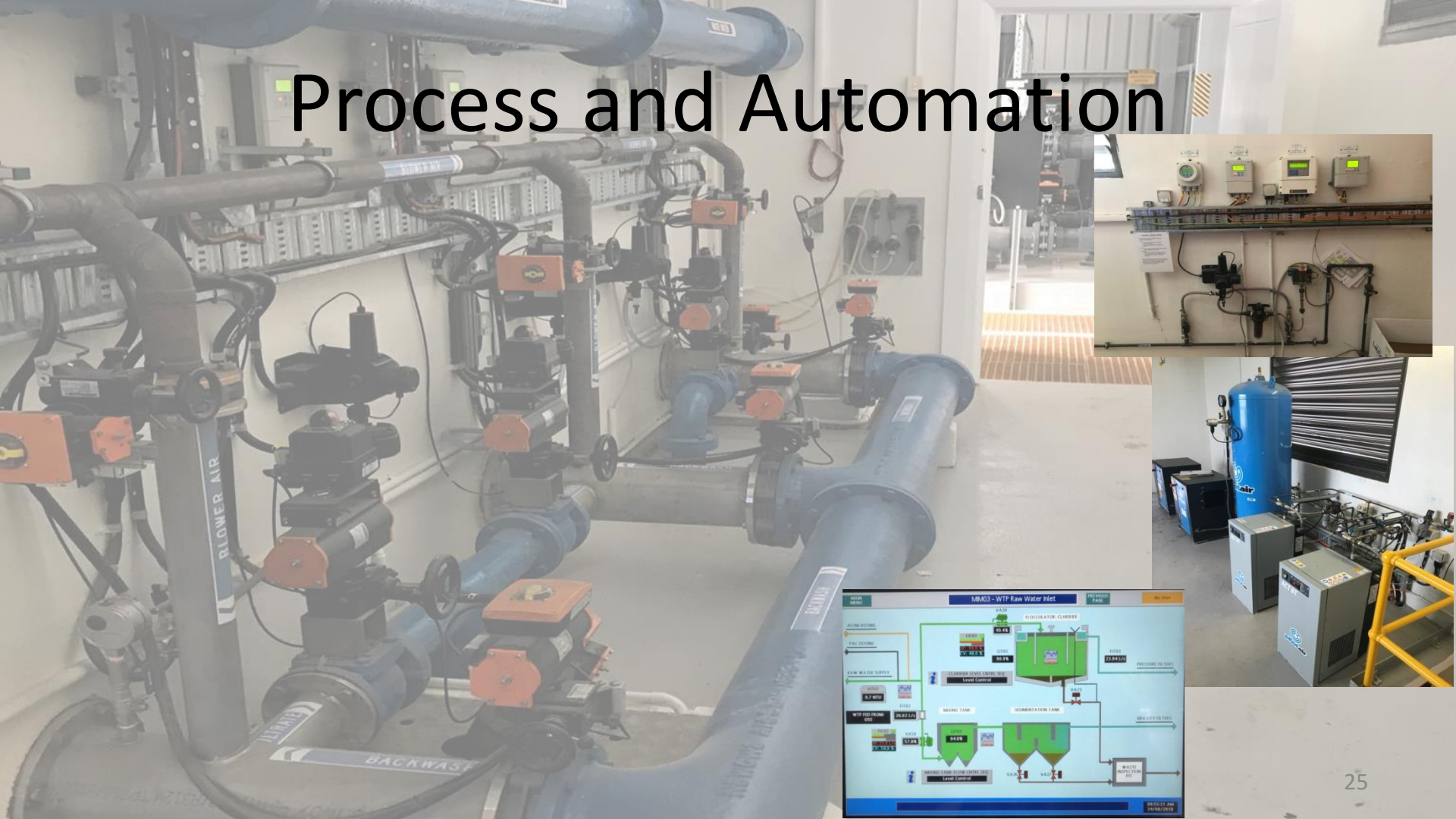
Clarifier



Other Before and After



Process and Automation



Other Innovations

- WTP waste water to sewer with pre-treatment via in-ground detention/sedimentation tank
- Raw water pump station conversion to allow dual pump operation and raw water turbidity monitoring and control
- Rising main creek crossing by underbore to eliminate in-stream timber trestle
- Renewable energy generation and demand management



Kyogle Water Supply Augmentation

VIDEO

<https://player.vimeo.com/video/272074352?autoplay=1>



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