Case Study: Smart Water for a Decentralised Wastewater Treatment & Recycling System in Australia

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Smart Water for On-site Wastewater Systems

- Economics are the key driver
  - Maintenance Company
  - Customer affordability
- Regulatory Requirements
- Technology must be robust & reliable
  - Calibration requirements
  - Outdoor/harsh environment
  - Staff training
  - Transmitting the information
Eco-development started construction in 2004
  Former sand mining lease (no extraction occurred)
172 Lots + community buildings & facilities
  Construction impacted by Global Financial Crisis
Managed by a Body Corporate
Decentralized water and wastewater system
Occupancy

- Occupancy is highly variable
- Large percentage of Holiday Homes and properties for short term rent/lease
- Permanent residents tend to be retired couples
- Very few families living within the development
- Peak periods for occupancy tend to be school holidays and long weekends
  - Christmas (Summer) and Easter
- Huge variations in wastewater flow during peak periods
- Cost of house rental tends to encourage large numbers of occupants
- Even permanent residents during peak periods tend to have increased occupants
- Water efficient infrastructure is an assistance
- 2018 average weekly wastewater production: 15,000 gallons
- 2018 Christmas/New Year week wastewater production: 56,000 gallons
  - Increases every year as new properties are built
Sewage Treatment Plant (STP)

- Batching Treatment Plant
- Original design from 2004 needed modifications
- Upgrades have occurred over time
- Each dwelling has a dual septic system
- Primary treated effluent is pumped into a pressure sewer line and delivered to a main pump station
  - Development is long and thin to take advantage of the sea views
  - No pump stations allowed next to the beach by Regulator
  - Wastewater pumped back over the ridge line to minimise spill risk to Great Barrier Reef Marine Park
  - 7 pump stations across the site
- Specialised treatment chain
Total Nitrogen
Biochemical Oxygen Demand (BOD)
Automation: SCADA

- Minimal Automation in all aspects of the engineered water cycle when treatment facility was 1st constructed
  - Relatively small number of dwellings meant that manual operating; particularly in a batching mode was more cost effective
- As the number of dwellings increased, this in turn, meant higher volumes of water and decreased time between batches
  - Increased labor cost
- Automation has been introduced into the engineered water cycle in direct response to labor costs in specific areas
  - Chemical Dosing
  - Potable Bores
  - Groundwater Top-Up System
  - STP Batch Timing
- The labor cost have been the same for the last decade (approx $65 000 USD/year) for the engineered water cycle even though water volumes have significantly increased
Interesting Wildlife at the Site
Very Good Fishing Spot