# **Affinity Water**

## INNOVATION & SMART WATER CONFERENCE

BIRMINGHAM 14<sup>TH</sup> MARCH 2024

AFFINITY WATER CASE STUDY SMARTER TANKS FOR A RESILEINT NETWORK

A 1<sup>ST</sup> ROUND IWC PROJECT

John Rumble Senior Asset Manager Affinity Water



### Innovation brief

## Smarter Tanks to Build a Resilient Network

## Optimising water storage to build a resilient network.



#### Supporting theme: Supply-side demand

Want to know more? john.rumble@affinitywater.co.uk

#### Challenge

Of wat

Transform Stream

**Bid winner** 

During the last 60 years the UK population has increased by 17 million and the average water consumption per person has doubled. That's why local water supplies sometimes struggle to meet demand during daily peak periods.

To address this, we need to use our local waterstorage infrastructure more efficiently; boost the capacity and resilience of our network; and improve the availability of local water resources when demand is high.





Aqua civits

#### Solution

We've teamed up with Exeter University and Aqua Civils to:

- explore the use of smart technologies to optimise water-storage capacity, maximise the available water supply before daily peak periods and minimise storage-tank refills during peak periods
- identify pilot sites to test the technologies in a real-world environment
- assess the suitability of tanks (for drinking water and for rainwater harvesting) as part of our company storage infrastructure capability
- consider enterprise development opportunities and how to incentivise producers, users and customers.



#### Outcomes

We will use the results of our Smarter Tanks to Build a Resilient Network pilot to examine the benefits, challenges and barriers involved in retrofitting remote technology control systems to optimise the storage of drinking water in urban areas.

We will produce a report summarising all our findings and may then look at applying the systems across our supply area.





## Who is involved?

**Main Partners** 



EXETER | Centre for Water Systems



**Project Steering Group Members** 











## **Project Overview**



- Application of Real Time Control (RTC) technologies on decentralised assets e.g. feeding tower blocks and rainwater harvesting tanks
- We will explore optimised control strategies for real-time topup control for two novel use cases 1) drinking water and 2) rainwater storage tanks.
- The project will develop a 'business model canvas, laying the groundwork for other companies or providers to adopt the concept if value is identified through successful proof of concept installations.





## **Hypothesis**

"Can real-time control using the IoT on break tanks and rainwater harvesting systems enable better efficiency and optimisation of supply during periods of peak demand through the utilisation of third party assets in conjunction with the wider water company network to reduce the impact on pressure and supply."





## **Main Project Stages**

- Explore the use of smart technologies to optimise water-storage capacity, maximise the available water supply before daily peak periods and minimise storage-tank refills during peak periods
- Identify pilot sites to test the technologies in a real-world environment
- Assess the suitability of tanks (for drinking water and for rainwater harvesting) as part of our company storage infrastructure capability
- Consider enterprise development opportunities and how to incentivise producers, users and customers.





# Key deliverables:

- Technology review and evaluation
- Business Model Canvas x2.
  - Rainwater harvesting.
  - Potable drinking water.
- Test sites aiming for two, one for each type of tank installation.
- Overall project report including analysis on scalability.





## **Blockages & issues:**

#### Business Model Canvas

- What problem are we trying to resolve?
- Who is the customer and where is the incentive for installation?
- Who benefits v who pays?

### Pilot Site Installation and Evaluation

- Tank assets not part of Affinity Water asset base
- Owned by third parties problems with identification of asset owners
- Impact of Covid access problems
- No viable rainwater harvesting sites within AW supply area

### Need for key partners

- Building Managers
- Developers





## Learning outcomes

- Technology exists, it is about how we use it and apply it.
- The need for key stakeholders to be engaged and working with water companies to apply these technologies.
- Easier to install at initial commission rather than retrofit.
- Tank sizes may be too small to have a significant effect in a supply catchment and will require mass utilization.
- May be useful for problem solving, test sites for have focused on local pressure problems.
- Not clear whether these installations can be integrated with wider control systems for water supply.
- Who pays for technology implementation and who manages it going forward.
- Needed more project time.
- Covid had a big impact on the project due to access to test sites.





# **AffinityWater**

# **Next Steps**



## **Recommendations**

## **Opportunities & further work**

- **Recommendation 1:** WSPs to explore the potential use of real time monitoring and control to understand customer demand patterns.
- **Recommendation 2:** WSPs to identify locations of decentralised assets such as drinking water tanks in high rise residential buildings and rainwater harvesting tanks.
- **Recommendation 3:** WSPs to install and pilot real time monitoring and control systems on decentralised assets within their operational area.
- **Recommendation 4:** WSPs to explore the requirement of formal agreements between the building management companies and the WSP for the installation, operation and maintenance of real time monitoring and control technology.
- **Recommendation 5:** WSPs to explore the potential use of IoT sensors for dual purpose of monitoring of water quality and water levels for real time control.



#### Innovation brief

# Water neutrality at NAV sites

Collaborating with NAVs to deliver water-neutral housing developments.



#### Challenge

Ofwat Innovation Catalyst

Stream Bid winner

Water companies in England have jointly pledged to reach net zero on operational emissions by 2030. It's a tall order, especially when you consider the additional water demand (and the consequent increase in operational emissions) that will be generated by new housing developments.

We expect new homes in our supply area alone to have increased the daily water demand by more than 83 million litres by 2032.

**107** tonnes of CO2e - we'll aim to save that amount each year

#### Solution

We collaborated with nine local 'NAVs' – companies that provide water and/or sewerage services to customers in specific areas within our region. We incentivised them to make all new homes in their area measurably water neutral.

A 30-month trial (around 3,000 new homes) is testing the effectiveness of three different approaches to reducing water use:

- 1. technology like using the latest rainwater harvesting techniques
- 2. behavioural change like households actively conserving water
- 3. a combination of both approaches.

#### 

#### Target outcomes

We aim to deliver the world's first water-neutral new development in collaboration with a NAV and to prove the technological, commercial and operational business case for it from both perspectives: water company and NAV. We will develop an evidenced, scalable plan [the Water Neutrality Blueprint] and share it with other UK water companies.

Frapeviner

112,000 litres of water

- we'll recycle that amount every year for each water-neutral home built

Supporting themes: Supply-side demand | Customer

Want to know more? victoria.nevin@affinitywater.co.uk





## **Key contacts**



John Rumble, Affinity Water Project Lead john.rumble@affinitywater.co.uk



Peter Melville Shreeve, University of Exeter Academic Lead <u>P.Melville-Shreeve2@exeter.ac.uk</u>

