



# AquaForm Water Infrastructure Platform

AquAffirm Limited

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## Introduction

The AquaFORM™ digital platform is a GIS<sup>1</sup>-enabled software tool that facilitates design, optimisation, real-time management, and visualisation of water infrastructure networks, offering significant usability and cost benefits to water utilities and other users both in the UK and internationally. Using advanced algorithms, a sophisticated user interface and interactive visualisation features, the platform can be customised to help our clients design and optimise new water infrastructure networks and assets. It can also be used to collect, analyse, and monitor data from our customers' sensor networks, helping systems to operate more efficiently and resulting in significant cost savings.

With features that have been successfully trialled in both Brazil and Bangladesh, this interactive, user-friendly digital platform provides an innovative, flexible tool for hydraulic and civil engineers and for large engineering consultancies developing master plans for new developments. AquaFORM is software for water infrastructure design and monitoring. The user-friendly digital platform enables engineers to design optimal water infrastructure and monitor its operation. Its advanced mapping, infrastructure modelling and real-time optimisation functionality provides the tools needed to create detailed 3D models of water infrastructure, with real-time CAPEX and OPEX calculations.

<sup>1</sup>GIS – Geographic Information System

There are a wide range of applications of the software including greywater system design, real-time water monitoring and optimisation of industrial effluent treatment systems. AquaFORM is built on a flexible software platform that can be reconfigured and optimised for new infrastructure projects.

## Software Platform Design

AquaForm is a software platform for water infrastructure projects. It is developed in C++ and OpenGL to provide high performance user interface software on Mac, PC, iPad, iPhone and Android. It contains a specially designed graphics rendering library that utilises the graphics processing unit to provide hardware accelerated rendering of complex 2D and 3D scenes. This enables the visualisation of extensive water infrastructure consisting of networks of thousands of pipes, buildings and water nodes. The platform also provides a user interface library that makes direct use of the graphics rendering to provide common user interface elements such as buttons, sliders and text boxes. By performing all rendering in a single unified environment, the platform provides unrivalled performance of combined 2D and 3D rendering of water infrastructure data. The platform also includes a custom mapping library for representation of Open Streetmap data in 2D and 3D, an optimisation module for realtime infrastructure optimisation and a 3D scene rendering library for visualisation complex 3D environments.

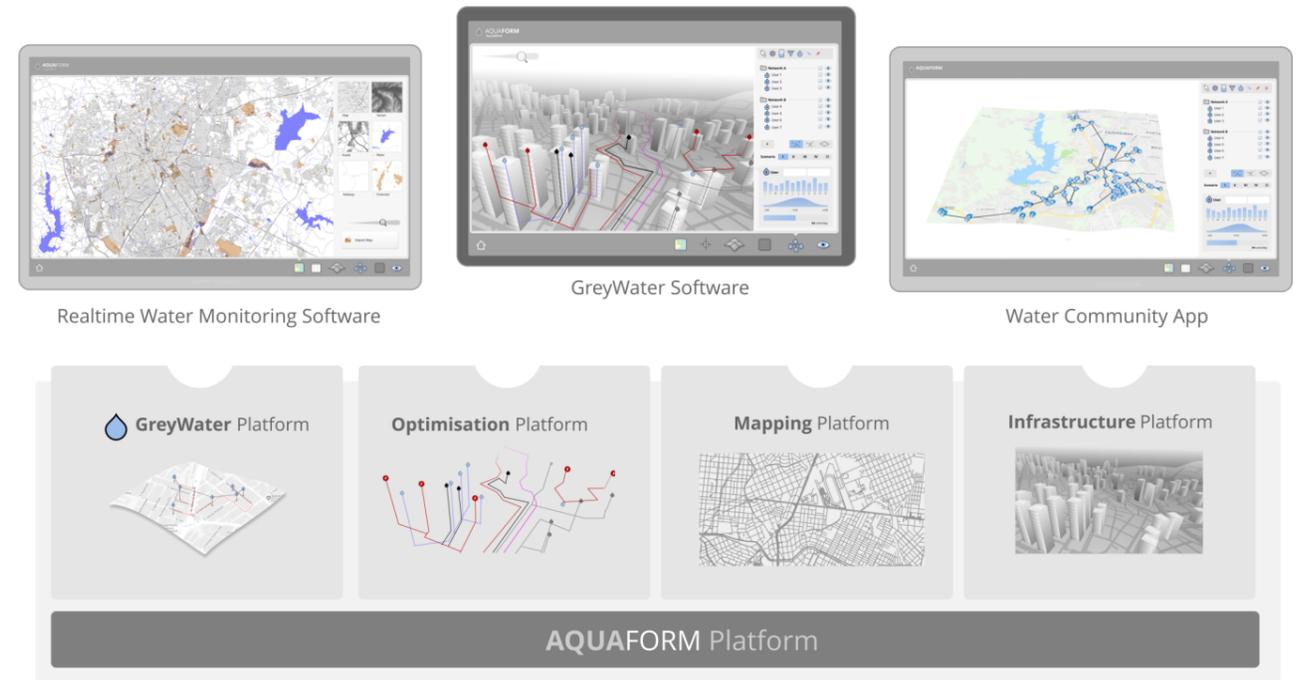


Fig. 2 - Schematic of the the AquaForm platform showing reusable components including the optimisation, mapping and infrastructure modules. The platform can be used to create a wide variety of water and infrastructure software solutions.

## Case Studies

In conjunction with project partners in Brazil and Bangladesh, we have developed three case studies utilising the AquaFORM™ Platform, as shown below:

### Case Study 3 Industrial Effluent Network

In collaboration with partners in Curitiba, Brazil, AquAffirm demonstrated the AquaFORM™ platform for optimising a network to treat industrial effluent most efficiently. Using AquaFORM's sophisticated modelling and algorithms, the team was able to optimise the treatment network for eight industrial facilities producing various types and concentrations of effluent.

### Case Study 1 Grey Water Network

The tool has been adapted from AquAffirm's proprietary AquaFORM-GW™ digital platform that facilitates planning, design, and optimisation of greywater (water reuse) systems and design of industrial effluent remediation networks. It was used to optimise a greywater system being proposed for Curitiba, Brazil. This tool is flexible and can be customised according to customers' needs, meaning they get a design that works specifically for their needs. It can also be used as a decision-support tool to encourage interest in greywater usage. AquaFORM has been used to create a detailed model for a proposed grey water system in Brazil.

### Case Study 2 Realtime Water Monitoring

In collaboration with partners in both Brazil and Bangladesh, we have demonstrated AquaFORM™ as a digital tool enabling mapping, visualisation, and monitoring of flow parameters and data from in situ/on-line sensors and point measurements. The cloud-enabled platform has sophisticated GIS-mapping and 3D visualisation capabilities for real-time data mapping and data analytics.

## Opportunities and Next Steps

Digital technologies like AquaFORM™ will make smart cities more liveable, sustainable, and prosperous in years to come. The concept of smart cities is gaining popularity due to rapid urbanisation and favourable government initiatives worldwide. Therefore, with growing urbanisation, the need to manage infrastructure and assets is prompting countries across the world to invest in smart city projects. Recent market forecasts predict spending on global smart cities will approach \$7 trillion by 2030, growing at a CAGR of over 24%. Furthermore, increasing investment in sustainable and green technologies like those that AquaFORM enables will further contribute to the adoption of these technologies by smart cities around the world. Our AquaFORM™ software will enable planners to design smart cities to optimise water management efficiencies, ensuring sustainability is at the forefront of design thinking.

Our AquaFORM™ software is also perfectly placed to make water recycling more efficient. Indeed, greywater systems like those that AquaFORM has been used to design can reduce water usage by up to 50%, representing tremendous savings for municipalities and other water providers. These recycle water from sinks, dishwashers, and wash basins for non-potable uses such as gardening and toilet flushing. AquAffirm is looking to partner with global players interested in sustainable solutions in the water sector.

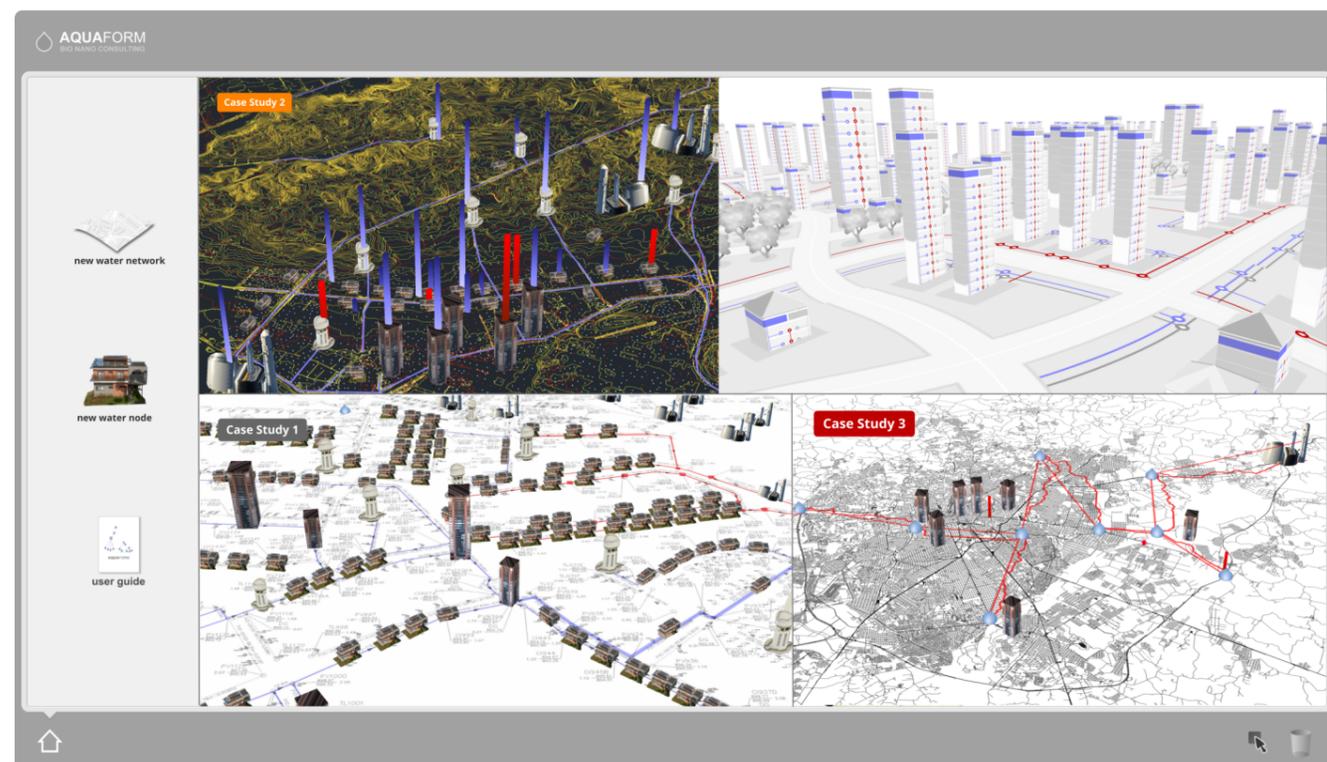


Fig. 1 - Screenshot from AquaFORM™ digital platform showing visualisations from the Grey Water Network, Realtime Water Monitoring and Industrial Effluent Network case studies.