

G-Cloud 15

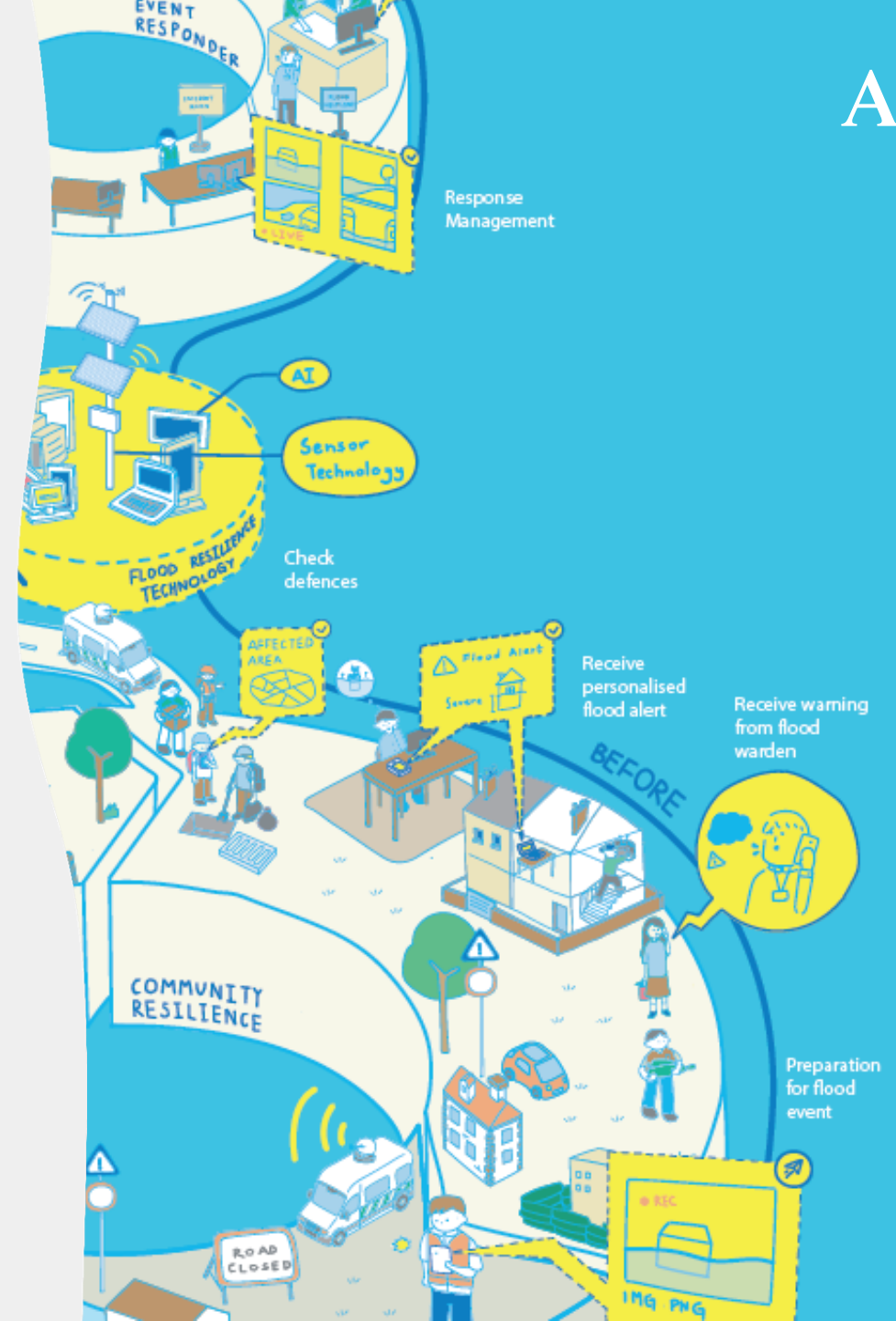
Digital water

G-Cloud 15
Service definition document

Our firm

Arup is a global collective of designers, consultants and experts dedicated to sustainable development, and to using imagination, technology and rigour to shape a better world

ARUP



Our aims

The aims and principles laid out by Sir Ove Arup in his Key Speech, continue to underpin our firm today

-  Social usefulness
-  Total architecture
-  Humane organisation
-  Straight and honourable dealings
-  Quality of work
-  Reasonable prosperity

Who we are

We combine digital expertise with market knowledge to advise on the role of digital and data in the built and natural environment

We deliver services and solutions that solve complex challenges for our clients



Our strategy

We work with clients, partner and practitioners who share our commitment to create a sustainable future for everyone



Our partnerships

From climate change to city resilience, our long-term collaborations help us to tackle some of the world's toughest problems



Some of our clients



Our G-Cloud 15 services

Digital service design and development

Discovery phase

Alpha phase

Beta phase

Digital Asset Information Management

Digital Strategy and Architecture

Built Environment Data Advisory

Digital Transformation

Digital Energy

Digital Water

Digital Transport

Experience Design

Digital for Sustainability

Digital Twins

Digital Planning

Co-Design

GIS (Geographic Information System)

Digital Water

Digital Water

Introduction

Arup works closely with colleagues in adjacent markets to leverage the best digital solutions, technologies and advisory services for our clients in the water sector.

The water sector has a significant role in driving a sustainable future across the built environment, which provides new challenges and interdependencies when operating and planning.

There is significant opportunity for new and emerging digital solutions to address these challenges. Advanced analytics and supporting capabilities can monitor complex systems at a scale that humans cannot, identifying trends, predicting outcomes and providing novel insights.



Increased system and problem complexity

The combination of data engineering, cloud computing capabilities and data science techniques has the unique ability to relate and analyse large complex data sets at scale.



Need to understand and react in realtime

Algorithms have the ability to identify and quantify trends and relationships across complex systems at a scale that humans cannot.



Need to plan for a resilient future

Machine learning techniques can be used to augment or replace traditional modelling methods to enable rapid analysis and iteration to model future scenarios with highly complex analytical and data requirements



Need for transparent, data driven decisions

Digital tooling, visualisations and explainability techniques can enable users whatever their digital maturity to interact with their data and make evidence-based decisions.

Digital Water

Service areas & offerings

Service areas



1 | BGI / NBS
2 | Nature Markets

Enhancing nature



3 | River Health
4 | Water Scarcity

Protecting water sources



5 | Water Networks
6 | Treatment Works

Managing water assets



7 | Flood Modelling
8 | Flood Management

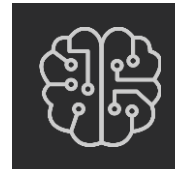
Improving flood resilience



9 | Digital Systems
10 | Digital Strategy

Digitising water

Service offerings



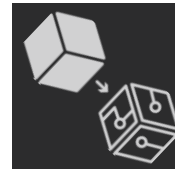
Digital advisory

Provide comprehensive strategic advice on the role of data and digital technology to support sustainable development and transformation.



Digital solutions & products

Combine domain expertise, digital and data to provide new higher-value offerings that support and enable our advisory capabilities



Digital twins

Use data throughout the lifecycle of the asset, process or system to derive insights & create inter-connected digital-physical systems

Digital Water

Tools, solutions and products

Tools solutions and products we offer include:

Terrain | Terrain is an Arup-developed machine-learning powered solution that helps better design cities, plan nature-based solutions (NbS) and improve biodiversity.

NatureInsight | A spatial mapping and modelling platform developed by Arup to identify opportunities for NbS and determining their costs and benefits.

SCALGO | SCALGO Live is a geospatial web-based tool for surface water planning, providing elevation data, land cover maps and surface water analyses. With SCALGO Live a user can map flow paths to explore surface water movements, explore flooded areas or identify impacts of sea level rise. (Client owned).

YARD | YARD is an Arup-developed AR tool for co-creating better public spaces. YARD engages communities in the process of designing and validating interventions such as blue-green infrastructure and SuDS.

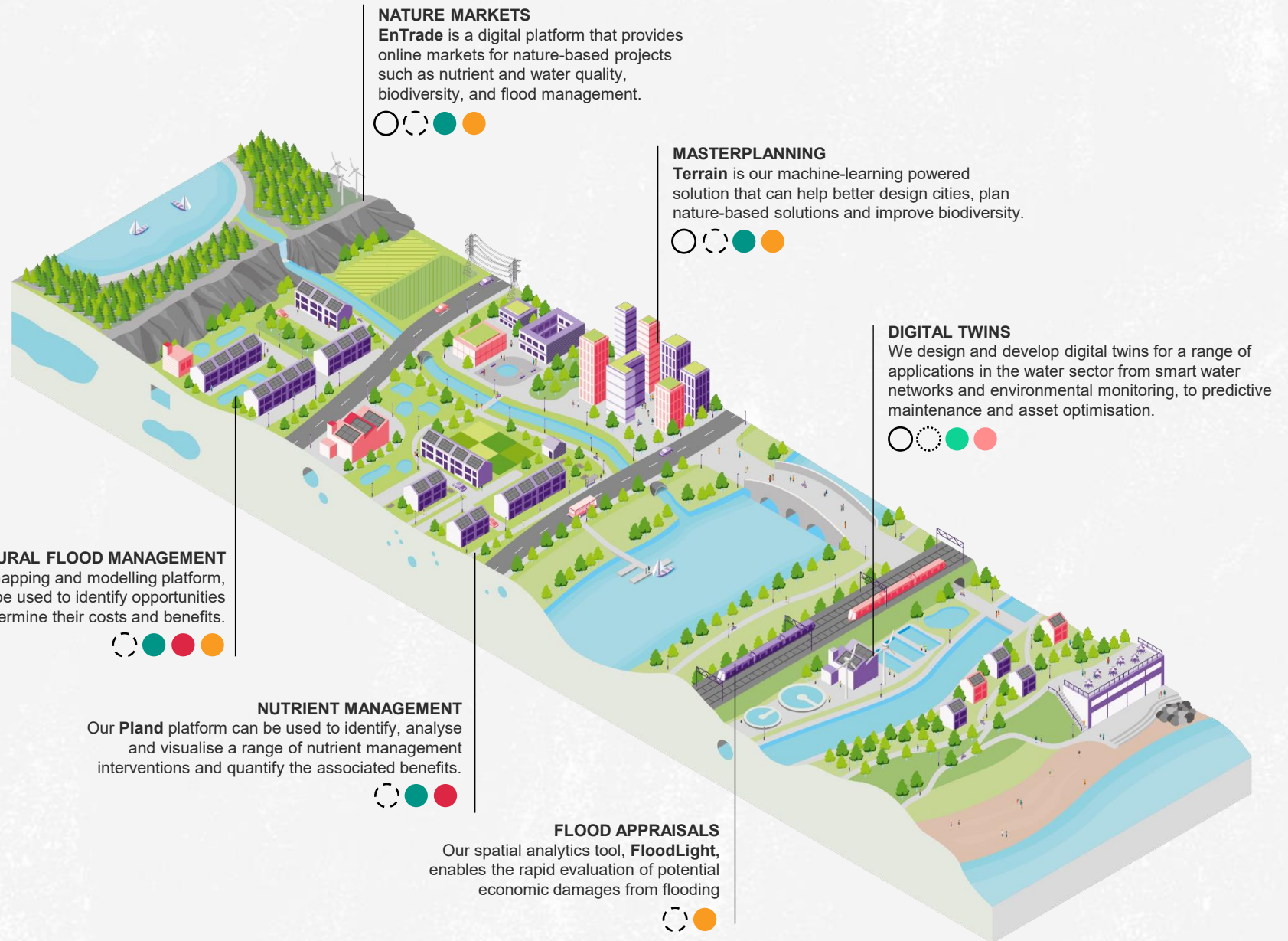
EnTrade | EnTrade is a platform that connects farmers and landowners with organisations that need to meet their environmental goals. It offers online markets for nature-based projects such as nutrient and water quality, biodiversity, and flood management.

Infotiles | Infotiles is a platform that offers AI-powered solutions that provides insight into water systems, helping cities and utilities become more sustainable. Infotiles has been supporting clients with support on managing water across the catchment, from predicting flooding, managing water ingress and predictive maintenance of assets.

FloodLight | Arup's in-house spatial analytics tool that enables the rapid evaluation of potential economic damages from flooding.

PLand | A digital platform developed by Arup and United Utilities for identifying, analysing and visualising a range of nutrient management interventions across a catchment and quantifying the benefits that could have a positive impact on water quality and the wider ecosystem.

What we offer



Features

Features

- Holistic approach underpinned by Water and Digital expertise
- Digital advisory, consulting and transformation to guide organisations in harnessing digital tools effectively
- Breadth of digital expertise including data modelling, data science, solution architecture and UX/UI
- Data insights and data governance to transform raw data into actionable insights in a sustainable and scalable way
- Digital Asset Management informed by right-time monitoring and analysis improve asset performance over their entire lifespan
- Digital tool development and deployment specifically focused on core needs and informed by water domain knowledge
- Our multidisciplinary expertise allows us to tackle complex challenges combining analytics, automation, digital creativity, and emerging technologies

Benefits

Benefits

- Managing aging Infrastructure – through extending asset life, minimising operational costs and improving environmental outcomes.
- Improving the quality of water – through monitoring and improved modelling, predicting water quality outcomes.
- Becoming resilient to climate change – increasing flooding and drought is causing regular infrastructure failures that are mitigated and planned for.
- Meeting increased demand – ensuring levelling up and managing the increase in demand from new housing and commercial businesses
- Responding to new legislation – helping clients to plan for political instability and the uncertainty in new investment requirements



Unpacking the challenges

What is bringing housing and water together?

Systemic risks such as extreme weather patterns, loss of biodiversity, relentless resource depletion, economic inequality and lack of affordable housing – just to name a few – affect every industry. These growing interconnected risks and liabilities cannot be addressed and managed by siloed thinking and isolated operations. They are an opportunity for collaborative action that unlocks cost efficiencies and maximises benefits.

Enabling Water Smart Communities

Anglian Water, United Utilities and Thames Water

Exploring the relationship between integrated water management and practices and housing development

Arup is the delivery partner to design and deliver a whole new model for creating water smart communities. This whole project created the design structure to transition to a new model for allowing the wholesale adoption of Integrated Water Management

[Enabling Water Smart Communities \(EWSC\)](#)

Smart Sewer Networks

Welsh Water

Using ML to optimise interactions on the sewer network to reduce sewer overflows

Cardiff's wastewater infrastructure faced the pressing challenges of aging infrastructure, increasing rainfall and the need to increase available housing stock in the city all while reducing sewer overflows.

We took an integrated catchment approach, combining domain knowledge with cutting edge digital approaches. This solution optimised the network to minimise flood risk and impact on the Bathing Waters. We have also increased the capacity of the network to allow for 25,000 new homes.



NatureInsight
Arup x SCALGO

Mapping and modelling nature-based solutions

Our planet faces the existential and very real threat of a warming climate alongside a catastrophic loss of biodiversity and species.

Nature-based Solutions (NbS) offer relief from these threats, with the potential to mitigate climate change, adapt to extreme events and provide restored and new habitats for plant and animal species. Planning and designing NbS can be complex and there are few established methods to enable greater uptake at the speed and scale required to combat climate change and biodiversity loss. We need proportionate and accessible tools to enable early exploration of NbS so that benefits can be identified, costs estimated, stakeholders can be brought together, landowners can be engaged, and funding can be obtained.

NatureInsight is a spatial mapping and modelling platform for identifying opportunities for NbS and determining their costs and benefits using a variety of spatial datasets.



Terrain

Water utilities, planning authorities, NGOs

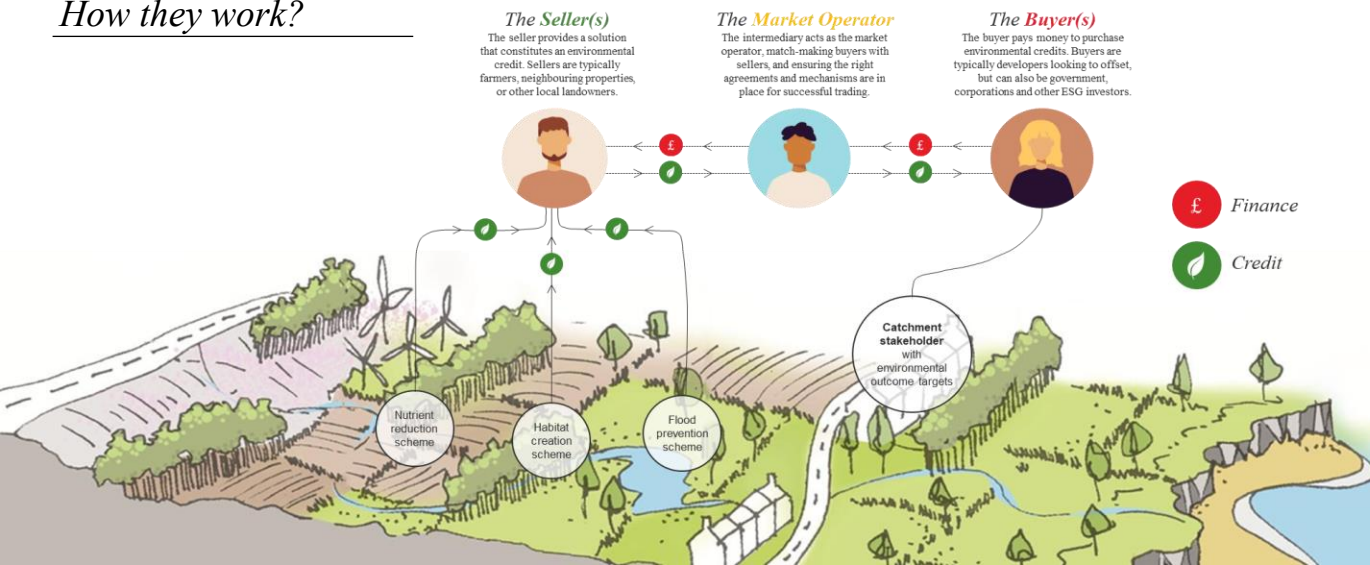
Using AI/ML to identify opportunities for nature-based solutions at scale

The sheer level of impact human beings are having on our environment demands analysis tools equal to the task. Deforestation, flood risk, overdevelopment, loss of biodiversity – these problems grow unnoticed, threatening the planet's future and our own. Arup has developed a new solution that can help planners and authorities to understand how land is being used, bringing the power of data analytics, machine learning and automation to satellite imagery. Terrain, our land use analysis solution brings new insights to the site planning process at the start of the project. It establishes the risks and opportunities, the realities and implications of a proposed scheme, allowing clients to test different ideas and explore future scenarios, with predictions about future changes to an area or district. It brings an outcome-led design rigour to the masterplanning process.

Where they are?



How they work?



Nature Markets

Local government, national government

Digital solutions to enable for nature markets

Catchment markets provide a huge opportunity to address many of today's most pressing environmental issues – greenhouse gases, biodiversity loss, pollution, flooding, water quality, and environmental degradation – by providing an innovative approach of leveraging funding for environmental conservation on private lands. We have helped to design and establish a number of catchment markets in the UK in which landowners sell nature-based projects in the form of 'credits' to buyers such as developers, helping them to achieve their environmental offsetting targets or other ESG commitments. Someone in the middle acts as an intermediary or 'Catchment Market Operator', helping to broker the deal and making sure everything else is in place for successful trading. Through demonstrable pilot projects, our work has demonstrated that nature-based solutions can provide a transparent, fair and efficient way of addressing various environmental issues and unlocking development.

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uk.procurement@arup.com