



Global Water Annual Review

2013/14



We shape a better world

www.arup.com/water



→ Foreword	03	→ Regional activity updates	18
→ Market overview	04	→ Projects	20
→ Design with Water	05	→ Water facts	32
→ Social impact	06	→ Water: commodity or human right?	33
→ Year in review	09	→ Our services	34
→ Research Review and Roadmap	17	→ Contacts	35



Foreword

April 2014

Access to water and sanitation is a fundamental human right. This has been recognised by the United Nations¹. Our role in improving people's access to water and sanitation, the quality of water they drink or their resilience to extremes in weather, is fundamental to Arup's role in 'Shaping a Better World'. Our 10 year target is to help more than half a billion people and we are already helping over 163 million people through our work across the water cycle.

It is important to recognise that four of the ten most significant risks likely to affect the world in terms of likelihood and impact are water-related². In managing these risks we need to better understand the "food, energy, water" nexus; we need to respond to the challenge posed by population growth and urbanisation on our existing assets; and we need to recognise the increased dynamic of a changing climate across the world.

Water is therefore a key focus area for Arup and in this context 'water' means water-related issues across the whole water cycle. We strive to lead thinking and work with the best clients, partners and experts in the world to develop sustainable, resilient and appropriate solutions to the context of these challenges. Whether through horizon scanning, research, planning or delivery, we seek innovative, creative and practical ways to work better, help others and continuously improve our understanding across the water cycle.

Mark Fletcher
Global Water Business Leader



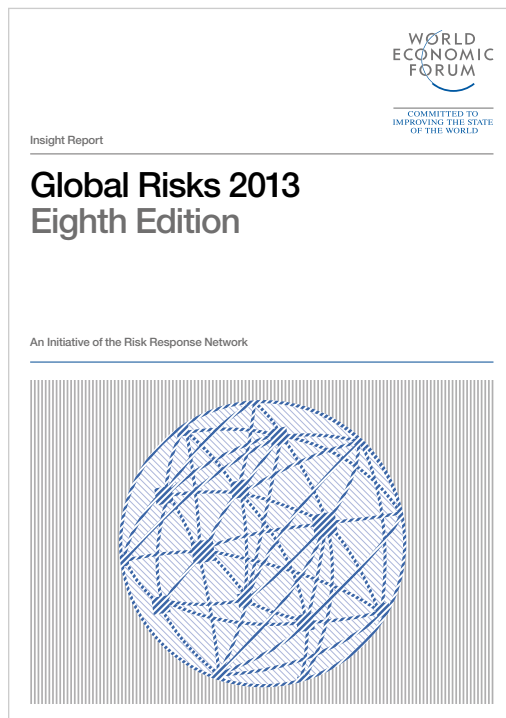
¹ Source: Resolution A/RES/64/292. United Nations General Assembly, July 2010
² Source: Global Risks Report, World Economic Forum 2014



Global Water Market

While water’s immediate impacts are often local, water security is now recognised as a systemic global risk. All countries whether developed, developing or emerging, must be aware of the whole water asset if they want long term economic prosperity. Water security is vital to achieve this. Whether prone to flooding or in a water scarce region, understanding the source, quality and volume of water that has to be managed and regulated, now and in the future, is vital.

Successful water management needs the cooperation of a wide network of water users, public and private institutions. Because of the systemic importance of water for global economic activity, any failings in its planning, management and use in one country can ripple across the world.



Ten global risks of highest concern

The World Economic Forum [Global Risks 2014 Insight Report](#) identifies Water Crises³ and Extreme Weather Events as two of the ten global risks of highest concern, with Water Crises listed third. In fact, four (possibility even five) of the ten most significant risks likely to affect the world, in terms of likelihood and impact, are water-related.

No.	Global Risk	
1	Fiscal crises in key economies	
2	Structurally high unemployment / underemployment	
3	Water crises	
4	Service income disparity	
5	Failure of climate change mitigation and adaption	
6	Greater incidence of extreme weather events (eg floods, storms, fires)	
7	Global governance failure	
8	Food crises	
9	Failure of major financial mechanism / institution	
10	Profound political and social instability	

Source: Global Risks Perception Survey 2013-2014.

3 Water crises definition: A significant decline in the quality and quantity of fresh water combines with increased competition among resource-intensive systems, such as food and energy production.



Design with Water



by Michael O'Neill (Melbourne)
in our @4 publication

A Design with Water approach recognises the need to change the way we live within our constraints and leverage the full benefits of taking a whole of water cycle approach to water management. At its core, the process is about reducing risk, increasing resilience and perhaps most importantly making better, healthier places and improving the local environment. This can be achieved through the reintegration of catchment-scale water management with urban planning and landscape design.

[Read the full article](#) →

Our work across the water cycle

By understanding and influencing the whole water cycle, Arup has developed particular expertise that enables us to assess risks and support our clients in taking a strategic approach to water management – as well as minimising mankind's impact on the environment. We provide services across the water cycle, addressing issues relating to resilience, flood risk, water supply and wastewater treatment through sustainable and innovative planning, design and delivery.



Main Outfall Sewer, Melbourne, Australia

Breathing new life into a 27km corridor of land, the Main Outfall Sewer project in Melbourne has helped client Melbourne Water develop a vision for a multifunctional community space.

[View the animation](#) →

Password: "arup1".



The impact of the a changing climate on the water cycle is a major challenge in the 21st century

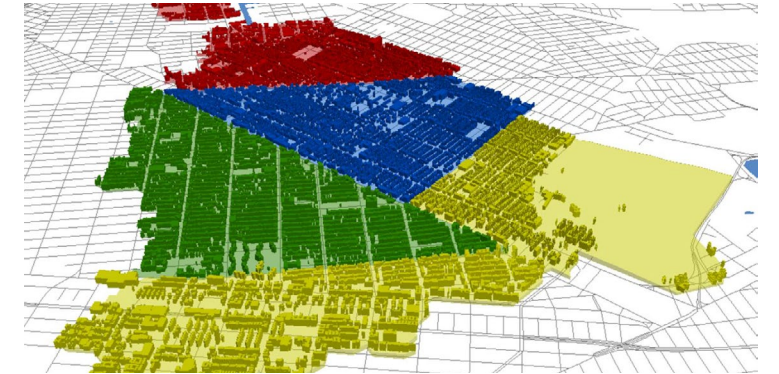
Mark Fletcher



Water Sensitive Urban Design, UK

Arup was lead consultant and co-author of the Construction Industry Research and Information Association's (CIRIA) [Scoping Document](#) for Water Sensitive Urban Design (WSUD) in the UK. An animated version of the report won a [Sustainable Water Industry Group \(SWIG\) Award](#) in the Communications Category. The film explains brilliantly, in less than five minutes, how designing 'with' water can reduce risk, increase resilience and make better, more sustainable places. It was commissioned by the Landscape Institute and CIRIA, and based on work by CIRIA, Arup and AECOM.

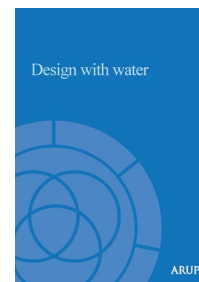
[View the film](#) →



New York City Economic Development Corporation (NYCEDC) Green Infrastructure Design, USA

The NYC Department of Environmental Protection (NYCDEP) are leveraging the use of green infrastructure to reduce combined sewer overflows, and to meet and exceed the water quality standards of New York City's waterways. The NYCEDC will be managing the process for NYCDEP to achieve the goals in the NYC Green Infrastructure Plan. We completed the site selection process and developed design/construction plans to retrofit the public ROW with 578 'Bioswales' or 'Stormwater Green Streets' within 531 acres of the Newtown Creek watershed in Brooklyn, NY.

Read our Design with Water booklet:



UKMEA

Australasia

Americas

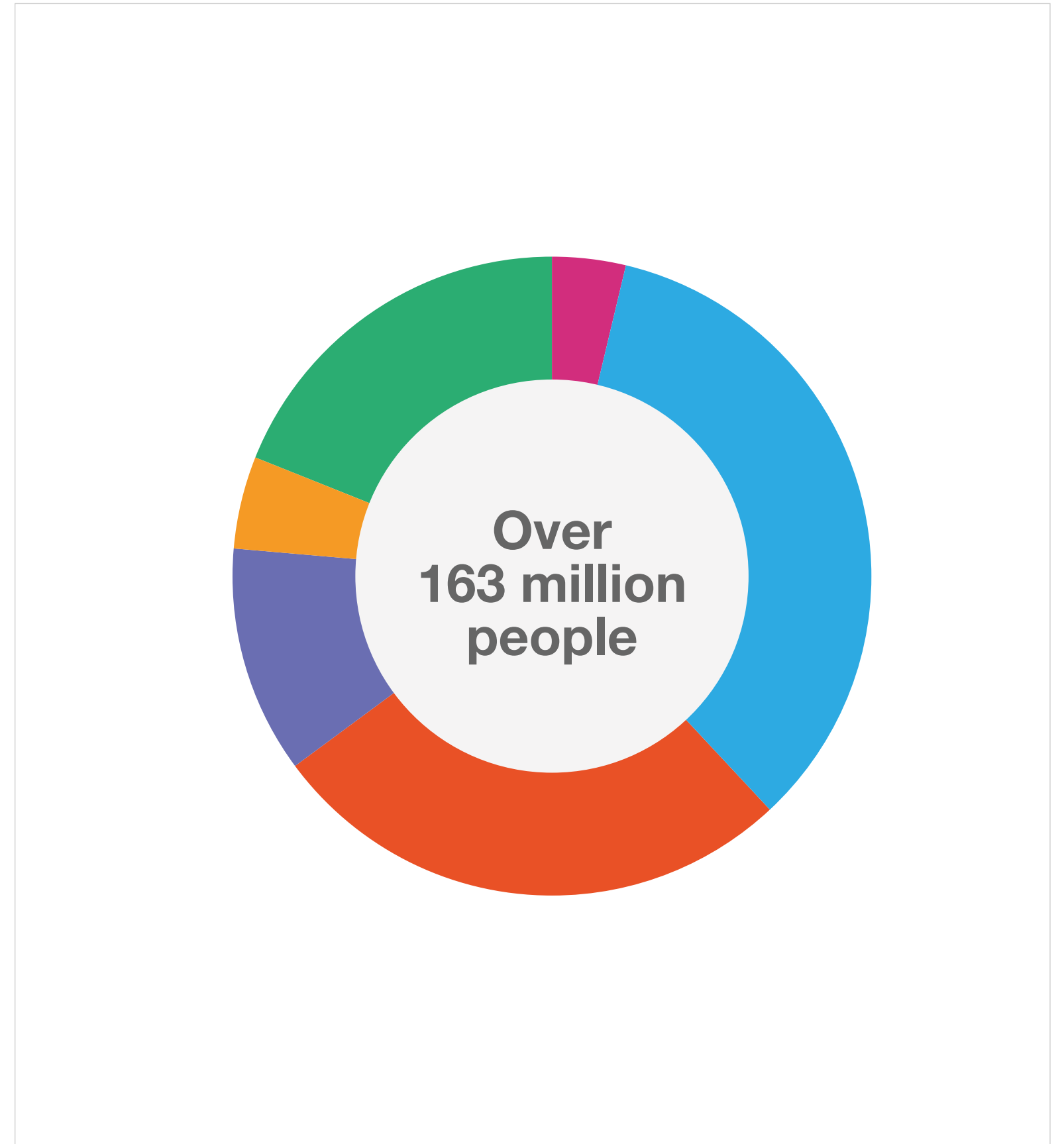
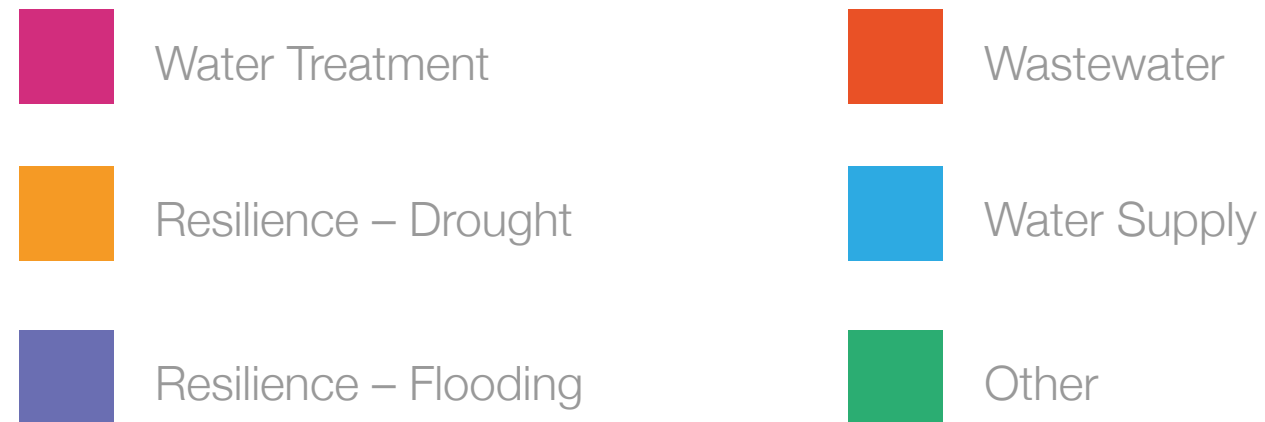


Social Impact

The benefit to people from our water activity during 2013-14 measures more than **163 million** people around the world.

We aim to shape a better world for over 500 million in the next 10 years.

Social benefit by category





Impact in the community



Walk 4 Water and World Water Day

Our Australasia region supported WaterAid's 'Walk 4 Water' campaign, which coincided with [World Water Day](#) on 22 March. Each team member walked 10,000 steps a day for five days to raise awareness and much needed funds to help transform lives by improving access to safe water, sanitation and hygiene in the world's poorest communities. Arup matched the \$3,000 raised by staff, to a total value of \$6,000.

[Sponsor our Walk 4 Water Team](#) →



[Watch Water4Water Video](#)



Nelson Mandela once said 'let there be work, bread, water and salt for all' – a simple, yet powerful message that it is still relevant. Walking 10,000 steps a day was a great reminder of how easy it is to take water for granted and to reflect on those less fortunate. If in some small way, we have helped to improve access to safe water, sanitation and hygiene for the developing world, then every step was worthwhile!

Sarah Booij
(Brisbane), Arup



Pro-bono work helping tsunami stricken citizens Kathirweli Tsunami Recon Phase 2, Sri Lanka

This second stage of a two year project in the region, which we aim to continue from the previous year, will focus on undertaking specific hydraulic analysis and implementation of practical solutions. Arup, in collaboration with EWB, aims to improve on the living conditions of the locals living in the areas that are affected by civil wars and the 2004 tsunami. It is the overall aim of this project to provide a reliable water supply for household use and irrigation source. This will support a struggling agricultural industry as well as to introduce new local capacity in terms of alternative or supplementary livelihoods. This will work to alleviate the local poverty rate, improve the living standards as well as aid in the growth of the local economics. The project also aims to repair the existing dilapidated flood mitigation and water storage infrastructure so that the community will become stronger and less vulnerable to climate fluctuations. These facilities will not only protect the various interest and livelihoods of the community but aid to improve the local environment against natural disaster such as flooding. Education on systems will be provided so that the stakeholders can enact and adapt themselves through knowledge transfer and capacity building.



We said thank you on World Toilet Day

Officially recognised by the UN, [World Toilet Day](#) raises awareness of the struggle faced by the 2.5 billion people currently living without access to a safe, clean and private toilet. 25 years ago we flushed between 7.5 and 9 litres of water; now we have 6 litre and dual flush, and are also substituting mains-supplied water with rainwater and greywater. Perhaps a step change is required. Arup is working with the inventor of an innovative toilet that flushes at 1.5 litres or less which uses air to assist the flush; We have also worked on a 'universal connector' so that it can be retrofitted on existing drainage systems.

[Find out more](#) →

Impact in the community (continued)



Mae Tao Clinic, Thailand

The Mae Tao Clinic is a free clinic in Northern Thailand, near the border with Myanmar, which has been serving vulnerable and displaced Burmese populations for over 20 years. The clinic is relocating to new premises due to increased rental costs. Overall design of the Clinic has been undertaken by Agora Architects, and Arup is working with the Mae Tao Clinic, Agora Architects and Suvannimit Foundation. The proposed (and partially constructed) new clinic design includes a plumbed sanitary system discharging into a series of tanks (referred to by Agora as septic tanks) from which they hope to ultimately pipe the treated overflow effluent to the nearest river. Our aim is to advise on the best sanitation solution given the site constraints (the site floods, the ground is very clayey and offers little absorption, the river is a fair distance away and across a small valley, we don't want to pollute any water sources, there is limited budget).

Future Relief Worker Scheme

When disaster strikes, it takes a coordinated effort of skilled people to help relieve the resulting human suffering and begin the rebuilding process. For 32 years, we have worked with the RedR family to equip engineers and other professionals with technical skills for disaster relief. Through the partnership, Arup staff in their early careers are eligible for the scheme, a three to six month placement on a humanitarian project in a developing country. The scheme aims to provide staff with the overseas experience needed to work in post-disaster situations. Over the past two years, five of our staff have participated in the scheme.

Uganda

Sandra Diaz (London) spent six months in Uganda in 2012 working with the charity African Village Support. Her work expanded on the Bulambuli district WASH programme which aims to improve water supply, hygiene and sanitation in an area where people were walking up to half an hour to get water from a contaminated source. Sandra faced the challenge of working with limited technical resources, being the only skilled engineer working for the charity at that time and her role involved training local workers to continue the programme after her placement ended.

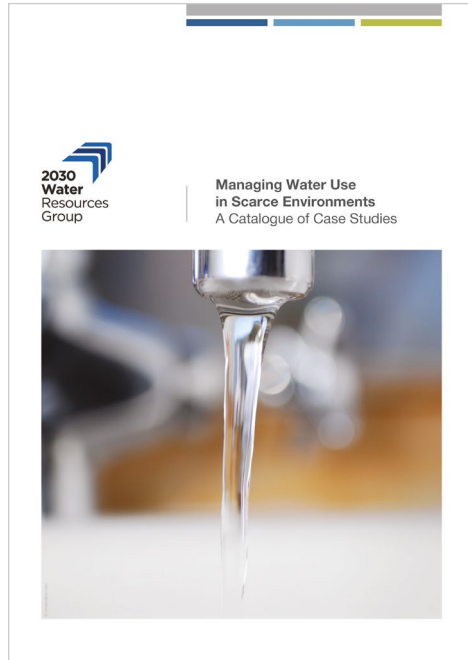
Mexico

Javier Sierra (Cardiff) took part in a three month placement in San Miguel de Allende, Mexico, working with the Centre for Appropriate Technology and Indigenous Sustainability. He worked on projects which improved access to safe water for rural communities. His activities ranged from building an incubator for micro bacterial testing in water to developing workshop materials for rural communities on contamination and hygiene techniques.





Year in review



World Water Week and launch of the 2030 WRG Catalogue, Stockholm

Hosted and organised by the Stockholm International Water Institute, World Water Week took place in September 2013. Members of our water team attended and presented in support of the launch of the 2030 Water Resources Group (WRG) - [Managing Water Use in Scarce Environments Catalogue of Case Studies](#).

On behalf of WRG, we researched and analysed over 40 case studies worldwide across the agricultural, municipal and industrial sectors. We also developed an innovative assessment framework which enabled us to define impact on basin level water resources, each intervention is also quantified and estimated cost per cubic metre of impact is provided.

[View the catalogue online](#) →



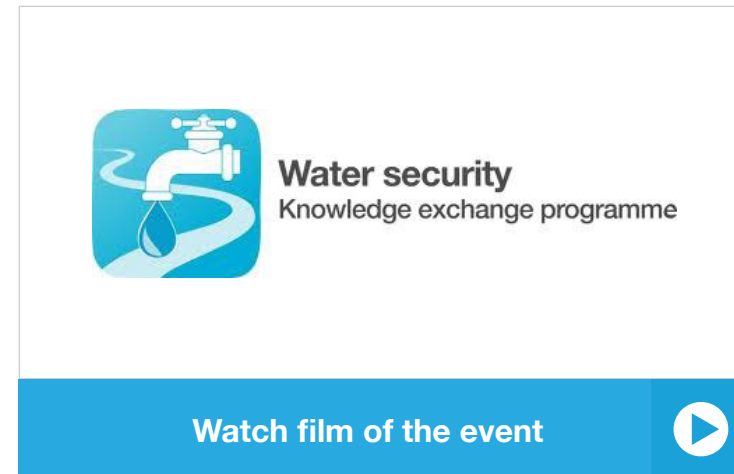
Water Technologies Conference and Exhibition, Israel

In October 2013, members of our water team from around the world attended the Water Technologies Conference and Exhibition ([WATEC](#)) in Israel. At the conference Mark Fletcher (Global Water Leader) presented on the role that design engineering consultancies play in rolling out innovation across major global infrastructure projects, and shared his thoughts best practice water treatment centres. Arup also hosted a number of Israeli clean tech companies in Sydney in September in the lead up to WATEC.



Global Water Summit, Paris

Our Water Executive attended the [Global Water Summit](#) organised by Global Water Intelligence in April 2014. Held in Paris, theme was growth, acknowledging water's key role in economic recovery and the opportunities for business development as we move towards 2050. The summit brings together water leaders and high level delegates from around the world and the strong Arup presence allowed us to contribute to and influence the conversation on key challenges.



Water Security Knowledge Exchange Programme, London

In November 2013, Mark Fletcher spoke at the Natural Environment Research Council Water Security Knowledge Exchange Programme ([WSKEP](#)) Reception. The theme focused on improving resilience of businesses to water-related risks. Guests comprised of MPs with an interest in water, Chief Executives from a wide range of industries, UK Water Research and Innovation Partnership representatives and over 110 other delegates. WSKEP aims to accelerate the uptake of research by businesses and regulators to help ensure sustainable use of water resources now and in the future.

[Watch film of the event](#) ▶



Year in review (continued)



Arup Design Book – 50 design questions answered
Our latest Design Book was released in September 2013 and features Bradford City Park, La Mesa Water Treatment Plant in Manila, Mallow Flood Relief Scheme in Ireland, Melbourne Park Stormwater Harvesting Scheme and the ecosystem services valuation framework for the Humber Estuary amongst 50 of the firm’s finest projects. The book explores the value of great design and some of its impact on the end users of buildings, urban spaces, and improvements to the natural environment across the water cycle. It includes contributions from some internationally-renowned commentators such as Boris Johnson (Mayor of London), Girish Menon (WaterAid Director of International Programmes) and Nancy Kete (Managing Director of the Rockefeller Foundation).

[Get the Design Book](#) →



Out of the Blue - Social and natural capital knowledge catalyst
On 14 April 2014, we launched our ‘Out of the Blue: new thinking on water, social and natural capital’ publication at an event in London. This knowledge catalyst looks at the future of water and how social, environmental and economic factors can be better understood and valued. It brings together new thinking across sectors and disciplines and from around the world, with knowledge/thought leadership pieces by senior figures and policy experts from NGOs, academics, agencies, businesses and Arup itself, with each contributing a piece on new thinking or practice. Contributors include Lord Chris Smith (Environment Agency Chairman), Mark Fletcher (Arup Global Water Leader), Stuart Orr (WWF International), Anders Berntell (Executive Director of the 2030 Water Resources Group) and Professor Peter Guthrie (Cambridge University) amongst others.

[Download Out of the Blue](#) →

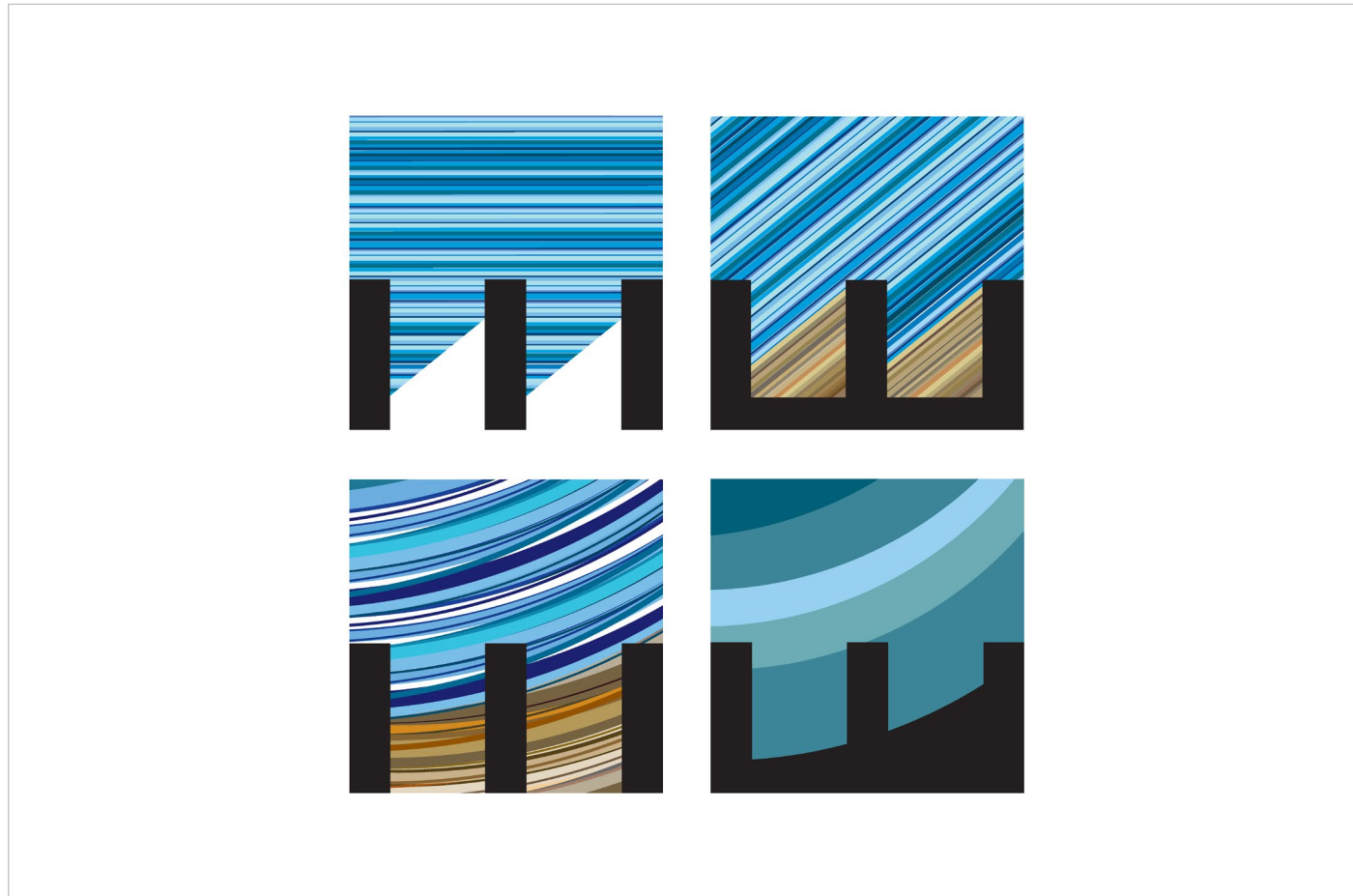
Pinsent Masons

Wet Networks event series connects innovators with investors, London

As technology and engineering partner, Arup co-hosts a water technology innovation event with Pinsent Masons three times a year. This technology innovation event provides a platform for young companies with interesting technology innovations in the water space who are looking for funding to present to potential funders and other interested parties.

The Wet Network events also provide a medium for networking and exchange of ideas between senior players in the water technology space. Ideas from the most recent event on 26 March 2014 included an efficient shower device, a novel grey water recycling system, and a low-cost ultrasonic sewer condition survey solution. We are collaborating on a number of the water solutions under development.

Year in review (continued)



Water cycle artwork by Ian Mitchell

As a creative firm, Arup commissioned Yorkshire artist Ian Mitchell, to explore the water cycle. He uses abstract reduction to represent the variability in flow, sources, quality and energy of water.

[Watch Mark Fletcher's interview with artist Ian Mitchell](#) →



Conservation International collaboration

Arup has joined the [Alliance for Global Water Adaptation](#) (AGWA), which is a global collective of funding banks, government agencies, NGO's, research organisations and private sector multi-nationals with an interest in consolidating and sharing experience of climate change adaptation and resilience in the water sector. AGWA is co-chaired by the World Bank and [Conservation International](#), an American based non-profit organisation with conservation field programmes in various parts of the world, but also with a strategic approach and contacts to influence water policy and direction.

We have developed some shared project ideas and a Memorandum of Understanding with Conservation International following their interest in our “Design with Water” approach, to address sustainable and resilient water themed design that is aligned with, and supporting other socio-economic and environmental drivers, to deliver more secure outcomes through achieving multiple wider benefits. We have created a prospectus of potential collaboration themed around water sector climate change. The coverage of scope and geographies is broad, with projects in Asia, Africa and South America, it is an exciting mix which draws on Arup's global reach and water skills base.

[View the prospectus](#) →



Year in review (continued)

Martin Shouler



EcoBuild, London

In March 2014, Arup presented new thinking in water at Ecobuild. Martin Shouler (London) presented on integrated water management, which included recent work on water re-use networks sponsored by the UK's innovation accelerator - the Technology Strategy Board. Justin Abbott (Leeds) presented on the relevance of water sensitive urban design to the challenges facing our cities, referencing our international experience and the research we led for CIRIA (Construction Industry Research and Information Association) in the UK. Paul Simkins (Leeds) presented on historic and current perspectives on water, green infrastructure and urbanism.

Paul Simkins



Justin Abbott



Drainage Services Department Open Day 2014

We recently supported one of our major clients, Drainage Services Department (DSD), as they hosted their annual Open Day at the Shatin Sewage Treatment Works. This year's event marked the 25th anniversary of DSD and was attended by over 11,000 people. In recognition of our established working relationship with DSD, Arup was invited to host a trade partner's booth, demonstrating the innovative work we have been undertaking with DSD. Our booth highlighted:

- The use of Building Information Modelling (BIM) in the Pillar Point Sewage Treatment Works design; and
- The rural flood risk assessment and floodplain management methodology we have developed and applied in the River Flood Risk Studies.

An interactive BIM model for the Pillar Point Sewage Treatment Works was set up in the booth, which allowed users to navigate the Sewage Treatment Works site complex in a simulated environment. Our involvement with the DSD Open Day was very successful, providing an excellent opportunity to strengthen our existing relationship with an important client, and demonstrate our innovative work to DSD, other technical trade partners and the broader public.

Kenneth Kwok (Arup) receives a "Certificate of Appreciation to Trade Partners" from Mr. Chan Chi-chiu, Director of DSD



Kids showing keen interest in the interactive BIM model for Pillar Point Sewage Treatment Works



Director of DSD, Mr. Chan Chi-chiu, visits the Arup booth



IPPF/ PowerGen Asia

In 2013, the Independent Power Producer's Forum, a global non-profit industry support organisation mandated by its members to work toward best practices in the Power Generation industry across the Asia / Pacific region, set up its water chapter, which is aimed at focussing on strategic water issues faced in the Asian power sector. Arlene Goode (Hong Kong), as founding chairperson of the chapter, has been connecting with the power and industrial sectors and promoting the issues and potential solutions. As a result of this, she was endorsed onto the board of advisors for PowerGen Asia 2013, one of the largest regional power sector conferences, which was held in Bangkok, for the inaugural "Industrial Water Day" and chaired the first session on "Regional Spotlights". She has subsequently been invited back onto the board for 2014 and specifically advises the organisers on issues being faced in the power sector.

Arlene Goode



Year in review (continued)



ECCP Water Forum (European Chamber of Commerce of the Philippines), Manila

At the Water Challenge Forum in Manila on 8 November 2013, we presented a paper entitled ‘Total Water Management; an integrated design approach to maximising water efficiency’. The event was set up to promote the issues currently being seen by the Philippine water sector as it tries to expand and grow to meet the challenge of providing the country with clean water, sanitation services and flood management in an integrated, sustainable and affordable way. Our paper showed, with the use of case studies, how the complete water cycle can be considered to provide solutions which minimise water use and therefore cost, at a building, development and urban scale. This forum allowed us to show how sustainability can be incorporated into the complete water cycle and how Arup can transfer knowledge globally to support clients.



AWA sponsorship, Brisbane

On 12 February, we were proud to lend our support and presence to an important technical meeting hosted by the Queensland branch of the Australian Water Association (AWA). [The meeting](#) explored a key issue for South East Queensland: the SEQ Design and Construction Code and the ADAC Schema. Attendees were invited to participate in a Q&A session with key speakers from Unitywater, Logan City Council, and the SEQ Code Steering Committee. As the sole sponsor of this event, we gave the vote of thanks and provided our ‘Design with water’ brochure to clients and attendees, which received positive feedback from clients who were impressed with what Arup has achieved globally in the water sector.



OzWater14', Brisbane

OzWater is Australia's annual international water conference and trade exhibition run by the Australian Water Association (AWA). Last year the event attracted over 3,000 participants from the water industry and those with a commercial interest in water. We submitted two papers for the 2014 event (29 April to 1 May), both of which were accepted. Ragini Prasad (Melbourne) and Ed Beling (Brisbane) wrote a paper which explored ‘understanding the business case for investing in catchments’. From Melbourne’s water team, Rhys Anderson and Michael O’Neill’s paper ‘compared the design of the Melbourne Cricket Ground (MCG) sewer mining scheme to the London Olympics sewer mining scheme’. The three-day conference and exhibition shines a spotlight on the pivotal topics in water as well as showcase innovative new services and technologies.

[Understanding the business case for investing in catchments](#) →

[Comparing the design of the MCG sewer mining scheme to the London Olympics sewer mining scheme](#) →

Year in review (continued)



Water Industry Achievement Award for Welsh school project, UK

On 1 April the Llanelli and Gowerton Green Infrastructure Project won the Sustainable Drainage and Flood management Initiative of the Year at the Water Industry Achievement Awards 2014. We worked with Morgan Sindall and Dwr Cymru Welsh Water on the project. The award recognised the innovative use of retrofit Water Sensitive Urban Design in relieving flooding and transforming a monochrome concrete and tarmac school playground with vibrant educational green infrastructure.

Asia Water 2014, Kuala Lumpur

On 20 March, Megan Tang (Hong Kong) presented research performed with Rowan Roderick-Jones (Los Angeles) at Asia Water 2014 in Kuala Lumpur. The research, funded by Arup, was carried out to enhance Rowan's Water and Energy Resource Characterisation Model (WERCM) and to create working models for megacities in East Asia. While enormous sums are spent on incentivising resource efficiency and carbon reduction projects, this money is not always put to its most effective use. WERCM provides a way to quantify embodied energy, water and carbon in regional energy and water utility portfolios and make direct comparisons of energy and water efficiency projects according to lifecycle costs and resource savings. Megan's presentation provided a focus on recent modelling efforts for Kuala Lumpur where the water supply industry reforms are expected to improve efficiency and reliability in a sector traditionally faced by financial and political challenges.



Megan Tang

[View the presentation](#)



Year in review (continued)

Melbourne Cricket Ground Water Recycling Facility, Australia



The MCG and Yarra Park Water Recycling Facility treats 600 kilolitres of local wastewater per day to Class A standard.

Arup developed an integrated water strategy for the Melbourne Sports Precinct, a sewer mining scheme was identified as a viable alternative water source for the Melbourne Cricket Ground (MCG) and surrounding Yarra Park. In addition to the treatment plant, Arup undertook the design and specification of the third pipe system within the MCG to transfer the Class A water from the treated water tank a to service the irrigation, wash down and toilet flushing demands for the MCG, Yarra Park and Richmond Football Club. Arup delivered this 600m³/day membrane bioreactor project from its initial identification through to construction and commissioning.

[Find out more](#)



[Read 'Living Victoria' article](#)



Client quotes

“This represents everything the industry is aiming for and they won’t find a better project to support, so you’ve done a great job setting the vision and helping us get the key decision makers inspired.”

“I appreciate the enormous amount of work that has been undertaken in tight timeframes and how flexible and responsive you have been to our needs.”

“I’ve enjoyed working with the team and am proud of what we’ve achieved so far, thank-you very much for the commitment and passion that each of you have brought to the work!”

Kathryn Naylor, Senior Water Strategy Advisor - Integrated Water Strategy, Melbourne Water (December 2013)

Awards

Winner of the Australian Water Association Victoria’s 2012 Infrastructure Project Innovation Award

Sustainability in Design - Highly Commended, Consult Australia Awards for Excellence 2013

Finalist, Banksia Sustainability Awards, Water - Our most precious resource 2013

Finalist, United Nations Association of Australia World Environment Day Awards 2013, Excellence in Sustainable Water Management Award



Knowledge, skills and people

Arup employs more than 11,500 people across the globe. Our community of talent and expertise grows every year, as does the global water skills network which now consists of over 1,255 people.

Our technical, commercial, financial and physical environments are always changing; the Regions experience different market conditions, resourcing needs vary and there is a continuing need to keep our skills at the leading edge. At the same time we must continue to develop our staff and create opportunities to grow their careers. Over the past year there have been a number of inter-office skills exchanges, strengthening local teams and sharing knowledge. In particular, skills in flood risk management, integrated water management and process engineering have been enhanced through staff transfers.



Global Transactions Water Link, London

In November 2013, the Water business held its fourth Global Water Link. This internal event brought together 20 leaders from around the world responsible for transaction and advisory related services in the water market. The aim of the event was to understand the ambitions of the global water business and consider how transactions related services can play its part and act as a wider stimulus for growth and market exposure. Together the group discussed the global drivers and market needs, considered key opportunities and challenges and developed an agreed plan of action. These events promote a greater understanding of the global and regional nature of the water sector.



Water Leaders Group

Mark Fletcher (Global Water Leader) has joined the [Global Water Intelligence](#) Global Water Leaders Group. The Group is a registered non-profit CEO-level organisation with the mission to create better global water provision by bringing together leaders from the water sector – utility directors, water ministers, mayors, regulators – to focus on the world’s water challenges.



Aquarius Leadership Development Programme

[Daniel Lambert](#) (Australasia Water Leader) was one of only 30 Global Water Business Leader’s chosen for the prestigious Aquarius Leadership Development Programme held in Singapore. The select group of water leaders from Australia, Finland, France, Germany, Hong Kong SAR, Indonesia, Japan, the Netherlands, Saudi Arabia, Singapore, Switzerland, United Kingdom and USA met in Singapore in September to discuss viewpoints, create cross-border business opportunities and forge connections to build the next wave of water leadership.

[Read more about the programme](#) →



New Skills Network Leader

Our new Global Water Skills Network Leader is Justin Abbott (Leeds). Justin has over 20 years consulting experience covering a wide range of water and environmental projects undertaken in both the UK and overseas.

“The development of our knowledge community is essential to our growth agenda over the short, medium and long term.”

[Justin Abbott](#)



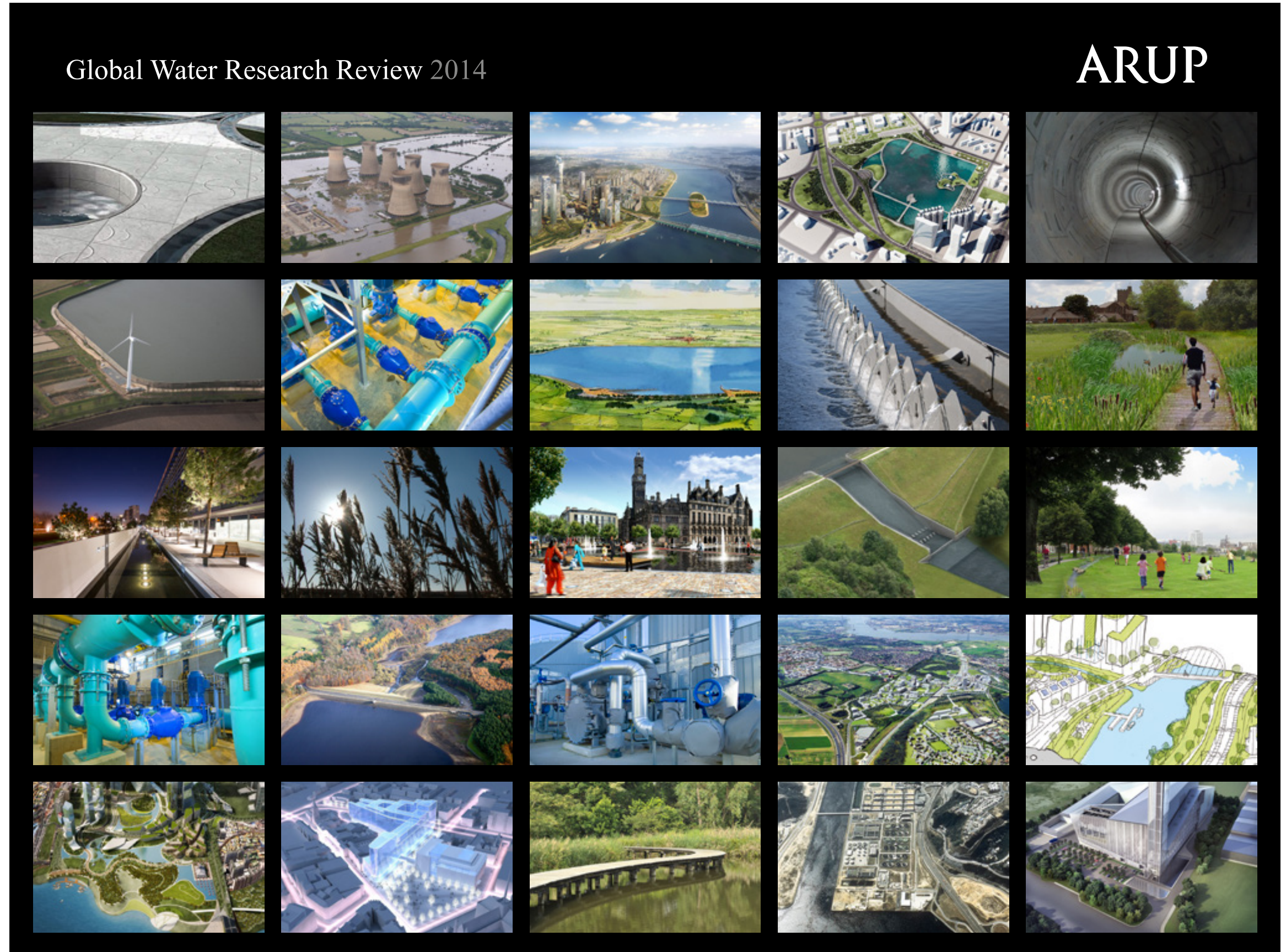
Global Water Research Review and Research Roadmap

Our Global Water Research Review offers 25 case studies demonstrating the practical research work we have completed with clients, research organisations and academic collaborators around the world over the last five years.

The Review and an internal workshop have helped inform our Research Roadmap for the short, medium and long term. The workshop was held to gathered input and contributions from all of our regions, and to discuss and plan future research and investment projects.

Our key areas of research will focus on: adaptation and responses to flooding, water recycling and integration into the urban environment among others.

[View the Global Water Research Review](#) 





Regional activity updates

Janine Witko, Americas Water Leader



Americas

The Water Team and Water Skills Network representation in the Americas continues to grow. Arup has become more involved in local professional organisations and councils such as the Water Environment Association and the Association of California Water Agencies, allowing increased opportunities to share insights and lessons learned on a variety of projects around the world. We presented at conferences across the United States on such areas as climate change and climate risk management, green infrastructure planning and implementation, and water balance and reuse, sharing our experiences from the Americas and around the world. We've been recognised by our award winning projects such as Hunters Point, recipient of an AIA and Landscape/Urban development award as well as an ACEC Platinum award.

Daniel Lambert, Australasia Water Leader



Australasia

Arup has undertaken numerous challenging and innovative projects in Australasia over the last 12 months. This has enabled us to consolidate and strengthen our position as a recognised and respected player in the water sector. We have advised insurers on the damage to strategic water assets affected by the Christchurch Earthquakes and successfully advised financiers on acquisition of water assets. Our outstanding record in solving complex problems for clients has been further strengthened and demonstrated through the successful delivery of integrated water management studies and water supply solutions for townships and smaller communities.

Fergal Whyte, East Asia Water Leader



East Asia

For developing Asia, planning around the scarce availability of fresh drinking water is seeing a shift in focus from supply to demand-type solutions, as it faces rapid urbanization, industrialization and population growth. Our water business in this region is helping clients to make smart use of water resources, including development of integrated water management plans for new developments and masterplanning projects and we have strengthened skills in sustainable water solutions. Meanwhile, we are also supporting clients to manage risks associated with flooding, including River Flood Risk Project for the Hong Kong government.

Private sector participation in water assets around the region has seen an increase and our team are involved in advising investors from due diligence to asset optimisation.



Regional activity updates (continued)

Jan Zabierzewski, Europe Water Leader



Europe

Last year we significantly developed our water skills network and made strategic decisions that positively influence the future of our water business in Europe. In particular, we will be focusing regional investments on water related activity in the Netherlands and Turkey. In the Netherlands we will concentrate on civil engineering design projects managed by the same governmental agency we have designed bridges for, for several years. We recently identified a water business developer in Turkey who is building a team targeting hydropower, water cycle in industry and projects funded by International Financial Institutions seeking potential business development outside of Turkey. We plan to support this work from our other offices.

We are also looking at Balkans where the World Bank and the European Bank for Reconstruction and Development are becoming more and more active. In Poland, the implementation of the Water Framework Directive and Flood Directive resulted in the announcement of major country-wide consulting tenders, which we are bidding for. In Ireland, we were successful in getting on the Irish Water framework, and plan to recruit additional people with skills related to water and sewage treatment. Despite rather stagnant economy in Europe our developing skills and new markets enable us to look to the future with optimism.

Mark Fletcher, Global and UKMEA Water Leader



UKMEA

This year has been significantly influenced by extreme weather events – the UK has had ‘too much water’. Some of the wettest months on record have heralded an unprecedented focus on flooding in particular. This has occurred at a time when Arup is leading the promotion of major flood schemes with Local Authorities eg Bristol, Leeds and Sheffield, with the Environment Agency eg Pickering, Skipton, Northwich and Hull, with Natural Resources Wales and in Scotland through the Water of Leith Scheme in Edinburgh.

It has also been defined by the amp cycle with the Water and Sewerage Companies (WASCs) in England and Wales. We have focused our efforts and renewed our framework with Yorkshire Water and won new frameworks with Severn Trent Water and United Utilities. We have also won a specialist framework for reservoir safety with Welsh Water and have undertaken our first reservoir project with South West Water for many years. We have five major amp frameworks at the final stages of tender so next year may be a major challenge in terms of resource and delivery depending on our success. Thames Tideway is looming large and our consortium with Atkins, BAM, Balfour Beatty and Morgan Sindall has successfully pre-qualified for all three tender packages, the only consortium to do so.

Our business in Southern Africa is growing under the leadership of Andrew Simmans and we have had significant recent success in Botswana in particular.



Projects

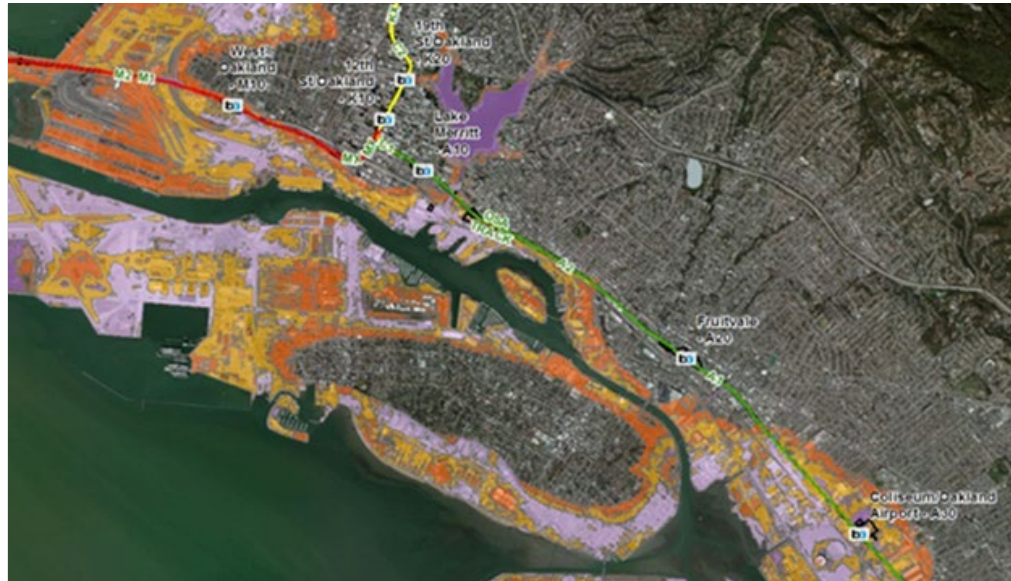
Click/tap a country to see a selection of water projects for that region.

- Americas
- Australasia
- East Asia
- Europe
- UKMEA





Americas Projects



Client: Bay Area Rapid Transit District

Bay Area Rapid Transit Sea Level Rise Adaptation Assessment Pilot Study, California

In a study funded by the Federal Transit Administration, we assessed the risk and developed adaptation strategies for climate change in the Bay Area for four Bay Area Rapid Transit (BART) assets. We researched downpour, flooding, and sea level rise trends; assessed condition of BART assets; determined pathways of vulnerability; determined the risk of the climate hazards at each location; and produced and ranked adaptation strategies. This set of adaptation strategies will eventually be integrated with the existing BART asset management, infrastructure rehabilitation and facilities standards.

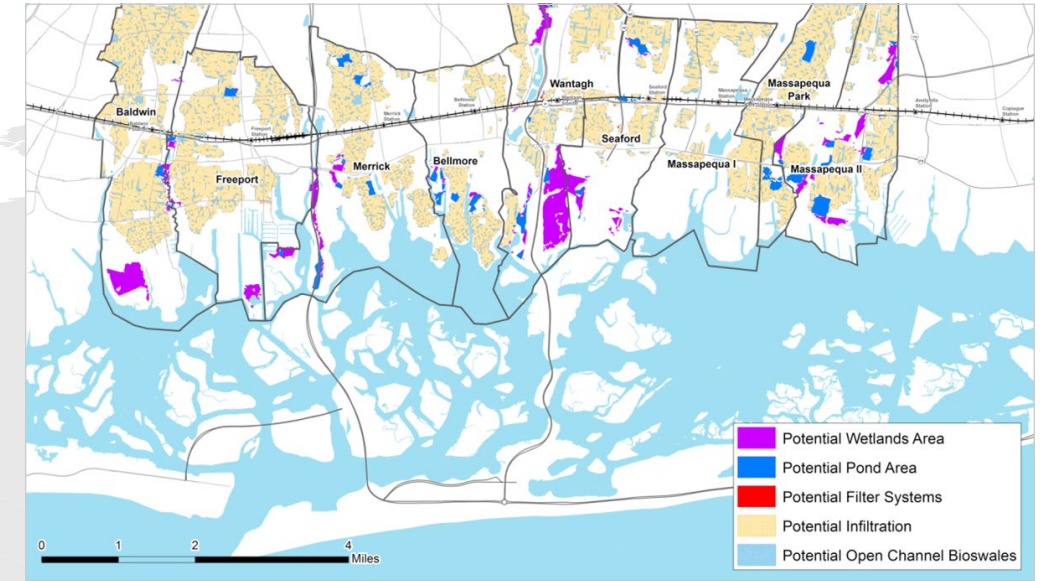


Client: City of Newport Beach

Newport Beach Civic Centre and Park, Newport Beach, California

The Centre and Park includes a new city hall building, community room building, council chambers building, parking structure, an extension to the existing library and a 17-acre park. The goal was to achieve comfort for its occupants, exhibit a responsibility toward the environment, and to showcase the buildings and park to its residents. A natural wetland at the site received polluted flows from upstream sources. We proposed to extract the polluted runoff, treat and reuse the water on site, resulting in lower pollutant loading and reduced domestic water demand. Working with the landscape architect, Peter Walker Partnership, we developed a series of vegetated bioswales and infiltration basins, which remove pollutants from stormwater runoff before it enters the city storm drain. These low-tech, low-maintenance solutions provide sustained treatment of stormwater, protecting both the onsite wetlands and Lower Newport Bay. The Center achieved a LEED Gold rating in January 2014.

[Read More](#)



Client: New York State Housing Trust

New York Rising Community Reconstruction Program, Long Island

The Program is driven by the Federal and New York State governments' recognition that there is a great sense of urgency in rethinking how five coastal and riverine communities across New York are planned, designed and reconstructed in the context of climate change and extreme weather. Superstorm Sandy, Hurricane Irene and Tropical Storm Lee, while devastating, created a unique opportunity to utilise Community Development Block Grants – Disaster Relief funding (administered by the US Department of Housing and Urban Development) to help impacted communities rebuild in a way that is holistically resilient. We are in the process of helping five communities on Long Island identify reconstruction projects and activities for funding through a comprehensive planning process that includes community visioning, asset inventory, risk assessment, needs and opportunities assessment, developing strategies for investment and action and as well as an implementation schedule. With input from the communities, we will produce a Conceptual and Final Plan to present to the State which will contain a list of projects for immediate funding through the Program, as well as longer term projects, plans and studies that will be funded through other sources.



Americas Projects (continued)



Client: Thompson Design Group

Long Branch Sustainability Masterplan, Long Branch, New Jersey

Superstorm Sandy severely damaged the City’s “first line” of coastal protection, namely, the Bulkhead, Seawall, and Bluff. Combination of storm surge and swell imposed impact damage and extensive scour which undermined the boardwalk, roadway, and promenade elements as well as the utilities supported by them. The City engaged Thompson Design Group, teamed with Arup, to study and design necessary Oceanfront Adaptation. The design team’s initial step was to enumerate the extent of storm damage and develop a coastal defense strategy in order to “hold the line”. The study was based upon preliminary site observations after Sandy, a collation of non-survey data, and pertinent best practice measures from around the world to mitigate storm damage. As part of this work a preliminary condition evaluation of the shoreside structures and defensive was undertaken for the full two miles of shoreline. This included both detailed observations and recommendations for repair and hardening of the affected structures and infrastructure. The plans seek to engage FEMA in discussions and plans for the greater coastal defense strategy of New Jersey which will result in a sustainably restored waterfront amenity for Long Branch.



Client: New York City Transit

New York City Transit Flood Resiliency, New York

Hurricane Sandy had a devastating effect on New York City and its surrounding areas when it came ashore in October 2012. It exposed the weakness of much of the infrastructure on the eastern seaboard and drew the attention of many public authorities to matters of resiliency. We are undertaking several flood mitigation projects on behalf of New York City Transit in the upper and lower Manhattan areas as part of their Resiliency and Recovery initiative. The projects include identifying vulnerabilities and designing mitigation measures at various critical assets on the subway network including stations, fan plants and tunnels. The projects address how to prevent flooding of the subway system under a Category 2 Hurricane and involve the implementation of current industry solutions and the development new and innovative approaches.



Client: Table Rock Capital

City of Rialto – Water Due Diligence performance monitoring, California, USA

Our initial scope was to advise equity investors in this landmark water P3 deal in California. Our unique mix of technical, commercial and financial specialists worked with the client to make a number of adjustments to the Concession that will ensure the highest quality project with minimal risk to bondholders. Our work enabled the project to gain a positive bond rating, raise the required debt financing and meet an aggressive financial close deadline. It is one of only a handful of successful water and wastewater P3s in the USA. We continue to play an important role in making the project successful over the long term. Rialto should be a template for other similar deals in the near future.



Australasia Projects



Client: Melbourne Water Corporation

Main Outfall Sewer, Melbourne, Australia

The project will determine what contribution the Main Outfall Sewer (MOS) and reserve can make to a regional integrated water management plan for the western suburbs of Melbourne, currently being developed by the Office of Living Victoria (OLV). It is a strategic and innovative piece of work that has the potential to be a key part of this regional plan, showcase the future of urban design and contribute to the realisation of the Melbourne's Water Future strategy. The project will harvest significant amounts of stormwater which currently go to waste and pollute waterways and Port Philip Bay for reuse by the community. Approximately 3.5% of Melbourne's current drinking water demands. Arup has brought a multi-disciplinary team to deliver the project including water, landscape, economics, community consultation and stakeholder facilitation experts into a single seamless service offering.

[Watch animation](#) →

Password: "arup1"



Client: Cunningham Lindsey New Zealand

Bromley Wastewater Treatment Plant, Christchurch, New Zealand

The Bromley Wastewater Treatment Plant (BWWTP) in Christchurch New Zealand experienced damage following the 4 September 2010, 22 February 2011, 13 June 2011 and 23 December 2011 earthquakes in the city. Arup provided engineering consultancy services to Richard Kirby Consultants Limited (RKCL) on behalf of Cunningham Lindsey New Zealand as part of the Lost Adjustment Team regarding Christchurch City Council's insurance claim for earthquake damage to BWWTP. Our scope of work included a preliminary process assessment of BWWTP based on available reports, site visits and discussions with treatment plant staff. It provided a qualitative assessment of the BWWTP process including identified impacts of proposed inspection and/or repair options on the operation and performance of the plant.



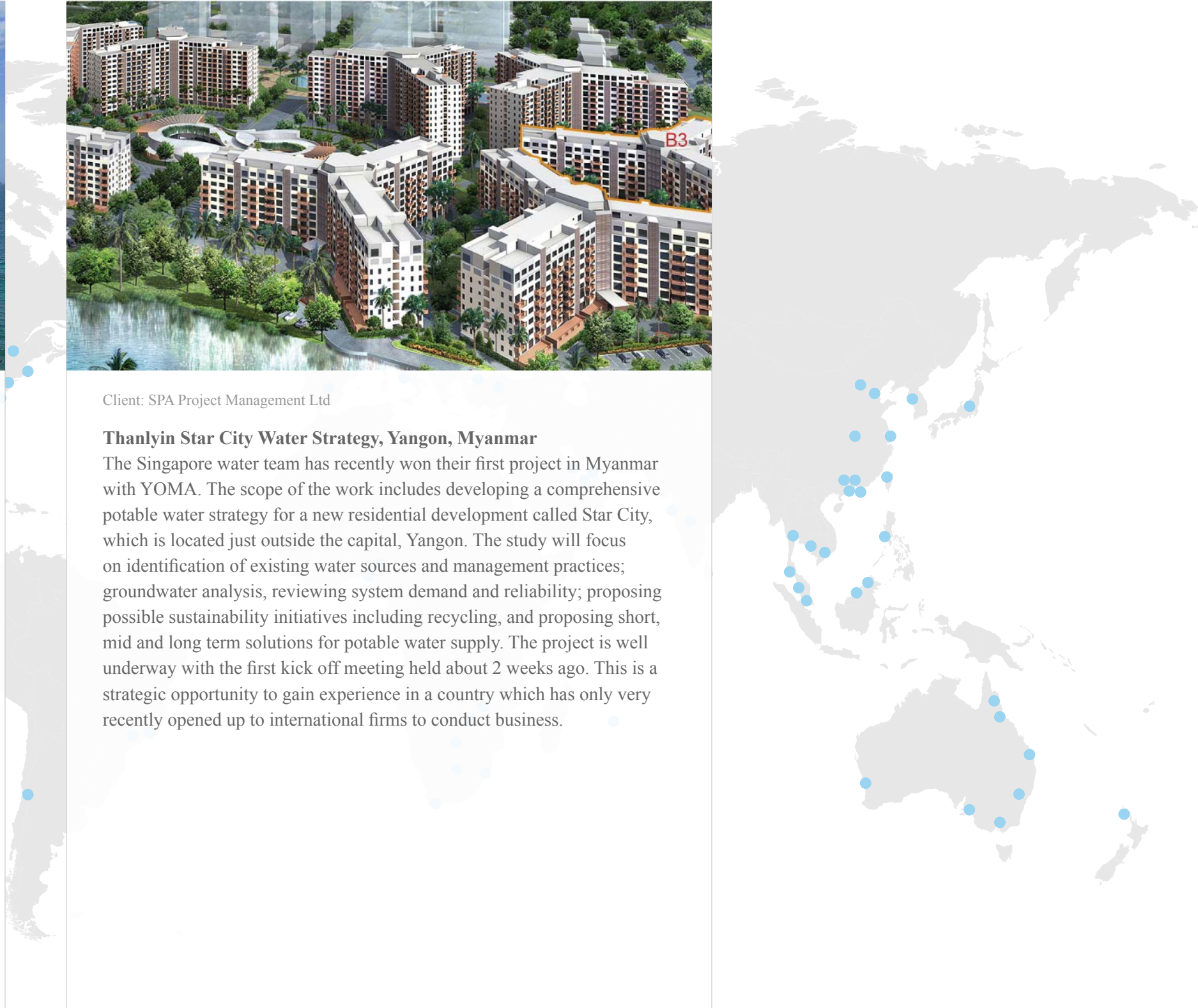
Client: Essential Energy

Water Bulk Supply Strategy, Broken Hill, Australia

Broken Hill a remote and historic mining town in central NSW has a bulk water supply system comprising significant amounts of aging infrastructure that are costly to restore and are therefore likely to be decommissioned at some stage in the near future. This will eventually lead to compromises in the existing water supply for Broken Hill, Menindee, Sunset Strip and Silverton and potentially other parts of the network. The key challenge of bulk water supply planning is to ensure that demand and supply including a risk contingency are kept in balance that future shortfalls in water supply are avoided and any increasing demands anticipated. Inherent in this challenge is its achievement at minimum expected total cost, thus minimising the impact on customers. Arup have been commissioned to undertake a future bulk water strategy to help the client (Essential Water) to help meet projected need. This involves assessing a range of options to develop the most cost effective, sustainable and socially acceptable solutions for providing a long term water supply.



Australasia Projects (continued)



Client: CH2M Hill Companies Ltd

Kawana Sewage Treatment Plant Ocean Outfall Approval Studies, Sunshine Coast, Australia

Unitywater commissioned a consortium of engineering and environmental consultancies to undertake the Kawana STP (and Landsborough STP) Infrastructure Planning and Approval Studies. As part of this consortium, Arup has been tasked with the assessment of impacts on the local waterways as well as license negotiations with Queensland Government Department of Environment and Heritage Protection. We are undertaking the necessary environmental assessments required to progress amendments to the utility's existing discharge licenses. These assessments include 2D/3D far field modelling of the Sunshine Coast coastline and the Mooloolah River as well as near field modelling of the outfall and diffuser structures. A key focus of these studies will also be the identification of options to defer significant expenditure on the treatment plant and outfall infrastructure. Options being considered in the studies include alternative wet weather discharge strategies, catchment transfers and effluent storage.

Client: SPA Project Management Ltd

Thanlyin Star City Water Strategy, Yangon, Myanmar

The Singapore water team has recently won their first project in Myanmar with YOMA. The scope of the work includes developing a comprehensive potable water strategy for a new residential development called Star City, which is located just outside the capital, Yangon. The study will focus on identification of existing water sources and management practices; groundwater analysis, reviewing system demand and reliability; proposing possible sustainability initiatives including recycling, and proposing short, mid and long term solutions for potable water supply. The project is well underway with the first kick off meeting held about 2 weeks ago. This is a strategic opportunity to gain experience in a country which has only very recently opened up to international firms to conduct business.



East Asia Projects



Client: ATAL and China State Joint Venture

Tai Po Water Treatment Works, Hong Kong

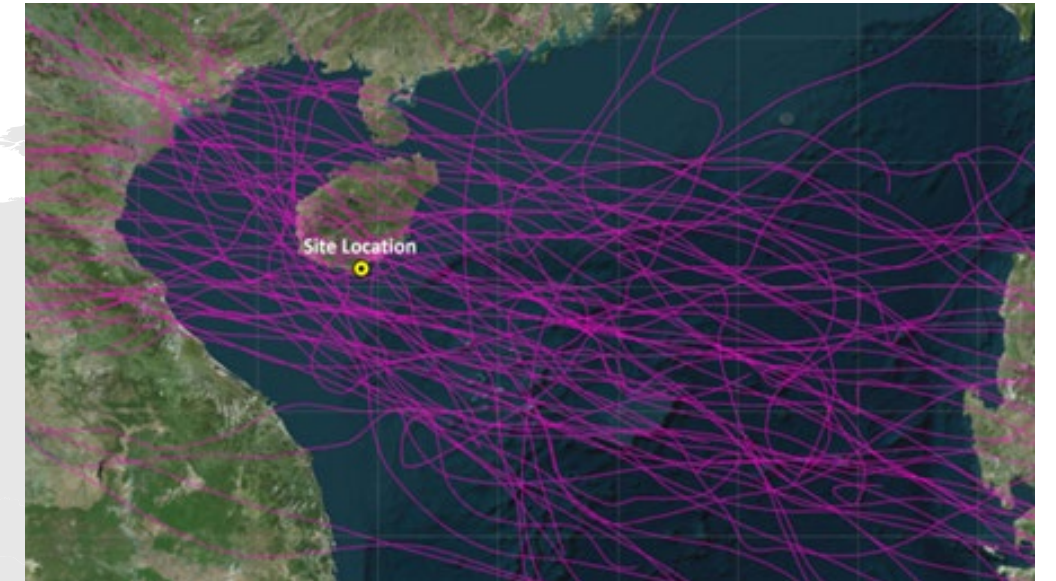
Tai Po Water Treatment Works expansion from 400 million litres per day (MLD) to 800MLD using a Design and Build contract form. WSD is the employer and we are engaged by the China State - ATAL Joint Venture as the contractor's designer. Our design services include process engineering, hydraulics, architecture, structural engineering, geotechnics, building services and landscape architecture. Upon completion, the expanded works will treat a further 400 million litres of water per day to potable water standards and is one of the largest potable water treatment projects we have ever undertaken worldwide. The expanded works will ensure the ongoing supply of clean water to Hong Kong residents and is due to become operational in 2016.



Client: Genting Malaysia Berhad Sdn

Genting Sewage Treatment Plant, Malaysia

The Genting Highlands Resort is a major resort of the Genting Malaysia Berhad organisation (GMB) located approximately 50 kilometres east of Kuala Lumpur. A major expansion to the facilities, which will include 3,000 new hotel rooms, a gaming area and a theme park, has been planned. This expansion is expected to attract some 100,000 extra daily visitors. Arup has been appointed by GMB to carry out the feasibility study, design and construction supervision of a new sewage treatment plant with effluent re-use facilities at Genting Highlands. Due to site constraints, the plant is proposed to be built in a multi-storey structure at the top of a cliff with a treatment capacity of 150,000 population equivalent, mainly to cater for the new development. The work is a joint project between Arup Jururunding, Malaysia and the Hong Kong office and our services include process, mechanical, electrical, control, instrumentation and automation systems and hydraulic, structural, geotechnical and building services engineering.



Client: Fosun Tourism & Commercial Group

Atlantis Sanya Water Engineering Project, Sanya, China

Our water engineering team is providing the overall water features and water system schematic design and study. This includes the overall water system demand and supply, water balance, water hydraulic and recirculation strategies.

East Asia Projects (continued)



Client: Gorakhpur Environmental Action Group

Enhancing climate resilience of Gorakhpur City, India

Gorakhpur faces annual flooding and waterlogging due to an inadequate drainage system, a lack of on-going maintenance, and an observed rise in seasonal rainfall intensity. Flood risk is further increased by urbanisation processes, which increasingly lead to the filling and development of the many existing lakes located in peri-urban areas around the city which store flood water in rainy season. Through funding provided by the Rockefeller Foundation as part of the Asian Cities climate Change Resilience (ACCCRN) program, Arup is working with Gorakhpur Environmental Action Group (GEAG) to develop planning and design guidelines to improve the Ward level drainage system, and developing a concept design for drainage improvement works specifically for Mahewa ward. In addition, we carried out a hydrological study for Gorakhpur City, focussing on preserving peri-urban areas as a flood buffer against seasonal flooding and waterlogging. We presented the findings from InfoWorks ICM model which shows city has high risk of flooding even with a moderate rainstorm and recommended to prepare a comprehensive drainage master plan for the city.



Client: Manila Water Co Inc

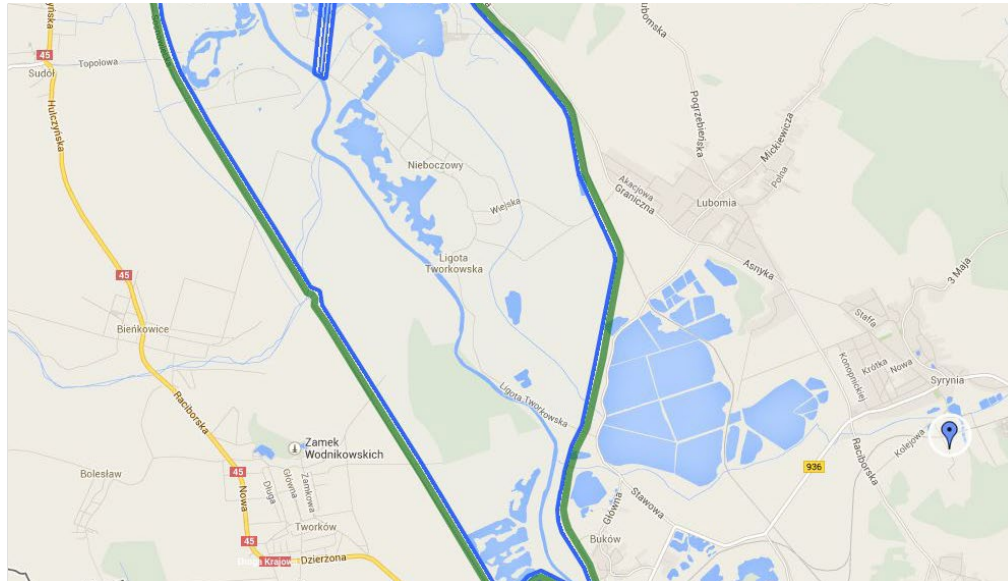
Libingan Ng Mga Bayani Sewage Treatment Plant, Taguig City, The Philippines

The Libingan Ng Mga Bayani (LNMB) sewage treatment plant (STP) is one of the largest STPs to be constructed in the Philippines. It is designed to accommodate an average of 75MLD of sewage flows coming from Makati South and Taguig North Areas. As the plant is adjacent to the national heroes cemetery, we developed a concept to hide the plant in a basement structure and construct a park on top to complement the cemetery. The eight basin sequential batch reactor treatment process is mainly buried and features significant landscaping to integrate it with the surrounding area. It provides our client the opportunity to enhance the value of constructing a new plant within the densely populated urban area of Metro Manila. The construction of LNMB represents a significant increase in their treatment capacity and a step change in the size of plants being constructed and operated.





Europe Projects



Client: RZGW Gliwice

Raciborz Dolny Flood Reservoir, Gliwice, Poland

Arup is conducting the supervision of construction works acting as FIDIC Engineer on construction of “dry” reservoir on Odra River, a few kilometers from town Raciborz in Southern Poland. Project is funded by the World Bank. Raciborz Dolny will be the biggest “dry” reservoir in Europe with capacity 185 million m³, area of 26.3 km² and embankments 22 km long. The flood retention is designed for flows above 1210 m³/s.

Client: RZGW Krakow

Czarna Staszowska River Flood Programme and Nida River Flood Programme, Krakow, Poland

In the view of implementation of the Flood Directive Arup is preparing a flood protection scheme for the catchments of the Nida River and the Czarna Staszowska River, both tributaries to the Vistula River. Significant flood losses have been noted within the catchments in recent years. The aim of the project is to propose the best option to minimise them. The scope of work is covering: site surveys, hydraulic modelling, GIS analysis, concept design, flood extent assessment, damage assessment, flood protection program proposal, SEA.

Client: AR-TEM

Bursa Wastewater Project II, Turkey

Located in western Turkey, to the south of Marmara Sea, Bursa is the fourth most populated metropolitan centre in the country. The city was the first Ottoman capital and holds important industries and cultural heritage. Since 2005, the service area for Bursa Water and Sewerage Administration General Directorate (BUSKİ) was expanded by more than tenfold, with the population nearly doubling. BUSKİ, who received a loan for Bursa Wastewater Project II from the EIB, allocated part of this loan for the contract for the technical assistance and consulting services for the second stage of the Bursa wastewater project.

Arup, together with Temelsu, is providing technical assistance and consultancy services to BUSKİ. The scope of services include assistance with tendering and contracting of the works, preparation of tender designs for the sewerage and storm drainage networks (over 500 km) as well as supervision and consulting services during implementation of the main collectors of the sewerage and storm drainage systems.



Europe Projects (continued)



Client: Irish Water

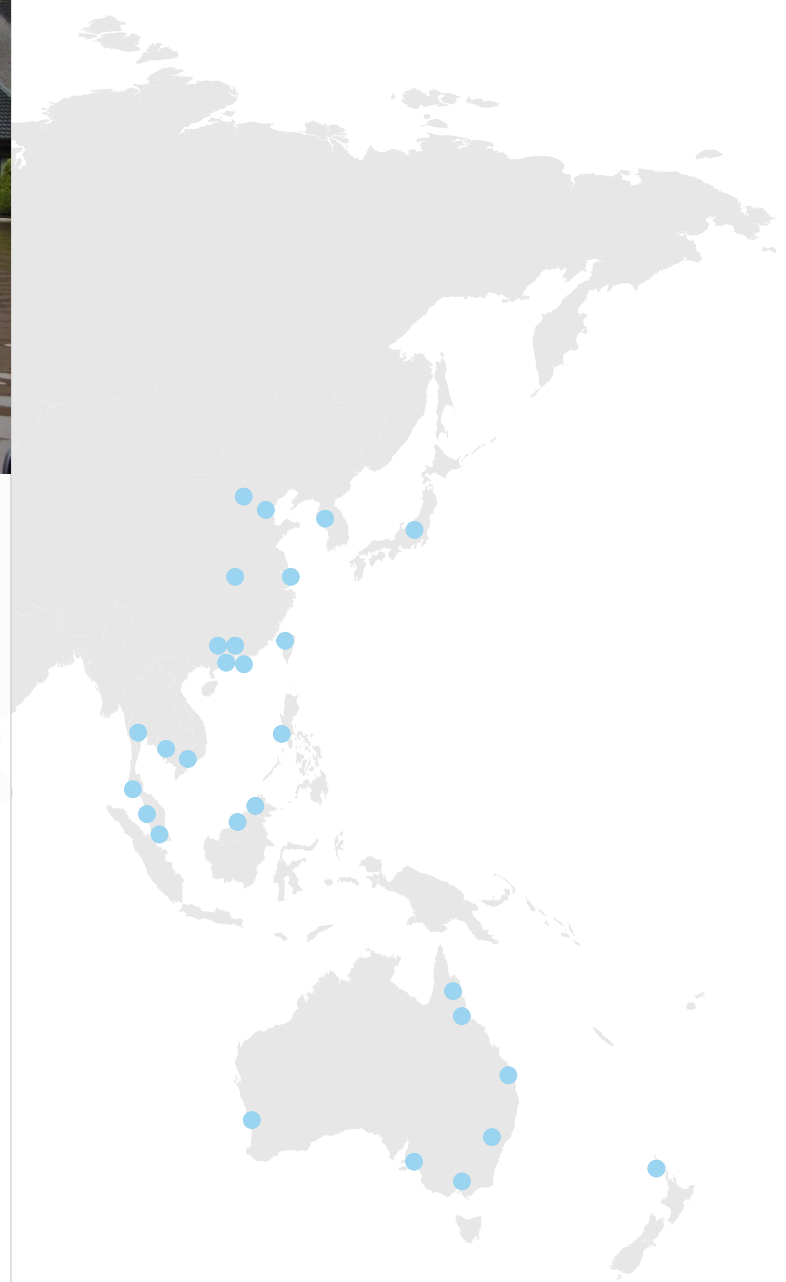
Irish Water Framework, Ireland

Arup has been successful in getting on the five year framework with Irish Water to provide Consultancy Services in both clean and waste water. The work will be awarded under mini tenders and on specialist skills amongst the ten consultants on the framework. It is expected that total design work to the tune of €10 to 15 million per year will be awarded by Irish Water as soon as the work stream commences.

Client: Cork City Council

Glanmire Flood Risk Assessment and Management Scheme and Douglas Flood Relief, Ireland

Engineering and environmental consultancy services comprising of Flood Risk Assessment and Management Study. These projects involve the design of flood defence scheme for the villages of Douglas and Togher and for the Glanmire and Sallybrook (Glashaboy River) which have suffered badly from flooding in recent years. The projects consist of scheme design through to construction and handover.





UKMEA Projects



Managing Water Use in Scarce Environments A Catalogue of Case Studies



Client: 2030 Water Resources Group

Managing water use in scarce environments catalogue of case studies
Arup delivered the 2030 Water Resources Group publication, which was launched at Stockholm World Water Week in September 2013. We researched and analysed over 40 case studies across the agricultural, municipal and industrial sectors. Developing an innovative assessment framework enabled us to define impact on basin level water resources, each intervention is also quantified and estimated cost per cubic metre of impact is provided. This makes it easy to compare the impact and cost effectiveness of different interventions. [The catalogue](#) is a tool for decision-makers and forms a focal point for action on water scarcity. The online tool enables users to explore water scarcity solutions from around the world, the approaches used to achieve them and the impact they have made so far. In time, it has the potential to become a focal point for decision-makers and a wider audience – a dynamic space for dialogue, inspiration and learning.



Client: Bristol Water Plc

Cheddar Reservoir Two - Scheme Overview and Engineering Design, UK

We are preparing the planning application for a new 9,000MI raw water storage reservoir. The location, south of the existing Cheddar Reservoir, was determined previously by Arup as part of a Site Selection and Water Resources Study. The new reservoir will be fed from Mendip spring sources close to the famous Cheddar Gorge show caves, and gravitate from there to the existing reservoir, located nearby. Our high level master plan sets out the recommended strategy and will covers all aspects of the scheme including consultation, environmental surveys and studies, planning, land purchase, design, construction and operational issues. Once operational, the reservoir and surrounding nature areas will transform low grade, intensive agricultural land with limited community value into an environmental asset that sits comfortably within the Somerset landscape. It is anticipated that the adjoining SSSI will expand as overwintering bird populations thrive in the newly created wetland habitats, otter and water vole populations improve and bat populations continue to grow off integrated foraging habitat. For the community health, wellbeing and educational benefits will be seen through the network of footpaths, cycle paths, bridleways, natural trails and associated educational facilities.



Client: Department of Water Affairs

Maun Water Supply Distribution System Rehabilitation, Maun Water Supply and Sanitation Upgrade Phase II and other Associated Works, Botswana

As the administrative centre for the North West District Council and a tourist gateway to the Okavango Delta, Maun has grown tremendously in recent years. The village has come a long way from the highly rural beginnings and now boasts of modern architecture. It has a population of over 60,000 with an estimated water demand of 8,500m³/day. The water supply sources include three water abstraction points from Thamalakane river and five ground water source.
The primary objective of this project is to upgrade the Maun Water and Sanitation transfer schemes and Distribution networks to meet the village water and waste water requirements. We will carry out studies for existing network optimisation, prepare conceptual design, feasibility study, tender documentation construction supervision and defect liability for the water and sanitation scheme for a 20 year design horizon, package the works as design and build contracts and supervise the construction activities. The main components of the project include the distribution network, transmission mains from boreholes to booster pumps stations, primary, secondary and tertiary lines for both water and sewerage system, optimisation of water and sanitation, vacuum system consideration, telemetry and SCAD System and water treatment for groundwater and surface water options.



UKMEA Projects (continued)



Clients: Severn Trent, Yorkshire Water, Welsh Water and Southern Water

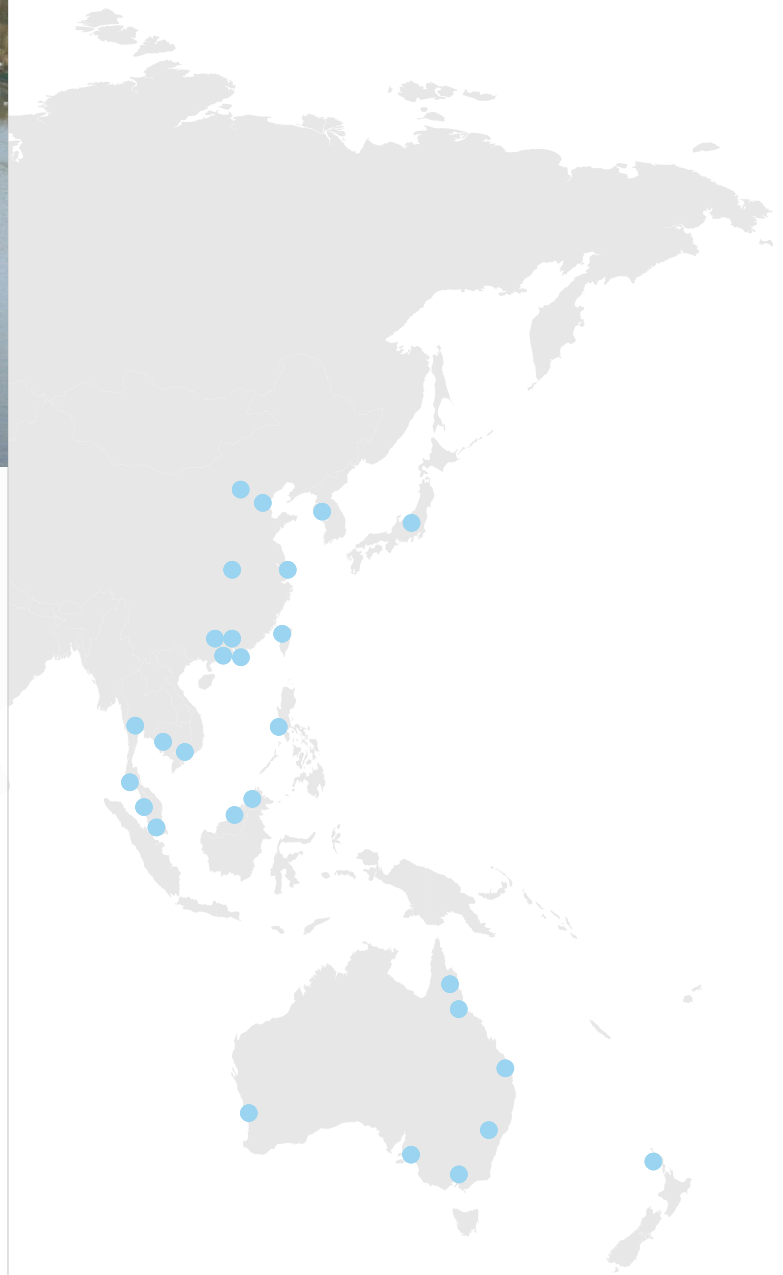
AMP framework success

This year has been defined by the amp cycle with the Water and Sewerage Companies (WASCs) in England and Wales. We have focused our efforts and renewed our framework with Yorkshire Water and won new frameworks with Severn Trent Water and United Utilities. We have also won a specialist framework for reservoir safety with Welsh Water and have undertaken our first reservoir project with South West Water for many years. We have five major amp frameworks at the final stages of tender.

Client: Bristol Water Plc

Bristol Flooding, UK

Arup is pleased to be on a framework of specialist flood risk advisors for Bristol City Council. We have built a comprehensive city wide model of the drainage systems which for the first time explains why flooding has occurred to the depths and extents which have been witnessed. We have also been advising the city about flood risk from tidal surges, the Avon Strategic Study. Our study highlights that better protection from high tides will be required if economic growth and creation of new jobs is to happen on areas of land in close proximity to the existing city centre, and also if much of the existing properties and infrastructure in the city are to be better protected. Our suggestion is that the case for a tidal protection barrier (like in London, Venice or Rotterdam) needs to be considered alongside other alternatives. We also have staff seconded into the City advising on the designs and approvals of sustainable drainage proposals in accordance with requirements of the new Floods and Water Management Act 2010.





Advisory Projects

Sutton & East Surrey Water

Arup provided technical and environmental due diligence for Osaka Gas on their investment in the UK water company.

Brazil Water

Arup provided Technical Due Diligence service to GIC for a portfolio of existing and future water concessions in Brazil. The existing business comprises one large concession serving a city of 800,000, a secondary concession serving a region with a population of 600,000 and a third smaller concession spread over multiple municipalities in Brazil. The future concessions pipeline comprises one dominant project representing 90% of the pipeline by population, another project representing 5% and a number of smaller project.

Maynilad Water, Philippines

Arup has provided in-depth technical and operational due diligence for a Marubeni on their 20% equity investment in one of the water concessions serving the Metro Manila area in the Philippines.

SmVaK, Czech Republic

Arup performed buy side technical due diligence on behalf of Mitsui for their successful acquisition of a 49% stake in SmVaK (€97 million transaction value). SmVaK is the fourth largest water company in the Czech Republic and holds a full cycle water concession for production and distribution of drinking water, discharge and treatment of waste water and bulk water supply. The company has 1.3 million users and owns 6,000km of supply network.

Tortola Water

Arup advised Biwater on its acquisition of the Tortola Water & Wastewater Plant in the British Virgin Islands.

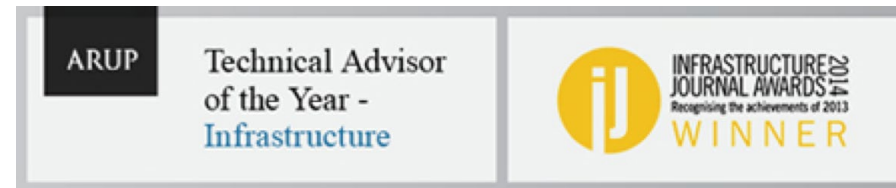
Southern Water

Advised Canadian investor Northleaf Capital in its investment in Southern Water.

Rialto Water Due Diligence, USA

Arup have been retained by a project company consisting of a consortium of American Water Works Company and Table Rock Capital to perform technical and financial due diligence on a concession with the City of Rialto. The project company will design and construct certain facility improvements and manage, operate and maintain the City's wastewater facilities. The Final Report will support a \$145 million bond issuance to provide funds for the Capital Improvement Program.

Technical Advisor Awards



[Read More](#) →

In March 2014, we were named **Infrastructure Technical Advisor of the Year Award** at the 2014 Infrastructure Journal (IJ) Awards. The award is given to technical advisors working on the year's most outstanding infrastructure and/or project finance transactions and recognises Arup's capability as a technical advisor in the transport, water, waste and social infrastructure sectors.



Arup was announced Best Technical Advisor at the 2013 Partnerships Awards ceremony. The international awards, organised by the Partnerships Bulletin, are recognised as one of the highest accolades available within the global project finance industry and have been judged by an expert panel of some of the most respected names in PPP (public private partnership). The award is given to technical advisors working on PPP transactions that have made an outstanding contribution to the forward progress of public private partnerships, and recognises Arup's capability as a technical advisor within the Energy and Utilities, Social Infrastructure and Transport sectors.

[Read More](#) →

“

We were delighted to receive this accolade in recognition of our tremendous achievements. We have been truly diverse in our reach across global PPP markets: we have advised on energy, water, waste, renewables, highways, airports, tunnels, schools and hospitals projects worldwide.

Steven Lloyd
Advisory Services Leader



”

[Find out more about our Transaction Advice offering](#) →



Water facts



On average, the production of one cup of tea requires 35 litres of water and one cup of coffee requires 140 litres.

Source: Waterfootprint.org



A 5 minute shower uses more water than an average person in the slums of a developing country does in a whole day.

Source: Treehugger.com



About 90% of sewage and 70% of industrial wastes in developing countries are discharged into water courses without treatment, often polluting the usable water supply.

Source: TheWaterProject.org

Humans are naturally drawn to water, on average it makes up 55–65% of our bodies and indeed it's crucial for our survival. Infants typically around 75-78%.

Source: about.com chemistry

The daily drinking water requirement per person is 2-4 litres, but it takes 2,000 to 5,000 litres of water to produce one person's daily food.

Source: Food and Agriculture Organisation

By 2050, rising populations in flood-prone lands, climate change, deforestation, loss of wetlands and rising sea levels are expected to increase the number of people vulnerable to flood disaster to 2 billion.

Source: World Water Development Report 2012

Up to 30% of fresh water supplies are lost due to leakage in developed countries, and in some major cities, losses can run as high as 40% to 70%.

Source: TheWaterProject.org

If you replace a cup of coffee a day with tea, you could save 10,950 gallons a year; orange juice with water, 16,717 gallons.

Source: Foodbev.com

The frequency and intensity of water-related hazards is generally rising. Between 1991 and 2000 over 665,000 people died in 2,557 natural disasters of which 90% were water related.

Source: World Water Development Report 2012

Water and Energy

The UN released some key facts and figures based on this year's World Water Day theme:

- Roughly 75% of all industrial water withdrawals are used for energy production
- In Stockholm, public buses, waste collection trucks and taxis run on biogas produced from sewage treatment plants.
- Approximately 15–18 billion m3 of freshwater resources are contaminated by fossil fuel production every year.

Source: UNWater.org

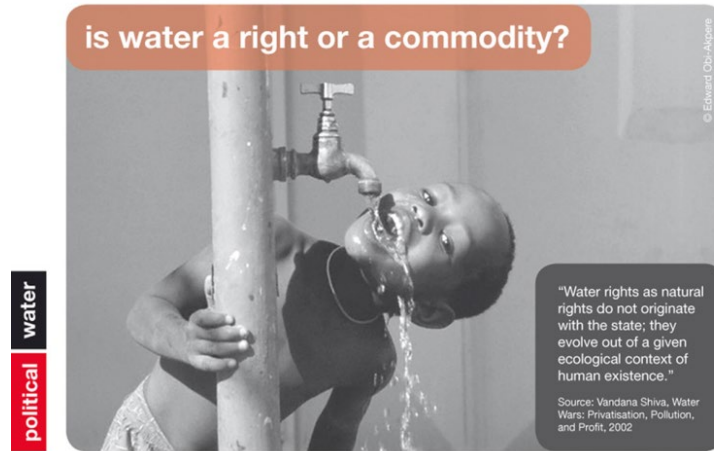
70 percent of global freshwater withdrawals are used for irrigation.

Source: World Water Development Report 2012

Many industries, some known to be heavily polluting (such as leather and chemicals), are moving from high-income countries to emerging market economies. Despite improvements in some regions, water pollution is on the rise globally.

Source: World Water Assessment Programme

Is water a commodity or a human right?

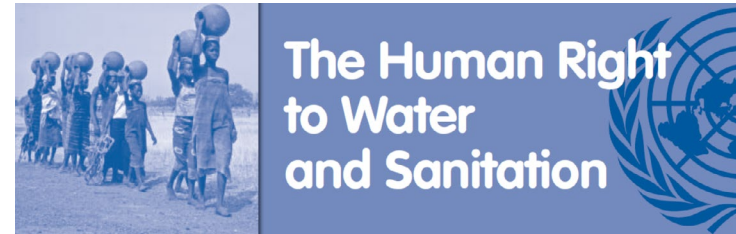


water rights

Access to water and sanitation is a human right. This has been recognised by the United Nations. In November 2002, the Committee on Economic, Social and Cultural Rights adopted General Comment No. 15 on the right to water.

Article I.1 states that:

“The human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights”.



Comment No. 15 also defined the right to water as the right of everyone to sufficient, safe, acceptable and physically accessible and affordable water for personal and domestic uses.

On 28 July 2010, through Resolution 64/292, the United Nations General Assembly explicitly recognized the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realisation of all human rights. The Resolution calls upon States and international organisations to provide financial resources, help capacity-building and technology transfer to help countries, in particular developing countries, to provide safe, clean, accessible and affordable drinking water and sanitation for all.

Some qualifying conditions include:

- Physically accessible: ‘within 1,000 metres of home and 30 minutes collection’ (World Health Organisation)
- Affordable: ‘not exceed 3% of household income’ (United Nations Development Programme)
- Safe (to drink): ‘free from micro-organisms, chemical substances and radiological hazards that threaten health’ (World Health Organisation Guidelines for drinking water quality)
- Safe (and adequate sanitation): ‘where physical security can be safe-guarded and hygienic toilets accessible for use at all times of the day or night’
- Continuous and sufficient: ‘50 to 100 litres/person/day’ (World Health Organisation)
- Acceptable – water: ‘colour, odour and taste for domestic or personal use’
- Acceptable – sanitation: ‘culturally appropriate and sensitive to gender, lifecycle and privacy requirements’



All people have the right to safe drinking water, sanitation, shelter and basic services.



Ban Ki-moon
UN Secretary General



Our Services

About Arup

Arup is the creative force at the heart of many of the world’s most prominent projects in the built environment and across industry. From 90 offices in 38 countries our 11,500 designers, engineers, scientists and business consultants deliver innovative projects across the world with creativity and passion.

Water at Arup

Our capability encompasses water in natural catchment systems, including flood risk management, water treatment and supply, its uses in municipalities, the built environment and industry, and its treatment, re-use, recycling and return to the environment.

Arup provides the following services related to water and design:

Strategy

- Strategy
- Catchment science
- Masterplanning and urban design
- Surface water management plans
- Water cycle studies
- Planning policy and spatial planning
- Water resilience strategy and planning
- Carbon management and climate change studies
- Landscape and green infrastructure strategy
- Economic assessments
- Sustainability assessments
- Asset management
- Smart water management

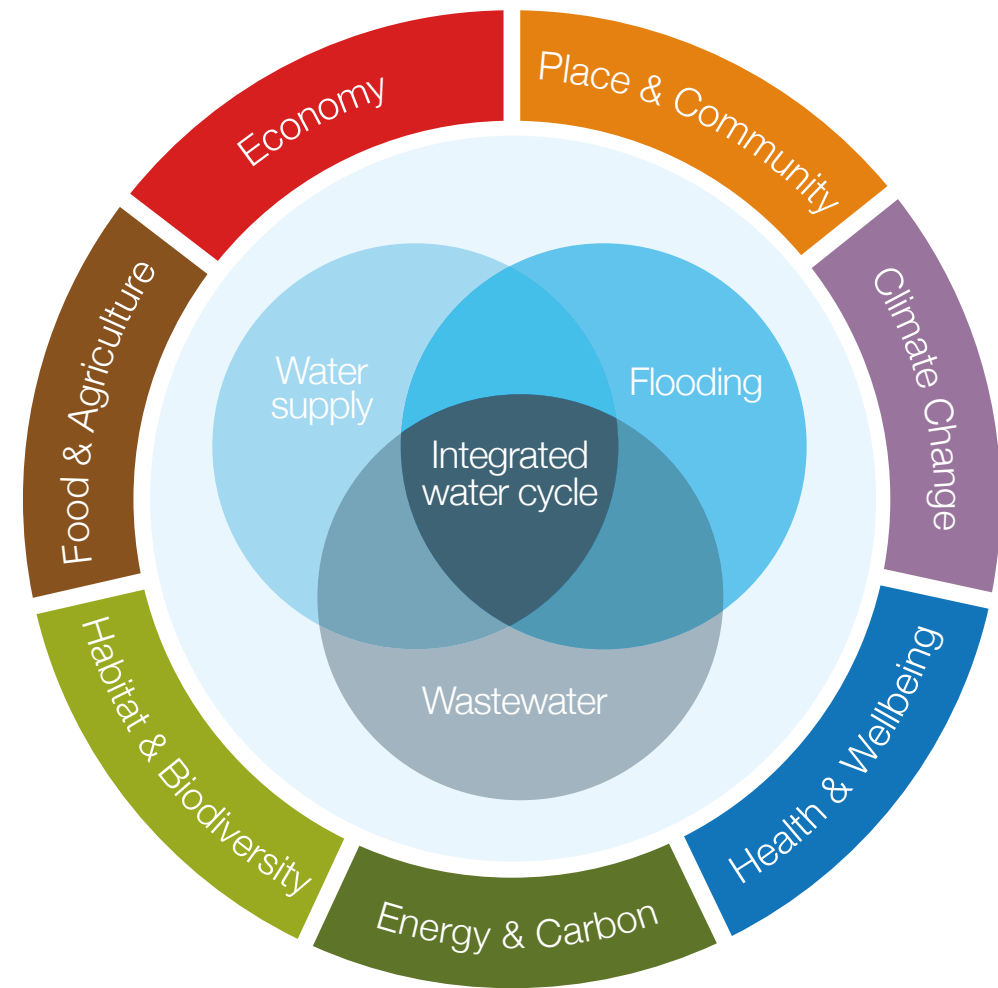
Project design and delivery

- Water efficient buildings
- Green roofs and walls
- Water re-use networks
- Coastal management
- Flood risk management
- Natural flood management
- Integrated drainage modelling
- Mechanical, Electrical and ICA design (MEICA)
- Resource efficiency and waste management
- River design and management
- Water supply and treatment
- Wastewater treatment
- Water resources management
- Planning applications
- Environmental services
- Post-project appraisal
- Renewable energy
- Hydropower
- Anaerobic digestion

Project development and funding

- Feasibility studies 3D city modelling & visualisation
- Community and stakeholder engagement
- Development of partnerships and funding
- Commercial strategy and management
- Ecosystems services assessment
- Analysis of social return on investment
- Technical Due Diligence

Design with Water





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Further information

This review provides information on a small selection of projects across our global water business in the last year.

To find out more visit:

www.arup.com/water

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