

water

JULY / AUGUST 2017 ISSUE 200



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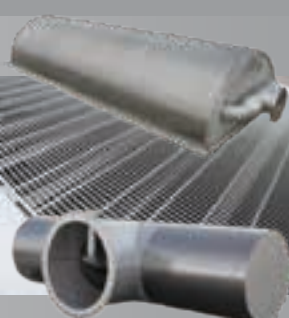
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The official journal of Water New Zealand – New Zealand's only water environment periodical. Established in 1958, Water New Zealand is a non-profit organisation.

Time to ask the big questions around water



Dukessa Blackburn-Huettner,
President, Water New Zealand

So far 2017 has been a big year for water issues – from quality, to how we exploit it and who benefits. As the year unfolds, it's clear that some of the key issues we've been looking at are going to continue to make headlines.

As our last edition of *Water* was going to print, the Havelock North inquiry released stage one of its report. It identified a number of failings in the way that drinking water had been managed, which led to the contamination outbreak and raised questions about the safety and security of our drinking water in general.

It's with this in mind that Water New Zealand will bring together a group of international experts in a one day workshop ahead of our 2017 Conference and Expo in September. We're looking to share some of the lessons learnt from around the world – particularly around water safety planning and water sanitation planning.

This is a workshop that is lining up to be a must-attend event for all drinking water decision makers and anyone responsible for ensuring public health aspects of drinking water. Included in the eminent line up is Steve Hrudehy, the co-author of *Safe Drinking Water – Lessons from Recent Outbreaks in Affluent Countries*.

We'll be looking at international best practices and

how these compare to some of our practices here in New Zealand, along with how we can learn from the experience of others. As Steve points out, protection of our water sources and treatment are of paramount importance and must never be compromised.

You can register for the workshop by going to the conference website – www.waterconference.org.nz.

And it's not just the quality or safety of our drinking water that has been an increasing focus for the public, politicians and a growing number of advocacy groups.

There is a growing public interest and questions around the quality of our water in rivers and coastal environments. The tourism industry relies on the clean and green image to sell New Zealand to millions of foreign visitors every year.

A recent report on New Zealand freshwaters has found that many of our native freshwater species are at risk as water quality faces "serious pressures".

The report *New Zealand's freshwaters: Values, state, trends and human impacts* by Professor Sir Peter Gluckman, Chief Science Advisor to the Prime Minister, urged politicians to address freshwater issues that he says are clearly linked to intensive farming and urbanisation.

The Gluckman report found clear evidence the freshwater estate was under pressure in terms of both water quality and quantity. There was a link between farming and declining water quality in pastoral areas, and contamination of urban waterways by expanding cities.

This has no doubt helped to set the scene for yet another growing public concern – bottling and selling water offshore – something that leads us directly into the vexed area of how we price water. Our view at Water New Zealand is

that it is now time for a national conversation over water pricing and the way water is used.

Globally, water is a precious resource. Increasingly the pressures of population growth, climate change and exploitation are making it more scarce and valuable.

International commentators are already talking about the fact that countries will be charging for water in the future in the same way they now charge for oil.

Our country is lucky to be blessed with an abundant supply of water, which as we know, is the foundation for our dairy sector. In 2010, farmers were permitted to take about 4707 million cubic metres of water per year from our rivers and aquifers for irrigation, mostly for dairying. Sixty eight percent of those water rights were allocated in Canterbury.

In addition, it's been estimated 23 billion litres a year has been allocated for bottled water bound for destinations all over the world including USA, Europe, the Middle East and Asia.

Just a few weeks ago, the West Coast Regional Council granted a consortium the right to build a pipeline from the edge of Mt Aspiring National Park to Jackson's Bay, south of Haast to pump 800 million litres of water per month straight onto ships waiting offshore. The plan is to export this to Kuwait.

It is a fair question to ask why this precious resource is given away so freely? The Government's claim is that

nobody owns the water and therefore nobody should pay for it. Yet we know that water permits for irrigation are worth literally millions of dollars to permit holders in the same way that oil is liquid gold for the petroleum industry.

It is clearly time for a national discussion over water charging and the development of a new policy framework that reflects the true value of water.

But in fairness, why should water bottlers be charged any differently from other users because some do not like the fact that bottlers make a profit from the free use of a resource? What about the soft drink manufacturers, the irrigators, or the dairy farmers that use up to 250 litres of water to make one litre of milk?

If we begin charging commercial users, should households pay for water? Despite the commonly held perception, we know that householders currently don't pay for water – just the supporting infrastructure. So, if water is charged for, who gets the royalties? All this raises the question of ownership and possible Maori rights.

Being election year, water will be an election issue so we've asked all political parties a series of questions about some of these key issues facing water and the way we manage it. A report on pages 22-25 outlines their response.

It's clear that the time for taking our water for granted is now over – New Zealand needs a long term, sustainable water plan. **WNZ**

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New MD for Beca

Beca has appointed Darryl-Lee Wendelborn

as managing director for New Zealand. Darryl-Lee has been a key member of Beca's senior leadership team since 2011 as operations manager for the substantial Environments business.



Her track record in delivering transformational outcomes was demonstrated in her sponsorship of the launch of Beca's successful Design Practice in 2015. She is known for her collaborative working style and as a great coach and mentor for the firm's emerging leadership talent.

Greg Lowe, Beca Group CEO, says Darryl-Lee was selected from a strong field of candidates from within Beca. "She is a wonderful colleague and a great leader, and will bring fresh thinking, new ideas and energy to the leadership of our business.

"Darryl-Lee will play a critical role in the next exciting chapter in our journey which has cemented Beca as one of the region's leading professional services firms."

Darryl-Lee says: "Our rapidly growing urban centres, growth in tourism, development pressures on our built and natural environments, combined with a strong economy, present both opportunity and challenge for businesses and government.

"I have always loved a challenge and I look forward to continuing to focus our business on solving complex problems and making a real difference for the businesses and communities we serve."

Darryl-Lee succeeds Don Lyon who has moved into a new role as chief strategy & operations officer for the Beca Group.

IWA appoints new executive director

The International Water Association has appointed Professor Kala Vairavamoorthy as the organisation's new Executive Director.

Kala Vairavamoorthy is currently the Deputy Director General (Research) at the International Water Management Institute (IWMI).

He is a water resource management expert, with a particular interest in urban water issues. Prof Vairavamoorthy was the Founding Dean of the Patel College of Global Sustainability and a tenured Professor in the Department of Civil and Environmental Engineering, at the University of South Florida.

He was a full professor and Chair of Water Engineering at the University of Birmingham, UK.

IWA President, Diane D'Arras says Prof Vairavamoorthy will bring his wide scientific, managerial and cultural experience to the organisation. He will move to the Netherlands and will take up his new role in October. Until then, Tom Williams remain as Interim Executive Director.

Author acknowledgement

In the March 2017 issue of *Water* was an article called, 'Waste Stabilisation Ponds – are they valued – are they understood?'

Include in this article was text from the current draft *WSP Good Practice Guide* co-authored by Humphrey Archer, Gilles Altner, Rupert Craggs, John Wong, Regan Senior, Hugh Ratsey and Nick Walmsley.

Lessons from the UK

Infrastructure New Zealand published a report last month that looked at the 2017 budget, which boasts the largest investment in our history, against the strengths of the United Kingdom approach to rebuilding national infrastructure.

Its conclusions were for us to set up an independent body to identify long-term infrastructure needs and monitor performance against these needs. This will enhance public awareness of capital requirements, encourage a strategic approach to service delivery and mitigate underinvestment through the economic cycle.

Recommendations were:

Reform planning laws and local government structures and funding to provide an aligned spatial planning and infrastructure delivery system nationally, regionally and locally.

Set up a specialised project procurement entity to help plan, prioritise and deliver national and local capital programmes. If this entity is independent of the Government, it will depoliticise procurement decisions and be able to work more closely with councils and the private sector.

Reform the water sector and consolidate water supply and wastewater services into a smaller number of large operators.

Shift to independent regulation. An enlarged Environmental Protection Authority taking on responsibilities of regional councils would reduce conflicts of interest, support professional development and have the ability to modernise environmental management. An independent water regulator would be more effective in holding local government to account for public health and financial performance outcomes.

Investigate the partial or full sell down of Watercare to fund growth. Watercare does not provide a return on investment so no revenue would be sacrificed. Proceeds could be used to fund growth infrastructure with a high social and economic return.

Improved efficiency from unrestricted capital management would offset price increases resulting from a margin for profit.

Revise council funding to align central and local government investment incentives. Broadening council taxation sources will encourage councils to better support growth. New funding tools will require strengthened governance and the promise of increased revenue will encourage councils to support change.



Wellington quiz champs

Quiz team A+C Enigma, from Allen and Clarke, once again proved they were in command at the annual Wellington regional meeting quiz competition.

This time they beat off 10 rival teams to take the throne for the third year in a row. Pictured with the trophy (l-r): Jason Carpenter; Anna Scanlen; Alasdair MacLeod; Rob Smith; and Stu Beresford. Allen and Clarke also sponsored the event.

Tapping in to water news

New chair for Opus International

Keith Watson has been appointed as chair of Opus International Consultants to succeed Dr Kerry McDonald.

Keith has been on the Opus board for eight years, chairing the Risk and Health & Safety Committee. He was previously a senior executive of Hewlett Packard in North America and Asia, including managing director of Hewlett Packard New Zealand.

Dr McDonald has retired from the board. He had been a director of Opus for 10 years, nine of those as chair.

Opus' board of directors is: Keith Watson, Alan Isaac, Sam Knowles, Dr David Prentice, Azmir Merican, Mohd Shahazwan bin Mohd Harris and Low Chee Yen.

More sewerage costs land on property owners

Masterton District Council (MDC) is looking at a district-wide sewer lateral inspections

programme with homeowners lumped with the bill for any repair work to pipes on their property.

Auckland and Wellington councils already expect homeowners to pay the cost of fixing faulty waste pipes between properties and the main sewerage system.

If a significant fault is not fixed within six months of council notice, the MDC will have it fixed at the homeowner's expense. Smaller unrepaired faults would go on the property's LIM report.

MDC assets and operations manager David Hopman has reported that when it rains heavily, issues in the network, including faulty laterals, cause about three times Masterton's average daily load to unnecessarily go through the sewer network, most of this being stormwater.

"Obviously, the less water that needs to be treated, the lower the cost, and the fewer issues there are."

Over the past eight years the council has spent \$16 million on sewer work around Masterton, concentrating on the "poorest performing sewers".

This work has reduced the inflow by about 18 percent.

David says MDC was still committed to continuing with its renewal programme, but it is now looking at complementing this with the proposed lateral repair approach.

Prior to this proposal, council had used an "ad hoc" approach to identifying lateral faults, he says.

Carterton District Council chief executive Jane Davis said the council hadn't had any issues with sewer laterals for at least 12 years, and "probably longer than that".

Some councils around the country remain responsible for the laterals between the main system and the property boundary.



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WATER NEW ZEALAND ANNUAL GENERAL MEETING

The Water New Zealand 2017 Annual General Meeting will take place at 5.00 pm on Thursday, 20 September at the conference venue, Claudelands Arena, Hamilton.

To meet constitutional deadlines, any notices of motion for this meeting must be supplied to the Chief Executive by 5.00 pm on Wednesday, 16 August.

Notice of Meeting, Agenda, and any Call for Notices will be sent to financial members by Wednesday, 23 August.

Please contact Amy Aldrich, Association Secretary, Water New Zealand, if you have any queries. Phone: +64 4 495 0894, Email: amy.aldrich@waternz.org.nz

Water New Zealand Board Election – Call for nominations

The call for nominations for election to the Board of Water New Zealand closes on Tuesday, 1 August. The Board comprises six elected members and may include two co-opted members. Members are elected for three-year terms. This year, one position is available, because a sitting member will retire by rotation.

Members contemplating standing for the Board may wish to discuss the role and responsibilities of directors with sitting members of the Board. The candidate, nominator, and seconder must all be financial members of the Association.

Backflow Conference

The 2017 Backflow Conference will be held in Tauranga

3rd–4th August

This conference provides a great opportunity to keep up to date with new ideas, training and best practice standards in the sector.

It's an important event for water supply managers, building compliance officials, manufacturers, plumbers, and training providers.

The conference will feature an exhibition area where exhibitors and conference delegates will be on hand to meet and discuss latest developments and backflow innovations.

Please visit the www.waternz.org.nz/backflowconference to register. The conference is organised by the Water New Zealand Backflow Group.



Backflow Group
WATER NEW ZEALAND

Customer-focus in action

The focus is shifting. New Zealand's water industry is listening now, more than ever, to its customers.

Water New Zealand and international professional services consultant, Arup, have recently closed the first New Zealand National Water Survey and, with more than 4500 responses nationwide, it has so far proved to have been a great success.

The survey is the first attempt of its kind to understand attitudes, priorities and perceptions of a wide cross section of consumers around water issues.

"The water industry is facing constant challenge over how we plan and manage our resources. Listening to customer feedback is vitally important to understand and respond to the changing needs of our communities," says Water New Zealand Chief Executive John Pfahlert.

Arup's project manager for the survey, James Peveril, says the survey has been a fantastic opportunity to 'take the pulse' of the nation.

"Everyday Kiwis are not often given the opportunity to have their say on water issues in a meaningful way. More than 4500 people took time to respond to the survey. This is similar to the uptake for last year's Australian Water Outlook Survey, and is a strong result given the difference in population between the two countries."

He says there was a large regional and age distribution of respondents – a robust sample – which is a strong indication that the results will be reflective of the views of the New Zealand population.

The survey also aimed to help get people talking about water issues and what is important to them. Key issues and areas that the survey considers include water efficiency, the price of water, the importance of drinking water quality and customer service.

"The resulting discussions amongst family, friends and colleagues, certainly help raise awareness. Be it availability, cost, usage, ownership of assets or future concerns, the survey encouraged conversations around the importance of water and how it is managed.

"It is also really important for us to evaluate the significant number of written comments that have been received, in addition to the multiple-choice answers. Respondents have expressed many strong views and concerns; and where consistent strong opinions are present, this may help drive change – at local, and potentially, national level.

"We expect the survey outcomes may be used by water services providers to inform their planning and strategic development and to understand where they can improve customer service. The results can be used by government and industry groups to understand consumer attitudes towards policy and planning for the future of water in New Zealand."

Daniel Lambert, Arup's Australasia water leader, will share the key results at the New Zealand Water Conference and Expo in Hamilton in September. Daniel says, "We are particularly excited about the prospect of identifying the issues of national significance to water consumers.

"There will also be scope to compare and contrast consumers' attitudes towards key issues with those on the other side of the Tasman and beyond – to work out what makes New Zealand unique and where we might learn from others."

The New Zealand National Water Survey will be available online shortly after the conference. The report will be accessible on the Water New Zealand website and it will be made available to service providers and local and national government.

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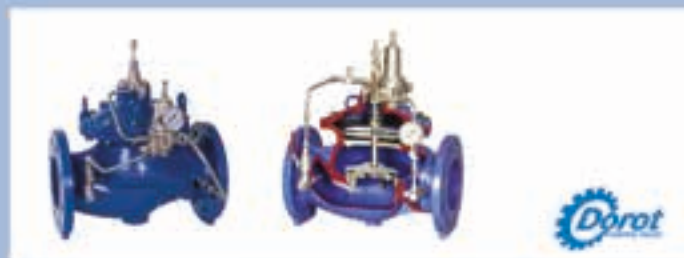
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Future-focused plan for infrastructure needed

New Zealand's infrastructure is at a crossroads and needs to be a key focus in the upcoming election, Local Government New Zealand says.

In its election manifesto, to be released at its annual conference in Auckland on July 23–25, LGNZ says the country's infrastructure will need significant attention in the coming years. The manifesto calls for an incoming government to commit to a range of measures to help communities manage factors including population growth, tourism stresses, climate change and an approaching need to renew existing infrastructure.

LGNZ Vice President Dave Cull says infrastructure and how it is funded is a major theme running throughout the manifesto, LGNZ's plan for a prosperous and vibrant New Zealand.

"Our roads, water pipes and sewage treatment plants are the bedrock of our communities, environment and economies, and we are at a point now where we need to

take some significant decisions about how we ensure we continue to enjoy the benefits of our vital infrastructure," Cull says.

The issue was also highlighted recently in the OECD's New Zealand Economic Survey, which noted limitations on the ability and incentives for local governments to fund land transport and water infrastructure has restricted housing supply. The report recommended enhancing councils' incentives to accommodate growth, for example by sharing in a tax base linked to local economic activity and to apply user charging more broadly for infrastructure, including congestion charging.

Cull says the OECD echoes LGNZ's own view and that it must be taken into consideration.

"The findings of the OECD confirm that local government needs alternative funding mechanisms beyond rates and debt to ensure we meet our infrastructure challenges. The OECD says our productivity

is already being held back by poor housing infrastructure, if our other vital infrastructure is not up to scratch it will become difficult for the country to thrive in a rapidly changing world."

In its manifesto LGNZ says to ensure infrastructure is properly resourced and fit-for-purpose for the future, an incoming government will need to:

- Ensure a broad range of funding tools are available for local authorities, for example regional fuel taxes or congestion charges;
- Give councils greater decision-making authority on urban issues, for example the option to use special purpose vehicles;
- Introduce integrated transport planning; and
- Provide councils with a mechanism for capturing a share of local economic activity which councils are instrumental in growing through effective infrastructure investment.

Big turnout to safe drinking water workshops

A series of workshops run by Water New Zealand over the past two months, aimed at helping local authority decision makers better understand the risks and responsibilities around safe drinking water, proved to be a huge success with around 350 council staff and elected councillors attending eleven workshops throughout the country.

The Safe Drinking-water Supplies: Understanding your Risks and Responsibilities workshops were presented by Opus Principal Environmental Scientist Jim Graham on behalf of Water New Zealand. Jim is a veteran of 25 years' experience in environmental science and environmental health science, specialising in recreational and drinking water quality.

"We received fantastic feedback from attendees. Jim presented what is highly technical information in a lively and understandable manner," says Water New Zealand Chief Executive John Pfahlert.

The workshops were aimed particularly at local body councillors, council and district health board staff, and district health board members and were sparked by the Havelock

North contamination event in August last year.

"Elected representatives and staff have a responsibility to ensure that their communities are supplied with safe drinking water so it's important that they understand their role and the impact of their decisions.

"The Havelock North water contamination crisis shows just what can happen when there is a failure to ensure safe drinking water.

"The workshops provided an opportunity for attendees to come up to speed on the evolution of safe water supplies, the contaminants that make people sick, technologies and what the compliance tools are trying to achieve.

"They looked at the cause and effects of other developed world water-borne illness outbreaks such as those in Milwaukee and Walkerton and how those events changed the thinking around drinking water."

Based on the success of the workshops, Water New Zealand is looking at the feasibility of running another series of workshops in 2018.

Look out for more information on this in our e-newsletter, Pipeline, and on our website.



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Council proceeds with Annual Plan option

After deliberating for nearly three hours on wastewater services options for its Annual Plan, the Waikato District Council has decided to proceed with the option that will allow it to prepare long-term plans to protect waterways and environmentally sensitive areas.

An Annual Plan for 2017/18 incorporating this option was drafted for formal adoption at an extraordinary Council meeting on 28 June.

The Council's decision came after it received and considered 466 submissions and heard presentations on 14 of those submissions.

Of the written submissions received by the Council, 41 percent were in favour of the option to be included in the draft Annual Plan (Option 2), 42 percent were in favour of a cheaper option to mitigate key risks of wastewater overflows (Option 1), and 11 percent were in favour of a more expensive option to prepare long-term plans for a district-wide 'continuous improvement programme' (Option 3).

The Council also undertook a poll of people who attended drop-in sessions during the consultation and sought feedback on social

media. Feedback received through polling and social media showed most of these respondents were in favour of Option 2.

The Council vote was carried by a majority, with councillors Stephanie Henderson, Shelley Lynch and Eugene Patterson voting against the decision to proceed with Option 2.

During the Council deliberations Mayor Allan Sanson said, "This is all about asset management. Asset data is key to every decision you make and... we've been flying blind for 15 years."

Commenting on the impetus to consider the issue, Mayor Sanson said, "There was a strong demand from councillors in this chamber to lift the level of services we provide after the problems we had [in Raglan Harbour] last year."

He said, "The Jacobs report highlighted for me the lack of understanding we had about our infrastructure... Raglan was the catalyst to force our hand to do something about it."

The Council's general manager Service Delivery Tim Harty said that interim results received this week from wastewater network

investigations approved last year so far showed that 20 percent of the network was in poor condition and that the life of the Council's wastewater assets was lower than average.

"The reason we need to understand our assets is so that we can manage our assets going forward in the most cost-effective way possible," he said.

Option 1 would allow the Council to assess the condition of only 25 percent of its network altogether, whereas Option 2 would allow for about 50 percent of the network to be assessed by the time the Long-Term Plan was due to be considered next year, and for the whole network to be assessed by mid-2019, said Tim.

Option 2 proposes that targeted wastewater rates will rise by between \$78 and \$230 depending on where the ratepayer lives. The change is complicated by the fact that the Council is still in the process of moving from five different wastewater rates throughout the district to a single district-wide rate that will be introduced in the coming year.

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Big focus on current water challenges at this year's conference

"This year's conference looks to be as big and as bright as 2016."

By Water New Zealand CEO, **John Pfahlert**



The big event on this year's calendar is fast approaching. It's time to register for the annual Water New Zealand Conference and Expo.

This year it's being held in Hamilton from 20-22 September and as well as the main conference and expo, Water New Zealand will be running an additional one-day Drinking Water Workshop on 19 September focussing on the learnings from the Havelock North campylobacter outbreak.

Several of the international keynote speakers will be sharing their expertise and experience of similar events overseas including Dr Steve Hrudehy who's regarded as one of the world's leading experts on contamination outbreaks.

The workshop will certainly be one of the highlights of the conference and a must-attend event for all drinking water decision makers and anyone responsible for ensuring public health aspects of drinking water. See pages 14 – 15 for more information about the workshop and the international keynote presenters.

The rest of the conference and expo is looking to be every bit as big and bright as last year's in Rotorua in which we hosted nearly 1300 delegates and expo attendees – almost a record attendance.

This year there will be 12 international speakers – the biggest line up of international speakers we've had at the conference – from the US, Denmark, India, Scotland, the Pacific and Australia covering issues from the Sustainable Development Goals to lessons from the Flint water contamination crisis in Michigan.

Again this year, we'll be running our Thought Leadership stream which proved very successful last year. This provides an opportunity to hear from industry leaders from around the world as well as New Zealand about big picture thoughts and strategies to help meet the challenges the water sector is facing. Running in conjunction with this will be more than 100 technical papers selected by our newly appointed Technical Committee.

But as always, we're looking for even more opportunities to challenge and entertain. So, this year we're hoping to see plenty of entries in our new event, the Operations Challenge.

This is a challenge that will hopefully be fun as well as provide an opportunity to test your teamwork, collaboration and problem solving skills across three activities:

- A health and safety practical challenge (confined space entry problem)





- A water transfer problem (theoretical calculation and application of design, including sampling)
- A treatment process challenge (manipulate an online process to achieve desired quality criteria).

As well as being fun, the activities are intended to have a 'real-world' application within the water sector.

If this sounds like a challenge for you, you'll need to get a team together and give yourselves a name. The teams will be made up of three individuals (ideally a 'cross-section' of technical staff from within a water industry organisation, sector, or collaboration) and may be from different employers or parts of an organisation.

Registration for the Operations Challenge is free but all team members must have a valid Conference Registration.

You'll get more information once your team is registered. Go to our conference website www.waterconference.org.nz for more information and to register for the main conference, Drinking Water Workshop, and/or the Operations Challenge.

The Water New Zealand Conference and Expo is a major event bringing together like-minded professionals to share experiences and knowledge and build new relationships. It is certainly the highlight of the 3 Waters events calendar in this country and an occasion that is not to be missed. **WNZ**

OPERATIONS CHALLENGE – REGISTER NOW!



Are you and your colleagues great at teamwork? Are you skilled problem solvers? If you're up for a challenge as well as some fun, then get a team of three together and enter the Operations Challenge. This is a new addition to the Water New Zealand Conference & Expo in 2017 and will put teams of industry professionals to the test in identified relevant activities.

Test yourself and your teammates in three challenges:

- » **health and safety** – confined space entry problem
- » **water transfer** – theoretical calculation and application of design
- » **treatment process** – manipulate an on-line process to achieve desired quality criteria

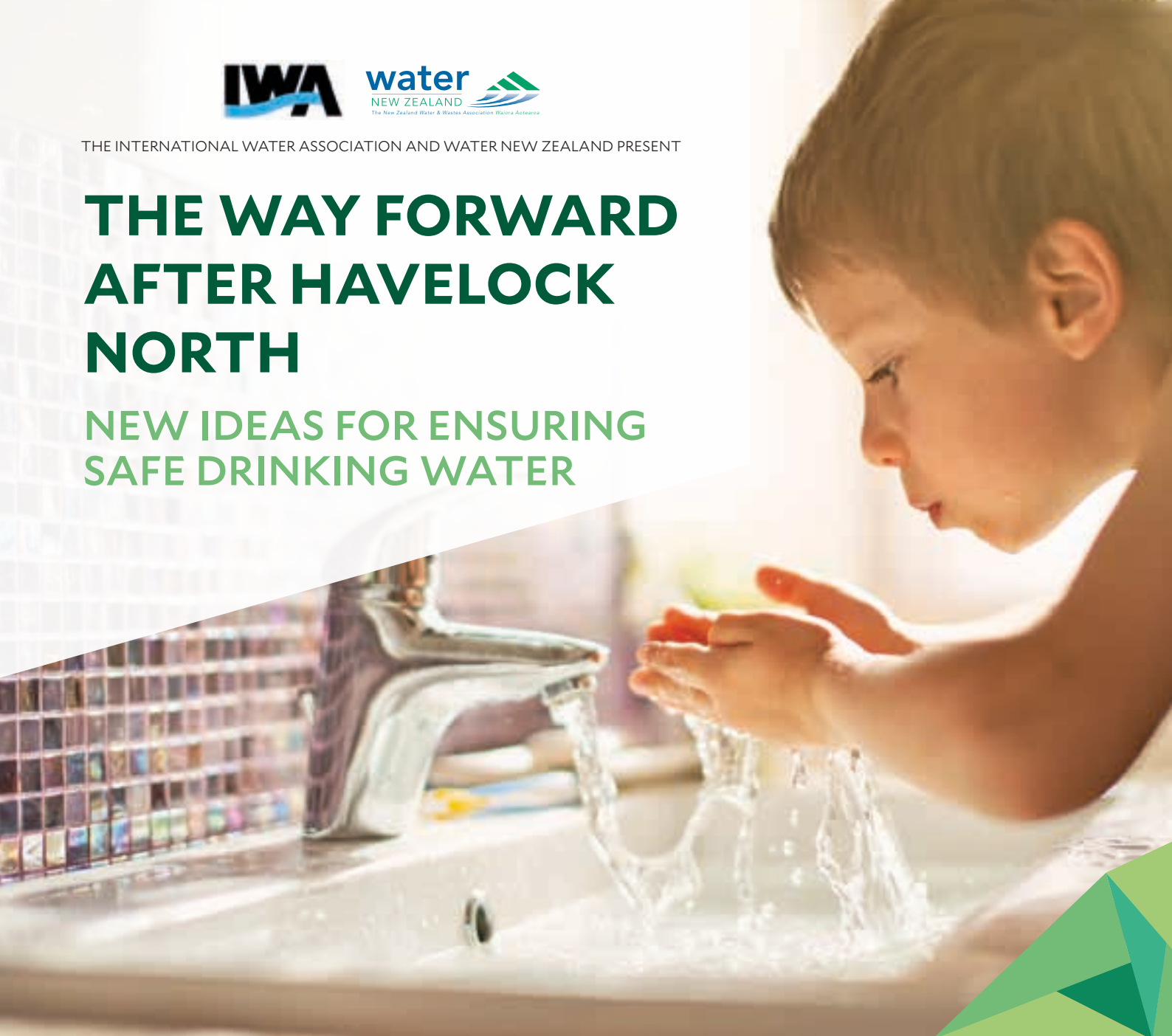
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THE INTERNATIONAL WATER ASSOCIATION AND WATER NEW ZEALAND PRESENT

THE WAY FORWARD AFTER HAVELOCK NORTH

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DRINKING WATER WORKSHOP

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- » What happened in Havelock and how it compares with international contamination events
- » Linkages between Water Safety Planning and Sanitation Safety Plans – potential concepts, policies and practice
- » Analysis of water quality management data – what it tells us (human health, animal waste and water quality)
- » Where we can go from here

INTERNATIONAL KEYNOTES

Steve Hrudehy – Professor Emeritus, University of Alberta, Canada – co-author of *Safe Drinking Water – Lessons from Recent Outbreaks in Affluent Nations*. Steve has served on 28 expert panels, dealing with high profile environmental issues including the Walkerton Inquiry (2000-2002), the Expert Panel on Safe Drinking Water for First Nations in Canada (2006) and Chair of the Water Research Foundation Expert Panel on drinking water disinfection by-products and bladder cancer (Washington DC 2014-15)

Dr Jamie Bartram – Director of the Water Institute, University of North Carolina, USA – has over 25 years' experience in international policy, research and advisory work in public health and disease prevention, especially in environmental health and water supply and sanitation.

David Kay – Professor, Aberystwyth University, Wales, UK – Director of CREH Ltd and Professor of Environment and Health at the University of Wales. Has acted as consultant and/or advisor on water quality and standards for recreational and drinking water to WHO, EU, USEPA, NERC, EPSRC, DEFRA, DWI, HPA, Scottish Government, Environment Agency, SEPA and WRc.

Paul Byleveld – Manager Water Unit, Environmental Health Branch, New South Wales Health, Australia – manages the Water Unit in New South Wales Health, Australia, which is responsible for public health regulation and advice on drinking water, wastewater, water recycling, and recreational waters. He oversees the legislation and policies for drinking water quality assurance.

Robert Bos – IWA / World Health Organisation – Public health biologist (University of Amsterdam) who completed a 32-year career with the World Health Organization in February 2013; the last four years he was Coordinator of WHO's Water, Sanitation and Health Programme in the Department of Public Health and Environment. Since January 2016 he is a member of a consultants' team for the Asian Development Bank, working on health impact assessment of infrastructure projects, with a focus on the Mekong countries.

They'll be joined by water sector and public and environmental health leaders in New Zealand to discuss the learnings from Havelock North and new ideas for ensuring safe drinking water.

"This workshop brings international experts together for one day to share some of the best practices from around the world"

John Pfahlert, Water New Zealand CEO

"It is certainly an essential event for everyone involved in drinking water management and public health"

Marion Savill, International Water Association NZ

REGISTER ONLINE NOW AT:
WWW.WATERNZCONFERENCE.ORG.NZ

Calling for nominations for **Water New Zealand 2017 awards**



Taking home the award for the CH2M Beca Young Water Professional of the Year at last year's Water New Zealand Conference and Expo has helped motivate **Jules Scott-Hansen** (pictured) to continue striving to do her best for the industry and her community.

“Getting recognition was really special,” she says. As an engineer with Opus International, Jules impressed her associates and colleagues with her professionalism, communication skills and passion for how engineering can make a difference to people's lives.

“As a new person in the industry you're not always told if you're doing well, so it was great to be nominated by my Business Manager and really nice to have the recognition of my peers and colleagues for the work done early in my career.”

Jules was one of more than a dozen industry professionals to receive recognition for their contribution to the sector through the Water New Zealand awards.

“Every year we run these awards because the conference provides a great opportunity for our members to show our appreciation of the work of our colleagues and the professionalism of the water sector,” says Water New Zealand Chief Executive John Pfahlert.

“These awards do mean a lot to those who have been

nominated and support the professionalism of our sector. So I strongly encourage all our members to look at the awards on offer this year and ensure you get nominations in.”

Other key awards include the Ronald Hicks Memorial Award which is given for innovative work on water pollution and sewage treatment in New Zealand. Since 1985 some of the many creative leaders of the association have been recognised through receiving this award.

Chair of the Ronald Hicks Memorial Trust, Mark Milke says the award helps communicate new knowledge and important innovations and he's asking for more nominations now.

“Today's society continues to be challenged to solve or better understand its water pollution and sewage treatment problems. We do not have all the answers, but we do have many people contributing to important innovations,” he says. **WNZ**

- Go to our website www.waternzconference.org.nz for more information on awards and criteria.

KEY AWARDS INCLUDE:

Hynds Paper of the Year – recognises the best technical and presented paper at the Water New Zealand Annual Conference & Expo based on written content and quality of presentation

Ronald Hicks Memorial Award – made to the author(s) of an article or paper considered significant in solving or clarifying sewage treatment or water pollution problems in New Zealand

CH2M Beca Young Water Professional Award – acknowledges and rewards one young water professional who has made a significant contribution to the water industry and the general community, and has demonstrated exceptional achievement in the early stages of their career

ProjectMax Young Author of the Year – complements the Hynds Paper of the Year Award and encourages participation of young authors

Poster of the Year – entries are welcome on any topic of relevance to the water industry, with entries from students particularly encouraged. Poster summaries must be 250 words or less and submitted in word document format

Opus Trainee of the Year – open to any trainee currently involved in an NZQA approved course applicable to the water and wastes industry

IXOM Operations Prize – seeking examples of best practice in the industry and nominations are welcome for individuals, an operations team, or a particular project that had a strong operations flavour

Veolia Health and Safety Award – will acknowledge and reward a corporate entity or individual who has developed an innovation which eliminates or minimises a health or safety risk in the water industry

YWP Conference Attendance Award – gives the opportunity for recent graduates to attend the Water New Zealand Annual Conference or the Water New Zealand International Stormwater Conference, in order that they may broaden their knowledge and gain greater appreciation of the water environment, water management, water engineering and the water industry at large

Project Award – provides recognition of excellence, not only in the delivery of a project, but also the contribution of various parties to the final outcome. Members are invited to nominate projects primarily associated with addressing water, wastewater and/or stormwater issues that highlight the projects technical expertise and the service applicants have provided to its clients.

Non-members of Water New Zealand are eligible for some of these awards.

Criteria and Scope for Awards

The definition and scope of each award, the criteria for selection, along with the nomination processes and timelines for submission can be found under the Awards section on the conference website www.waternzconference.org.nz.

Nominations this year will close **Friday, August 11, 2017**, and the awards will be presented at this year's Annual Conference in Hamilton.



water

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Drinking Water Workshop 19 September 2017



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Operations MAN

As Mike Monaghan's career has developed, so too has his passion for the water industry and the people who work in operations.

BY MARY SEARLE BELL.

If you grow up in St Helens in the northwest of England, there's a very good chance you'll end up working for the town's largest industrial employer, world-leading glass company, Pilkington. That was the case for Mike Monaghan's parents, brother, and just about his whole extended family, however, when Mike was set to leave school in the mid-80s, he opted for a trade apprenticeship rather than a career in glass.

He was fortunate to be offered three apprenticeships to choose between. He opted for one as an electrical field service engineer with, what was then, North West Water. Following privatisation a few years later, the company was renamed United Utilities, and is the second largest water company in England/Wales.

"The package was better," says Mike of his decision to go with electrical services engineering. "And the industry looked interesting."

He spent the first 14 years of his career as an electrical field service engineer, maintaining water and wastewater



Mike Monaghan

treatment plants across the north west of England, until the mid-1990s, when there was a change in how the UK disposed of its biosolids. For more than 100 years, sludge collected from the sewage treatment plants in the Mersey Valley was piped out to sea. In 1998, United Utilities opened a state-of-the-art sludge dewatering facility and a fluidised bed incineration plant.

“I was given an opportunity for early involvement in the commissioning of the plant and the operations side of things really appealed. So I ditched the electrical services engineering to become a process engineer.”

His new role was that of Process Controller with the Shell Green Mersey Valley Sludge Processing Facility. This plant is responsible for the dewatering and disposal of wastewater sludge from the Manchester and Liverpool regions.

“This facility was dealing with 6000 cubic metres of sludge for a population base of approximately seven million customers. To put that in context, it deals with more sludge than the whole of New Zealand produces!”

For five years Mike worked at the plant, and while he enjoyed it, he and his wife Shelia were toying with the idea of living abroad.

“We had been on holiday to New Zealand and really liked it – the lifestyle, the Kiwis – it was a real draw. So, we thought we’d have a go at emigrating.”

In 2003 the couple and their three school-aged children arrived in New Zealand.

“We came on the back of my electrical ticket, thinking I’d get back into electrical engineering, but an opportunity came up with Palmerston North City Council [PNCC] at the wastewater treatment plant, and I thought I’d prefer to stay with the water industry.”

The role was that of wastewater treatment plant supervisor. Coming from a big commercial company, with over 4000 employees, to local government had its challenges for Mike.

“I didn’t really know how local government worked,” he says. “And the scale of things was so different.

“I enrolled for a National Diploma in Wastewater Treatment, and met a few great people down there on the course. I think it was shortly after that time when I first got involved with the Water Industry Operations Group (WIOG) too.

“I began to grow a real affinity for the operations sector and helping other operators to gain knowledge through training and networking, and having a voice became a real passion for me.”

Mike was elected to the WIOG committee in 2008 and has recently completed four years as chair of the group.

“It was a truly honourable moment to be recognised by my peers and elected to chair,” he says, and an even prouder moment when he received the WIOG service award – the twisted tap – which recognises an individual’s effort, commitment and services to the organisation.

Meanwhile, back at PNCC, the water treatment plant supervisor left and Mike stepped in while a replacement was sought. Instead, however, a new role was created with Mike in mind.

“The challenge for us all is to be absolutely sure our systems are sound and we are doing everything we can to ensure we are providing safe drinking water.”

In 2007, he was made senior treatment plant supervisor, and was responsible for looking after both the wastewater and drinking water teams. Consequently, to round out his education and complement his wastewater qualification, he completed a Diploma in Drinking Water.

Change came again in 2014 when the department Mike worked for at council had a reshuffle and Mike became the treatment plants manager, with overall responsibility for the operation of all treatment plants, bore stations and pump stations for wastewater, stormwater and drinking water. He reports directly to the general manager of City Enterprises, the council’s in-house contracting division responsible for the maintenance, operation and construction of its infrastructure networks and facilities.

He was delighted at the 2016 WIOG conference to have the Palmerston North drinking water judged to be the best tasting in a blind taste test by a panel of expert judges.

On the wastewater side of things, PNCC is heading into a resource consent review process – the plant is due for re consenting in 2022 and there is much to be done between now and then.

Currently, each year, some 12.9 billion litres of wastewater from the city is delivered to the main treatment plant in Totara Road, where the majority of contaminants are removed before it is passed through wetland ponds and then discharged to the Manawatu River.

“There is a lot of work to do to explore all the options to find the best solution going forward,” says Mike.

Naturally, he believes his current role has more than enough to keep him engaged and excited for the foreseeable future. In addition, he has found PNCC to be an excellent company to work for.

“PNCC has been a great employer – letting me develop and grow over the years,” he says. “Here, you are treated as a person, not a number. That is the biggest difference between United Utilities and my experience with the council.”

He is very aware of the responsibility of his position and the importance of the work his team does.

“Take a look at Havelock North and what happened there – anyone with a responsibility for providing drinking water is watching the outcome of that situation with keen interest.

“We have to continuously improve and upskill the operations sector,” he says. “The challenge for us all is to be absolutely sure our systems are sound and we are doing everything we can to ensure we are providing safe drinking water.” **WNZ**

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Political parties talk water

The future of the country's water is a concern from many angles. Just weeks away from polling day, Water New Zealand asks the major political parties four key questions about how they will tackle critical water issues.

1 What changes are needed in the management of fresh water to ensure its long-term sustainability and ensure that all New Zealanders have fair and equitable access to it?

ACT

Economically efficient use of water will result if we price water and allow it to be tradeable. Given that water is part of a natural system of evaporation, condensation and flow, revenues from the pricing of water should be owned in common, as revenues to local and central government. Those revenues should in the first instance be used to fund the monitoring, consultation, enforcement, scientific research, and environmental work focused on fixing degraded water quality.

Green Party

There are lots of ways in which we can manage fresh water to ensure its long-term sustainability. We can start by ending the millions of dollars that go to large-scale irrigation schemes like Ruataniwha and Wairarapa, that will enable dairy farming and push our rivers and aquifers to the limit. Irrigation schemes are not silver bullets to provide secure water into the future, they overlook the need to build resilience to climate instability and farm with the environment, not against it. We also need to look at how we're treating our aquifers that provide drinking water for large parts of New Zealand. Water bottlers and exporters are able to take pristine water from deep aquifers, while our towns rely on shallow aquifers that as we've seen in Havelock North and other parts of the country, do not always supply the best water to people.

Labour

We must make our rivers and lakes clean enough for people to swim in during summer without getting sick, while also achieving aquatic ecosystem health. Labour will do this through a new Freshwater Management National Policy Statement [NPS] based on that recommended by former chief Environment Court Judge Sheppard in 2010, but spiked by National. Increases in livestock land use intensity will no longer be a permitted activity. This is needed to stop rivers and lakes getting dirtier. The NPS, along with stronger water quality

standards, will mean that within five years water quality should be improving. Even the most grossly polluted rivers and lakes must be cleaned up over a generation. This will also protect aquifers.

Maori Party

Better management of our freshwater resource is vital to its long-term sustainability which is why we advocate for Te Mana o Te Wai (the health and well-being of water) to be at the heart of all decisions.

Water, the health of the environment and its people are interlinked and only by recognising this can we improve the mauri (quality and vitality) of water and safeguard the resource for future generations.

National

The Government has made a major step forward in freshwater management with the first National Policy Statement. Its implementation by Regional Councils is progressing with limits being set on contaminants and water takes. Our top priority is seeing this policy implemented nationwide.

New Zealand First

The current National Policy Statement on Renewable Electricity Generation and the National Policy Statement on Freshwater Management must be reviewed.

The government must ensure that only the sustainable taking and use of water for commercial purposes is permitted by developing a national water use strategy.

Legislation must ensure that the granting of RMA consents is consistent with the proposed new National Policy Statement and the Strategy.

The Opportunities Party

Water quality is under threat in many areas, while the demand for clean water is rising. We need to guarantee the public's right to clean fresh water while making the most of this incredible asset. The way to do that is by making polluters and commercial water users pay, and use that revenue to ensure water quality is restored.

United Future

We need to keep our fresh water of high quality and available for future generations.

At the very least, there needs to be a coherent royalties regime put in place, like there is for oil and gas. That way we can ensure that our water resources are not being just given away.

Secondly, there also needs to be a clear national policy developed about water exports. For too long there has been a complacency that water will always be abundant in New Zealand, and while that is generally true, recent developments show we can no longer take it for granted. Dirty and dried up rivers, and contaminated aquifers are not what we have usually been used to, nor do we want them to become the norm. Especially, if at the same time, we have to sit and watch the ships sailing away with millions of litres of our pure water for which they have paid virtually nothing.

2 The issue of water pricing has become relevant given the public concern around the bottling and selling of water for profit. What policy changes, if any, need to be put in place to ensure fairness when water is taken and used for profit?

ACT

Introducing tradeable water rights will help ensure water is allocated to highest-value uses.

Green Party

If you take water and profit from it, you should pay for it, just as you do any other input. We've been calling for a price on the commercial use of water for some time now, and what's clear is that it's a complex issue that we need to talk about as a nation. We'll be making policy announcements this year on it, so watch this space.

Labour

Labour says that everyone owns water, although some people have particular interests that others don't. Some of those are now valuable. We say that when a community resource such as this is being used for commercial profit, it is fair that the public gets a return on it by way of a royalty – as we do for oil, gas, coal, and even gravel.

All domestic and municipal uses of water would be exempt from the royalty, as would stock water uses. Royalty revenue would be shared with local councils and iwi.

Maori Party

The current system is not fair, or for that matter, clear. A discussion needs to be had around charging a fair rate for the bottling and selling of water but it needs to be guided by the principles of Te Mana o Te Wai.

It is not right that households are charged more to access a water supply than companies are who make a substantial profit from the allocation of water rights. We want water exports by foreign companies suspended so issues around water, namely quality, management and ownership, can be addressed.

National

The issue of water pricing needs to be considered with care and sophistication. Bottled water is such a small fraction of takes (0.002 percent) that a knee jerk response could derail sensible policy for key sectors like dairy, horticulture and wider industry. The Government has established a high powered technical advisory group that is carefully working through the issues and will report later this year. It will help inform future policy.

New Zealand First

Water must not be taxed or subjected to any charge beyond the recovery of capital, and the operational costs (including a fair rate of return) of taking, storing and reticulating it for authorised uses.

Where fresh water is exported from New Zealand in a purely or substantially natural state (such as bottled water), a royalty will be charged on a volume exported basis, and at least 25 percent of the royalties collected will be returned annually to the territorial local authority or authorities from which the water is sourced, for use exclusively for local economic development purposes. The amount of the royalty will be determined from time to time in consultation with the local authorities where water for export is sourced.

If a water consent holder finds they do not need all the water they applied to use, or they do not build as much irrigation infrastructure as planned, it should not be transferred.

The Opportunities Party

All commercial water users should be charged for the water that they use. The ideal outcome is that local authorities should identify how much spare capacity there is and auction off temporary permits to the highest bidders. This needs to be accompanied by charges for water pollution to ensure the water is truly used in a way that makes us all better off.

United Future

The job of Government is to safeguard and manage the resources of our country for all New Zealanders. As per our answer to question one, we would like to see a coherent royalties regime put in place that would attach a price to water when it is taken. There likely needs to be a wider political conversation on the most efficient way to regulate this natural resource and ensure that our water is future proofed for the country we will leave to our children and our children's children.

3 Is it now time to talk about ownership and pricing issues?

ACT

Yes. We fixed over-exploitation of our fisheries by leading the world with a system of tradeable quota and science based quota management. We can do the same with freshwater and water quality, by pricing water and allowing the use rights to be traded, all supported by a strong science research base to ensure we do not over-allocate water, while repairing the environmental damage already done to our rivers and lakes.

Green Party

Absolutely. The thinking so far has been that water is infinite and free, but we're getting situations like the Waikirikiriri/Selwyn River that ran dry this year and still has minimal water in it. In terms of ownership, we need to talk about who has responsibility for the care of our water rather than who owns it.

Labour

Yes. See Answer 2.

Maori Party

Yes. Current water allocation arrangements, which effectively allow water to be used to generate a profit, is a form of ownership despite the Government saying that no one owns the water.

Any national discussion on water ownership must consider the rights of iwi under the Treaty of Waitangi and we support their endeavours to further their rights.

Companies that profit from effectively a free resource should protect and preserve that water source or risk a substantial financial penalty and if the water quality declines they must restore it to an acceptable state.

National

The issues of pricing and ownership of water are hugely complex. Market models have a mixed track record internationally. They may be an appropriate solution in areas facing significant shortages but for most parts of New Zealand, only a fraction of the water resource is used. Any reforms need to be progressed cautiously and be based on science.

New Zealand First

Water is a common good and cannot be owned by any person or by the crown.

Maori rights and interests: The Treaty of Waitangi does not confer rights to take or use fresh water upon Maori, which are greater or lesser than the rights of any other New Zealander.

Crown Entity to hold all water storage in trust: All water storage facilities used for the purpose of hydro-electricity generation and/or agricultural irrigation held in any man-made storage reservoir, or in any lake or river consented for those purposes under the RMA, currently owned or held by any State Owned Enterprise, other Crown entity, or any local authority, will be transferred to a new Crown entity to be held permanently upon trust for the people of New Zealand. The new entity will allocate and license all water storage resources for hydro-electric power generation and agricultural irrigation and any other commercial use in accordance with the Strategy.

The Opportunities Party

Yes, and as part of that Maori ownership rights over freshwater need to be recognised and resolved. This issue is too big to hospital pass to local government to resolve, we need a national settlement.

4 New Zealand's three waters (drinking, storm and wastewater) are under increasing pressure due to declining quality, climate changes and population growth. How should much-needed long-term investment in infrastructure be tackled?

ACT

We believe local councils should receive half the GST from building in their area, for use on infrastructure. This means March's \$2 billion in new consents would signal an extra \$150 million investment in vital local infrastructure, such as drinking, storm and wastewater – all of which are desperately needed with population increases.

Green Party

We need to take a long view, not a short term view as this government has done. The protection of public drinking water is a serious national issue and it may need central government support to ensure a clean supply for some communities, as well as changes to land uses, especially when water comes from unconfined aquifers.

Catherine Delahunty has a bill in the Members Ballot addressing how we can protect our aquifers by giving them the same status in law as other water bodies. We could also support drinking water from small home tanks and water reuse systems. We are wasting a lot of water we could reuse. Water conservation plans need to be developed for all communities. There is best practice in stormwater and wastewater in different places but no national leadership to ensure it's shared, either a university or an MFE unit could gather and promote the best practice options, as wastewater contains emerging contaminants which require very specific wetland plants to assist in decontamination. The public need education about what products are actually unsafe in wastewater and some products should have toxic ingredients removed from them. This should be carried out by the EPA but it's seen as too expensive to reassess them.

Labour

Sewage treatment has improved enormously over recent decades in most of our cities, but some have not completed the separation of their stormwater from sewage. Labour will work with Auckland and other cities to agree timeframes for completion of this separation.

Labour will investigate the adequacy of urban sewage treatment plants across smaller urban areas to identify towns that may need assistance with planning or implementing cost-effective upgrades.

Meeting minimum drinking water standards is a core responsibility of local authorities. It can sometimes be a challenge for smaller communities, and Labour will assist them as we did when last in government.

Maori Party

Large scale investment, particularly in rural water infrastructure, is urgently needed, but it needs to be accompanied by a change in approach in infrastructure planning and management at all levels – local, regional and national.

Demands on water infrastructure will become more intense with the impact of climate change which is why we propose all local authorities prepare a risk assessment in their long-term planning to help address future infrastructure needs.

National

The next key reform priority for National is the 3 waters. We need to better integrate the Resource Management Act and Local Government Act provisions to better plan and fund new water infrastructure. We will also need to respond to any system problems identified from the Havelock North Inquiry and improve the regulatory environment to better ensure the quality of water services.

New Zealand First

Priorities for granting water rights must place public benefits before private benefits. Accordingly requirements for potable water for people's domestic supplies must prevail over all other takes and uses; the government must invest over time in water schemes which are consistent with these policies; large scale hydro-electricity generators, and large scale geothermal electricity generators, currently state owned enterprises, must remain exclusively in state ownership.

The Opportunities Party

We need to start planning ahead for issues like climate change. If we make superannuation sustainable we can afford to use the NZ Super Fund to invest more in the infrastructure a growing country needs.

Local authorities need also the ability to raise revenue from a variety of sources rather than just rates.

A charge on commercial water users would be a good start.

United Future

In addition to the policies discussed above, we would want to see standards lifted for quality as we face pressures of a rising population and climate change. We would do this by revising national policies around water to ensure more rapid resolution of over-allocation, and to set more stringent quality levels to reduce pollution and improve the ecological health of freshwater ecosystems. In addition, append and strengthen the NPS with a National Environmental Standard for Freshwater to set flow and quality criteria.

We would also explore environmental innovation and sensibility by introducing user pays for all water-takes and polluter pays for any individual or entity who introduces point or non-point polluting discharges into rivers or lakes. [WNZ](#)

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Converting hindsight into foresight



Dr Steve Hrudehy is a professor emeritus at the Faculty of Medicine & Dentistry, University of Alberta, Canada. He prepared an 'evidence' paper for Water New Zealand's submission to the Government Inquiry into Havelock North Drinking Water. This is a précis of his work by **Alan Titchall**.

Dr Steve Hrudehy has been engaged in environmental health sciences research and practice for 46 years. From 1999 to 2002, he worked with the Australian National Health and Medical Research Council expert working group to develop a Framework for the Management of Drinking Water Quality to restructure the Australian Drinking Water Guidelines (ADWG) towards a preventive risk management approach. He also served on the Research Advisory Panel to the Canadian Walkerton Inquiry from 2000 to 2002. This inquiry was conducted into a drinking water outbreak in Ontario, Canada's largest and wealthiest province, that caused seven fatalities and over 2300 cases of illness because livestock manure carrying *E. coli* O157:H7 and *Campylobacter* spp. contaminated a groundwater supply.

After the completion of the inquiry Hrudehy and his wife, a microbiological technologist and technical writer, expanded on the report to publish a book of case studies of drinking water outbreaks. This 500-page book published in 2004 by International Water Association Publishing provides analyses of over 70 reported drinking water outbreaks in 15 affluent countries (including New Zealand) over the previous 30 years.

Hrudehy's Havelock North evidence is framed according to six well-established guiding principles for ensuring safe drinking water adopted by the ADWG and is based on a review of international experience that includes 38 outbreaks of serious drinking waterborne disease occurring in 13 affluent countries, including one in New Zealand, that resulted in a total of 77 fatalities in nine fatal outbreaks and caused over 460,000 cases of gastrointestinal illness in the 38 outbreaks considered.

"All these outbreaks were preventable if the threat posed by microbial pathogens in drinking water had been recognised and suitable preventive measures had been implemented and consistently maintained," he says.

The first and by far the most important principle of the ADWG he says is: "The greatest risks to consumers of drinking water are pathogenic microorganisms. Protection

of water sources and treatment is of paramount importance and must never be compromised."

However, an initial review of evidence from Part 1 of the Havelock North Inquiry clearly indicates that those responsible for the safety of the Havelock North drinking water supply and hence the health of the community's consumers apparently had not embraced any of these guiding principles for ensuring safe drinking water, he says.

"In particular, there was remarkable urgency demonstrated in ceasing chlorination after the minimum time allowed for attaining clear results after the 2015 *E. coli* contamination incident, yet there was no apparent urgency in obtaining results for an investigation to explain what had caused the microbiological contamination in the first place.

"Protection of water sources and treatment is of paramount importance and must never be compromised."

"This circumstance makes it difficult to avoid a conclusion that chlorination was seen as a greater concern than microbial contamination. If chlorination is regarded as untenable for consumers, for whatever reasons, then water purveyors and public health officials are obliged to require investment in alternative disinfection technologies with all of the attendant costs, treatment and reticulation system maintenance obligations that may be associated with those technologies.

"The Havelock North outbreak was severe in its consequences, but the vulnerability that allowed it to occur could have resulted in an even more severe outcome. In particular, if livestock faecal contamination had included the pathogen *E. coli* O157:H7, the pathogenic strain of *E. coli* that was involved in the fatal Walkerton outbreak and in fatal outbreaks in Cabool, USA, Saitama, Japan and Washington County, USA, fatalities and severe illness among young children could have occurred in Havelock North."

Drinking water contamination events causing human illness are inevitably complex, he adds. “But the root causes are remarkably common and simple – risk assessment needs to be tiered with global common cause issues understood first before greater detail on contributory causal factors is pursued and elaborated. “While detail is ultimately important, the complexity arising from site specific details must not be allowed to interfere with achieving a thorough understanding of whether the overriding principles are being respected.

“Ultimately, providing safe drinking water is an exercise in risk management. The Walkerton Inquiry into the fatal outbreak in Ontario, Canada in May 2000 described some essential characteristics of risk management as:

- Being preventive rather than reactive.
- Distinguishing greater risks from lesser ones and dealing first with the former.
- Taking time to learn from experience.
- Investing resources in risk management that are proportional to the danger posed.

“International best practice for achieving risk management has been developed around the water safety plan approach. That approach, which is intended to be inherently preventive, can only be as effective as the care and commitment invested in preparing and continuously updating it allows. A water safety plan must be conscientiously developed and truly owned by those who must use it, not by an external third party. If a water safety plan is not owned by those running the water system it may become just another document taking up space on an office shelf.

“Systemic problems that are evident in many of the international outbreaks reviewed, and are certainly evident in Havelock North and likely elsewhere in New Zealand, are the resource limitations and inadequate capabilities of small water purveyors. Although providing drinking water of adequate quality can often be comparatively routine, provision of high quality, safe drinking water 24 hours a day, seven days a week, 365 days a year is a challenging interdisciplinary responsibility.

“Ensuring safe drinking water in the face of the pervasive challenge posed by microbial pathogens and the countless ways that pathogen contamination can occur is a daunting technical challenge.

“Allowing a fragmented system of drinking water supply by many small jurisdictions is a common problem worldwide that inevitably contributes to vulnerability for contamination.

“Some jurisdictions including England and the states of South Australia, Victoria and Western Australia have addressed this risk by creating larger, capable, regional or statewide water authorities to provide the critical mass of expertise for ensuring safe drinking water. Such measures are politically difficult to implement, but they can be remarkably effective.

“Ultimately, a drinking water purveyor can only be relied upon to consistently provide safe drinking water if those responsible for delivering public drinking water take personal

ownership of the considerable public health responsibility that providing drinking water entails.

“There should be no room for complacency among those who must accept this responsibility.

“In closing, the common theme across all of the international outbreak evidence is one of complacency. Our affluent societies have known for many decades how to prevent outbreaks yet we continue to allow them to happen by failing to do what we know needs to be done.

“In this sense, an analogy may be drawn with recurring outbreaks of communicable diseases like measles and mumps that occur because of a failure to maintain adequate immunization. These circumstances reveal the inevitable tension between individual rights and societal benefit. In the case of drinking water, individual biases about water disinfection and treatment should not be allowed to endanger innocent consumers, especially when such biases are based on urban myths and are not founded on authentic public health evidence.”

Risk management

Dr Hrudehy advises risk management requires sensible decision-making in the face of uncertainty.

“After incidents happen it is often difficult to obtain conclusive evidence about the specific details causing the failure.

“Critical decisions need to be made in real time facing uncertainty, so that sensible, defensible precaution in decision-making is necessary.

“Reactive measures, such as boil water advisories, can only limit but not normally prevent public health consequences and often to a very limited degree; risk management must be focused on being preventive.

“Treated water monitoring for contaminants is mainly a reactive measure unless it includes effective early warning indicators that lead to system improvements.”

In summing up the Havelock North outbreak Dr Hrudehy says overview consideration of the evidence from Part 1 of the NZ inquiry appears to indicate that those responsible for the safety of the Havelock North drinking water supply, and hence the health of the community’s consumers, failed to embrace any of the well-established guiding principles for ensuring safe drinking water.

“While knowledge of these principles in the form presented depends on being familiar with the Australian Drinking Water Guidelines, the underlying experience from which these principles were derived is engrained in good practice, worldwide.

“Failure to reflect any of these fundamental approaches in the management of the Havelock North drinking water system is profoundly troubling.”

In his paper Dr Hrudehy details a number of international outbreaks in affluent nations over the past 40 years that are relevant to this country. They provide evidence for guiding principles for ensuring the safety of our water supplies. **WNZ**

- You can read the full paper here: www.waternz.org.nz

Saving lives with backflow prevention



*The 2017 Backflow
Conference will be
held in Tauranga
3rd-4th August*

Peter McLennan, general manager, Brencliff, and regional manager, Apollo Valves (and president of The Backflow Prevention Association of Australia) reviews the design, installation and hydraulics of backflow prevention devices with a focus on pressure drop and flow restrictions.

Backflow prevention devices are like smoke detectors. They both save lives. Ignorance in understanding how they operate is not an excuse when the coroner knocks at your door.

Backflow prevention devices have become an integral part of the water supply asset. With the protection of drinking water being paramount, backflow prevention is required by Plumbing Codes in both New Zealand and Australia at any connection that is subject to being affected by a cross connection.

The operation and subsequent restraints backflow prevention devices present is not well understood. This article discusses the design requirements and the performance characteristics of Reduced Pressure Zone backflow prevention devices so that device owners and installers can be cognisant with potential issues before they occur.

Backflow Basics

Backflow is the term used to describe the reversal of flow in a water supply pipe or system. Backflow prevention devices are used to protect drinking water from contamination where cross connections occur.

A backflow prevention device is a safety valve that protects the drinking water supply. It is estimated that there are more than 500,000 testable backflow prevention devices installed across Australasia. But, other than a few in the plumbing industry, many people responsible for managing and maintaining drinking water systems know little of backflow and how the devices affect the system.

Whether a plumber, hydraulic designer, plumbing consultant, water officer, water engineer, contractor or property owner, there are several things you must understand when considering installing or requiring the installation of a backflow prevention device.

The following areas need to be understood and addressed when considering the use of a Reduced Pressure Zone Valve (RPZ) backflow prevention device.

The Plumbing Code

AS/NZS3500.1-2015 is referenced in Australia in the National Construction Code, Volume 3, the Plumbing Code of Australia and in New Zealand G12. Section 4 is Cross Connection Control and lays out the backflow prevention requirements when installing a drinking water piping system. When a State or Territory references the National Construction Code in its plumbing regulations, unless otherwise stipulated, it makes the use of backflow prevention

devices mandatory. The adoption in New Zealand of the Boundary Backflow Prevention for Drinking Water Suppliers Code of Practice serves a similar function.

The Standard

Backflow prevention devices are WaterMarked to AS/NZS2845.1-2010 or AS/NZS2845.1-1998. The WaterMark is your assurance that the device has been manufactured and tested in accordance with the relevant Standard. If it does not have a WaterMark it should not be installed in the drinking water network. In New Zealand devices approved to the USA ASSE Standards are also permitted under G12.

Hazard Ratings

The AS/NZS3500 Standard identifies three levels of hazard (the contamination or pollutant that can come in contact with the drinking water).

- High Hazard – The pollutant or contaminant if ingested could kill you. Facilities connected to the water supply likely to have this level of potential contamination would include mineral processing, meat processing plants, hospitals, mortuaries, plating works, etc.
- Medium Hazard – The pollutant or contaminant if ingested is unpleasant and may make you ill. Facilities connected to the water supply likely to have this level of potential contamination include commercial buildings, schools, public parks, food processing plants etc.
- Low Hazard – The pollutant or contaminant is non-toxic but is objectionable and should not be present in drinking water. Facilities connected to the water supply likely to have this level of contamination include residential homes, rainwater tanks etc.

Cross connections within the piping system are how backflow contamination occurs. There are two types of cross connections.

- 1) A direct connection. This is where the cross connection is 'hard piped' and is often installed by people unaware of the possible consequences. It could be a bypass line or a submerged tank filling connection.
- 2) An in-direct connection. The most common cross connection is a hose. A hose is an in-direct connection as the outlet can be used and left in all sorts of situations. For example, drain cleaning, chemical mixing, pipe flushing, pool filling etc.

Once the piping system is cross connected, should a backflow event occur, the chance of contaminants entering the drinking water escalate significantly.

Two types of Backflow

Backsiphonage – the pressure in the supply line is reversed causing the water to be sucked or run backwards. This is usually caused by a water main break in the street but can be caused by mechanical devices that rely on venturi action to draw water from the supply line.

Backpressure – the water pressure within the facility is greater than the supply pressure. Causes can include high head pressure found in high rise buildings and at the top of hills and mechanical equipment failures.

Pressure Drop & Flow Rates

Backflow prevention devices rely upon pressure drop across the check valves for effective operation. The minimum spring differentials are stipulated in the AS/NZS2845.1 Standard and all WaterMarked devices must comply. Testable backflow prevention devices are field tested for effective operation upon commissioning and at least annually by an accredited tester trained in backflow prevention. Always check the manufacturer's published literature for the pressure drop curve to ensure you have enough available pressure to supply the amount of water required. It is especially important where a fire connection is concerned.

These examples are from manufacturers' published literature and should be used as a minimum.

- 100mm RPZ Valve at 20 L/s has a head loss of 68 kPa
- 100mm Double Check Valve at 20 L/s has a head loss of 20 kPa
- 100mm Double Detector Check Valve at 20 L/s has a head loss of 68 kPa.

Reference: All Valve Industries, Apollo Valves Backflow Prevention Catalogue. Pages 6 – 8 & 11. bit.ly/AllValveBackflowCatalogue.

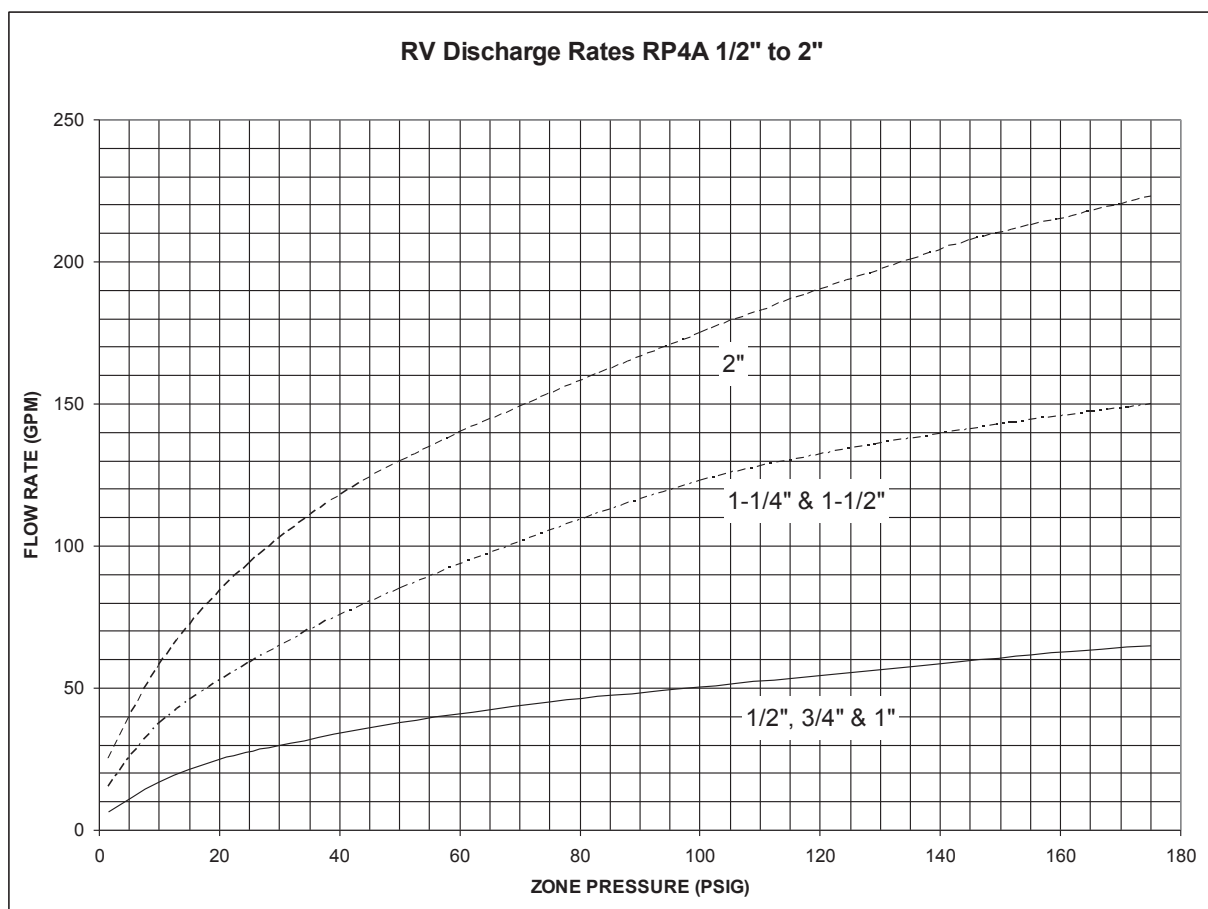
- 100 Single Check Valve Detector Testable at 20 L/s has a head loss of 57 kPa

Reference: Pentair ValVcheq Backflow Preventers Figure SCDA03. bit.ly/valves_emerson_SCDA03

These figures are devices only and do not include strainers or isolating valves. These values must be considered where pressure is limited. It is not unusual for a complete assembly comprising of isolating valves, strainer and the RPZ having a pressure drop close to 100 kPa.

Discharge from RPZ valves

All RPZ backflow prevention devices will dump water through the vent in the valve. It is a safety feature that ensures that if the device fails or there is a backflow event, the drinking water is protected.



Apollo Valves RPZ Discharge Rates.

The spillage of water is often inconvenient, but when installed where it cannot get away, it can become dangerous to property and humans.

All manufacturers publish the discharge rates applicable to their devices so be aware of these when you install an RPZ.

Otherwise you may have a flood on your hands as for example, a 50mm RPZ with a pressure of 700 kPa can discharge around 660 L/min, sufficient water to empty an Olympic sized swimming pool in six hours. See graph.

Installation guidelines

Backflow prevention devices are mechanical devices that require regular testing and maintenance. To facilitate this, they must be installed where ease of access is available. The Standard addresses some aspects, but each manufacturer outlines specific installation requirements in their published literature.

The three questions you need to ask yourself are:

1. **Is the device I am installing suitable for vertical and horizontal installation or just horizontal?** Reduced Pressure Zone backflow prevention devices are designed to discharge water either during pressure fluctuations or mechanical failure. To not compromise the level of safety, they are to be

only installed in the horizontal plane. There is no WaterMarked RPZ device approved for vertical installation.

2. **Is the device I am installing suitable for concealing in a valve box or pit?** Due to the discharging of water, a valve box is susceptible to flooding. Once the water level covers the discharge vent, the valve is compromised and the safety reduced.

3. **Does the device I am installing have ease of access for regular testing and maintenance without the need for special equipment or dismantling from the line?** AS/NZS2845.1 2010 stipulates that testable backflow prevention devices are to be commissioned upon installation and tested at least annually to ensure effective operation. Workplace health and safety guidelines would dictate that backflow prevention devices not be installed in confined spaces, near hazards, in elevated positions or in ceiling cavities.

Understanding what backflow is and the limitations of the various devices will not only allow you to satisfy your duty of care where these devices are used, but to be able to understand the impacts the installation of these have within your network.

Backflow prevention devices are like smoke detectors. They both save lives. **WNZ**



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Dr Matt Savage, technical director, Apex Environmental, and **Joseph Findley**, project engineer, Southland District Council, review the building of the new Curio Bay sewage treatment plant.

The rugged beauty of the Curio Bay area of the Catlins Coast and the presence of a 170-million-year-old petrified forest, and an astounding diversity of rare and endangered wildlife, has experienced a significant lift in visitor numbers over the past decade.

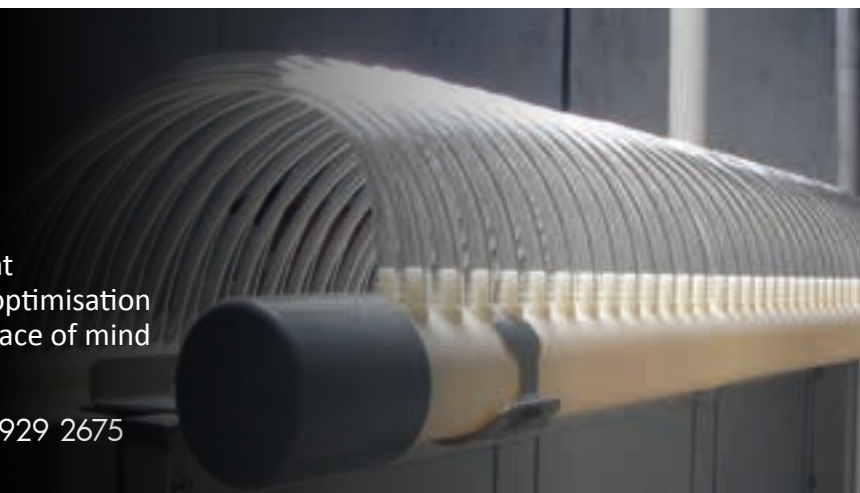
This has placed growing pressure on the infrastructure of this remote site, which has historically only used onsite septic tanks to handle the sewage that resulted from the 30 or so permanent residences and 100,000 plus visitors per year.

In response to the steady increase in visitor numbers, the South Catlins Charitable Trust has upgraded campground facilities to include a large kitchen, multiple showers and new toilet blocks, and has started construction of a new Natural Heritage Centre to educate visitors on the



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Curio Bay story. The Natural Heritage Centre will also include a much-needed cafe, as despite such a high level of visitor numbers, this is not something the small remote community has been able to offer previously.

As part of the upgrade to the area, the Department of Conservation is building a new car park to accommodate the increased visitor numbers, and constructing new public toilets integrated into the Trust's new Heritage Centre.

In 2006, the South Catlins Charitable Trust, the Department of Conservation, and the Southland District Council reached agreement that the wastewater infrastructure of the community needed substantial upgrade to cater for the proposed growth.

A governance group was formed to represent the collaborative interests of all parties involved and in 2012 they issued the council a directive for the new wastewater treatment plant.

It was agreed that the plant needed to: produce high quality discharge to protect the sensitive receiving environment; be of modular nature to cater for increasing tourism numbers and bring the rest of the community on board in future; and be capable of handling high seasonal variance in daily flows.

Council worked closely with local Maori interests with

"The plant needed to: produce high quality discharge to protect the sensitive receiving environment; be of modular nature to cater for increasing tourism numbers and bring the rest of the community on board in future; and be capable of handling high seasonal variance in daily flows."

links to the Curio Bay area through Te Ao Marama Incorporated (Southern Iwi), which ensured a seamless progression of the project.

Based on the extensive consultation and as a result of the high level of treatment required, a Membrane Bioreactor (MBR) was specified as the preferred type of treatment system. MBR systems have been shown elsewhere in the region and throughout the country to not only provide a very high level of treatment consistent with the needs of the sensitive receiving environment, but to do so far more stably under the varying seasonal loads encountered at sites like this.

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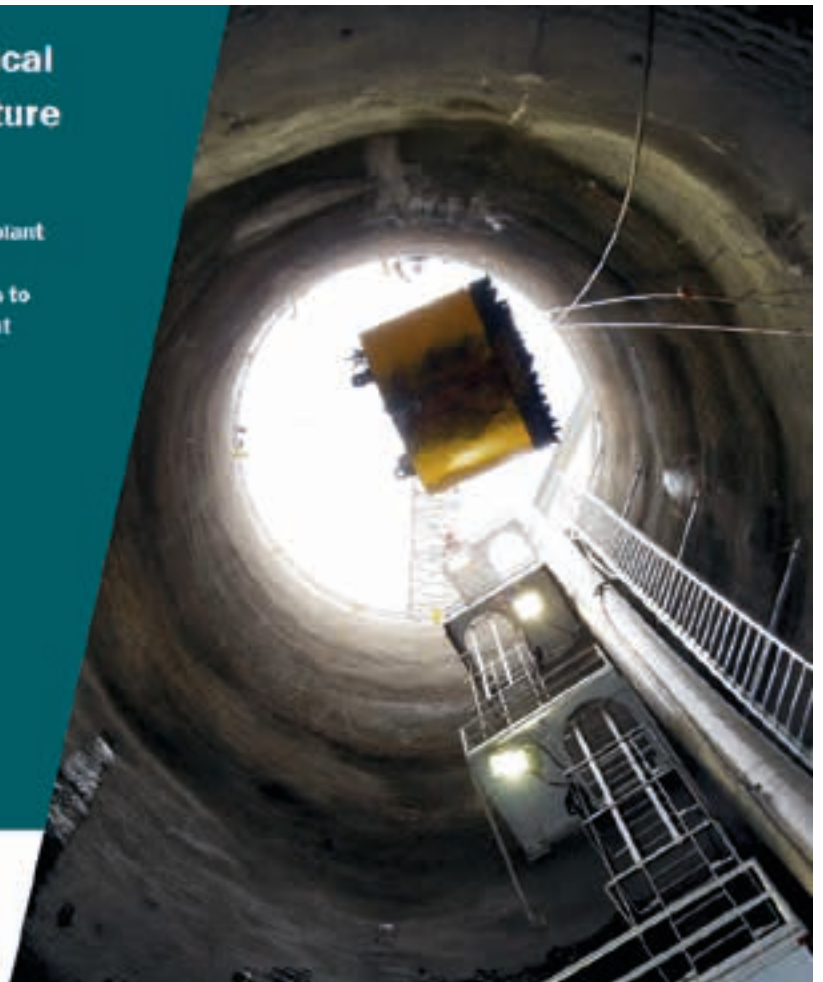
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Once the decision was made to use an MBR as the treatment process, Apex Environmental was approached to design and cost a suitable system. The company had already built a similar system at a DOC camping ground, further up the Catlins Coast.

Preparation included assessment of environmental effects for the resource consent for the proposed process, as well as consent hearings.

Detailed options analysis was carried out by Apex using BioWin biological modelling software which identified an optimum MBR plant configuration for the near complete removal of BOD₅, suspended solids and coliforms with a two-stage anoxic system with supplemental carbon dosing to also minimise the discharge of nitrogen.

The system was designed in a modular nature so that half of the plant could be isolated during the off season to minimise operating cost and allow off-season maintenance. The full plant volume can then be quickly brought back online to handle peak visitor numbers over the summer holiday period.

The membrane component of the treatment plant was also made modular with the hydraulic capacity of the overall plant able to be doubled simply by adding a second

submerged membrane module to the current membrane tank. This capacity can then be doubled again by duplicating the membrane tank with all other equipment already sized to accommodate the subsequent four-fold increase in peak hydraulic capacity.

While the resource consent for the site is for ultimate discharge of the treated water into the surface waters of Cook Creek, the clean water is first discharged into a rock bed and then flows down about a kilometre of heavily vegetated drainage ditch for further absorption of any residual nutrients before actually reaching the stream.

The flow into the drainage ditch up stream of the point where the treated water enters was also diverted as part of the project to minimise stormwater flows in the ditch and therefore maximise the amount of treated water that is absorbed into soil before actually reaching Cook Creek.

With the plant commissioned over the summer of 2016-17, it is now fully operational and typically achieving undetectable levels of BOD₅, suspended solids and faecal coliforms in the discharge.

Apex will be involved in the continued operation and maintenance of the plant, made possible by the very high level of automation and remote telemetry built into the process. [WNZ](#)

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Coming clean



Graeme Thacker's School Certificate subjects didn't indicate a career in water technology. They leant more to the arts than the sciences. Nevertheless, he has enjoyed a long and successful career in the industry, most notably as the founder of water and wastewater treatment equipment firm Filtec.

BY MARY SEARLE BELL.

Graeme Thacker (pictured) grew up in Taranaki, attending Spotswood College before getting his first job as a technician with the New Zealand Post Office.

After 10 years he embarked on a completely different career – that of a flying instructor. He resigned his job to take full time flying lessons, achieving his flight instructor's certificate in 1974, and began working at Rex Flying School.

However, just two years later, he joined Niven Industries, a mechanical firm that had a contract to build the Waikanae Water Treatment Plant. When the plant was commissioned, he was offered a job as a service engineer, looking after hundreds of plants – mainly chlorinators – from Taupo south. In 1977, he was promoted to supervisor.

In 1983, while Graeme oversaw his many water treatment plants, the company went through a significant change. Publicly listed company Steel & Tube was in growth mode and purchased several well-known companies including Niven Industries. It also purchased MacEwan Machinery from Fletcher Building, bundling the two into its new water treatment division, of which Graeme became sales manager.

However, an even bigger change was on the horizon, thanks to the sharemarket crash of 1987.

"Steel & Tube decided to get back to its core business and decided to sell MacEwans," says Graeme. "But everyone else had the same idea and no one would buy it."

Steel & Tube's solution was to offer the division managers to buy their divisions, and Graeme was keen.

"I went around the family to see how I could fund it," says Graeme. "I had some money in a superannuation scheme and an aunt agreed to buy shares."

Colleague Craig Freeman, who had come to Steel & Tube with MacEwan Machinery, also became a shareholder of the new company. And in October 1992, Filtration Technology, better known as Filtec, was launched.

"In our first year of trading we had a turnover of \$3.1 million," says Graeme. "At the time I thought, that's one dollar for every person in the country, if our turnover can keep up with the population growth we'll be right."

“But in 2012 when I sold out of the business our turnover was \$13.3 million – we didn’t do too badly,” he says with a chuckle.

Working at his side was his wife Rick.

“I did the tech, she did all the paperwork – she ran that side of the business for 15 years or so.”

Graeme sold his portion of the business to Matt Ewen and David Rouse, but within a few months Matt bought out David’s shareholding.

Graeme says Matt had worked for him for five years before buying him out.

“He was being groomed to take over,” he says. “He would have been CEO if he hadn’t got the money together to buy the place.”

As for Graeme, he was 65 years old and becoming a bit risk adverse.

“I was shit scared of OSH,” he says. “How long before they lock some CEO away because of an idiot that works for him?”

Confident the company is in safe hands with Matt and Craig, Graeme and Rick have retired to Omokora on the outskirts of Tauranga. Graeme now spends his time driving a school bus when needed and helping on the match committee of his bowling club. He’s also maintained his work as a ‘bush lawyer’.

“I’ve always been one to go through everything with a fine tooth comb,” he says. “And when you’re retired and sitting

around waiting for the weeds to grow, you’ve got the time.”

While working, he was heavily involved with various water associations – he says he was plucked out of the audience at a NZWWA conference in the 70s and elected to the committee. He served for many years but says when the association (now Water New Zealand) moved to Wellington its focus became political, and his roots were technical, so he opted out.

And while he “really enjoyed” his time with that particular association, his heart belongs to WIOG – the Water Industry Operations Group, which he still helps out as much as he can.

A life member of Water New Zealand and a recipient of the Association Medal, Graeme is also life member of WIOG, the Water Environment Federation (USA), and the American Water Works Association.

Graeme travelled to the US every year to seek out new products for the Filtec range, and in doing so would alternate between the two US associations’ conferences. It eventuated that he was on the spot to sign the Memorandum of Understanding between the New Zealand association and AWWA one year.

However, for Graeme, travel to the States has a particular difficulty. “It takes three goes at US Customs to get a fingerprint off me,” he says.

“They can usually get one off my thumb eventually, but that’s what you get for working with chemicals for years!” **WNZ**



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Water Inquiry

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By **Helen Atkins**, partner, **Vicki Morrison-Shaw**, senior associate, and **Rowan Ashton**, solicitor, of Atkins Holm Majurey.

There has been a flurry of activities these past few months spanning both formal inquiries to legislation developments and proposals.

In this article we summarise the key findings of the Havelock North Water Inquiry Stage 1 Report and outline the issues to be considered in Stage 2.

We provide a brief overview of new Whanganui River Claims Settlement Act 2017, as well as summarise the recent urban development authorities' proposal which we noted (but did not discuss) in our earlier article. We hope you enjoy the read!

HAVELOCK NORTH WATER INQUIRY

The outbreak of gastroenteritis in Havelock North in August 2016 resulted in approximately 5500 of the town's 14,000 residents becoming ill with campylobacteriosis. Forty-five people were hospitalised and the outbreak contributed to three deaths.

The campylobacter outbreak was traced to the Brookvale 1 and 2 bores on the outskirts of Havelock North. A similar incident occurred in the same area in 1998, suggesting that appropriate lessons had not been learned.

The Stage 1 Inquiry Report into the outbreak found that several of the organisations responsible for the drinking water supply of Havelock North, (in particular the Hastings District Council [District Council], Drinking Water Assessors [DWAs] and Hawke's Bay Regional Council [Regional Council]) failed to meet the standard of care and diligence necessary to protect public health. These failings have raised serious questions about the state of New Zealand's multidisciplinary system for the provision of safe and secure drinking water.

Key findings of Stage 1 Report

The Inquiry made a number of key findings in the Stage 1 Report in relation to both the cause of the outbreak and the failures of the organisations involved.

In general terms the Inquiry found that:

- It is highly likely that heavy rain on neighbouring paddocks caused water contaminated with sheep faeces to flow into a pond about 90 metres from Brookvale Road bore 1.
- Water in the pond entered the aquifer and flowed across to Brookvale Road bore 1 where the bore pump drew contaminated water through the bore and into the reticulation system.
- Another possible source of contamination (but much less likely) was water from paddocks entering roadside drains adjacent to the Brookvale Road bores and then entering the bore chambers. If enough water entered the chambers, it would overtop the bore head cable holes and, because the cable seals were loose, travel down the cables into the water supply.
- Protection of the water source, in this case the aquifer, was the first and a critical step in the multi-barrier approach to ensuring safe drinking water.

In terms of the three organisations responsible for the drinking water supply, the Inquiry held that:

- There was a critical lack of collaboration and liaison between the Regional Council and the District Council which resulted in a number of missed opportunities that may have prevented the outbreak.
- The Regional Council failed to meet its responsibilities under the Resource Management Act 1991, to act as guardian of the aquifers under the

Heretaunga Plains. In particular, the Regional Council:

- Lacked necessary knowledge and awareness of aquifer and catchment contamination risks near Brookvale Road.
- Failed to take specific and effective steps to assess the risks of contamination to the Te Mata aquifer near Brookvale Road and the attendant risks to drinking water safety.
- Imposed a generic condition on the water take permits it granted to the District Council and failed adequately to monitor compliance with the conditions of the permits.
- The District Council:
 - Did not apply the high standard of care required of a drinking-water supplier – particularly in light of the similar outbreak in 1998, and a significant history of positive E.coli test results in the District.
 - Made key omissions in its assessment of risks to the drinking water supply, and breached the Drinking-water Standards.
 - Mid-level managers delegated tasks but did not adequately supervise or ensure their implementation – causing unacceptable delays to the preparation of a Water Safety Plan.
 - Did not properly manage the maintenance of plant equipment or keep records of that work.
 - Had no Contingency Plan/Emergency Response Plan, and no draft boil water notices, or communications plans at the ready.

Although the failings of the District Council and Regional Council did not directly cause the outbreak, a different outcome may have occurred in their absence.

• The DWAs:

- Were too hands-off in applying the Drinking-water Standards. They should have been stricter in ensuring the District Council complied with its responsibilities, such as having an Emergency Response Plan and meeting the responsibilities of its Water Safety Plans.
- Failed to press the District Council sufficiently about the lack of risk assessment, analysis of key aquifer catchment risks, and a meaningful working relationship between it and the Regional Council. They also failed to require a deeper and more holistic investigation into the unusually high rate of transgressions in the Havelock North and Hastings reticulation systems.

Matters for consideration in Stage 2

The focus on the Inquiry now turns to the future of New Zealand's drinking water system. In this regard, the Inquiry's terms of reference require recommendations on the following matters:

- Any legal or regulatory changes or additions necessary and desirable to prevent or minimise similar incidents;
- Any changes or additions to operational practices for:
 - monitoring, testing, reporting on and management of drinking water supplies;
 - implementation of drinking water standards;
 - contingency planning;
 - responses by local and central government, to address the lessons from this incident; and
- Any other matter which the Inquiry believes may promote the safety of drinking-water and/or prevent the recurrence of similar incidents.

The Inquiry has produced a detailed list of issues for consideration in relation to these matters. It is likely that the outcome of Stage 2 of the Inquiry will significantly influence the shape of New Zealand's drinking water system going forward.

WHANGANUI RIVER

The Government recently passed the Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 [the Act]¹, which declares the Whanganui River to be a legal person with all the rights, powers, duties and liabilities that attach to such status.² This is not the first time legal status has been granted to a natural resource – in 2014 Te Urewera Mountain Range was also granted legal personhood.³ However, it is the first time such status has been applied to a river.

Purpose and scope

The purpose of the Te Awa Tupua status is to recognise the mana of the Whanganui River in a manner consistent with Whanganui iwi's view of the river as a single indivisible and living entity.⁴ Accordingly, the river is holistically defined as:

"Te Awa Tupua is an indivisible and living whole, comprising the Whanganui River from the mountains to the sea, incorporating all its physical and metaphysical elements."

The Act endows the river with the ability to take legal action on its own behalf. This could include both positive initiatives designed to remediate or enhance the river – eg, fencing the river off from stock – as well as enforcement actions against those who pollute or degrade the river without authorisation.

The Act does not however affect existing rights. Existing public access is maintained as are all private and public property rights, resource consents, and the statutory functions, powers and duties of the relevant local authorities.⁵

Potential liabilities

One matter which the Act presently does not expressly address is the issue of potential liabilities. For example:

- Is Te Awa Tupua likely to be liable for damages arising from flooding?
- Could criminal charges be brought against Te Awa Tupua if its actions – such as flooding – resulted in loss of life or damage to property?

Precedent for other natural resources?

The Act is a positive step forward in recognising the importance of natural features and the relationship that iwi, the crown and the wider community have with these features. However, there are still some uncertainties to be worked through before the full impact of the Act can be determined. With claims over other natural features currently being considered in a number of legislative contexts (including the recent Maori Council claim for customary marine title under the Marine and Coastal Area [Takutai Moana] Act 2011), assigning legal personhood to nature, is a mechanism we may see used more widely.

URBAN DEVELOPMENT AUTHORITIES PROPOSAL

Earlier this year the Government released a Discussion Document which proposed the creation of Urban Development Authorities (UDAs). UDAs are ad hoc bodies that would be established to support and fast-track urban development projects. The proposal would allow UDAs to be endowed with a variety of planning, compulsory acquisition and funding powers. The UDAs proposal has the potential to significantly alter the legal landscape for landowners, developers, territorial authorities, infrastructure providers and planners.

Why UDAs?

UDAs are part of the Government's response to Auckland's growth pressures over housing and infrastructure. However, UDAs are also proposed to be an enduring part of the regulatory landscape and to apply to New Zealand generally. UDAs were first suggested by the Productivity Commission in its 2015 "Using land for Housing" report as institutions that can:

- amalgamate land parcels to make large-scale development economic;
- coordinate the provision of infrastructure; and
- remove or ease planning barriers to the provision of innovative and lower-cost housing.

Building and Construction Minister the Hon Dr Nick Smith has said UDAs would enable major redevelopment projects like those proposed or under way in areas such as Hobsonville, Tamaki, Three Kings and Northcote to occur three to five years faster.

"The international experience in cities like London, Melbourne, Sydney, Toronto and Singapore is that UDAs can create vibrant, new suburbs, with greater gains for housing, jobs and amenities than through usual incremental, piecemeal redevelopment."

The legislation is intended to cover complex and strategically important developments including residential, commercial and associated infrastructure projects. Dr Smith considers the key to the success of UDAs is in how they interact with councils and businesses.

It is proposed that Central Government and territorial authorities work together to identify and assess opportunities for the establishment of UDAs. Areas may be viable for UDAs due to a proportion of the land being in public ownership, land being underdeveloped, or a lack of adequate modern infrastructure in an area. Both Central Government and territorial authorities must agree to proceed before the proposal is subject to public consultation. The UDA is then established by Order in Council specifying:

1. the development project;
2. the development area;
3. the strategic objectives;
4. any conditions;
5. the development powers available to the UDA; and
6. the organisational structure of the UDA – publicly controlled with certain allocated development powers.

Development plans

UDAs will have responsibility for producing a development plan that accords with the UDA's strategic objectives. Development plans would address:

1. how each of the development powers are proposed to be exercised (eg, the nature of any new land use rules, the location of infrastructure);
2. how the development powers will contribute to delivering the strategic objectives;
3. an assessment of effects on the environment;
4. any infrastructure levies of development contributions anticipated; and
5. any further development powers that the UDA intends to seek.

Development plans will be subject to a process of public consultation, objections from affected persons, and a hearing before independent commissioners in relation to objections. The Minister will make the final decision as to the form of the development plan, taking into account any recommendations from commissioners.

Stage of process

The UDAs proposal was released in February 2017 and submissions closed on 19 May 2017. The Ministry for Business, Innovation and Employment is currently considering the submissions with a response likely later this year. [WNZ](#)

1. The Act gained royal assent on 20 March 2017.

2. Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 Subpart 2 – Te Awa Tupua s12 Te Awa Tupua recognition.

3. Te Urewera Act 2014 s11 states "Te Urewera is a legal entity, and has all the rights, powers, duties, and liabilities of a legal person."

4. Record of Understanding in relation to Whanganui River Settlement dated 13 October 2011.

5. Te Awa Tupua (Whanganui River Claims Settlement) Act 2017 s46 Certain Matters not affected by vesting.



Minimising gas release & sewer damage

By Bryan Holyoake, chemical engineer, Armatec Environmental.



The air-water mixing behaviour in vortex drop structures delivers benefits to sewer networks.

Vortex drop structures are known to provide reliable and practical corrosion, water damage and odour release management in vertical drops through sewers. They do this by creating a controlled swirl down a dropper pipe and minimising exposed turbulence. However, vortex droppers provide additional installation, corrosion and odour control benefits both at the point of installation and downstream that are often overlooked. They can provide sewage network providers and operators cost savings and lead to longer

asset lifespans and lower odour emissions – and can turn the typical design approach of laminar flow in sewers on its head.

Vortex drop shafts were firstly introduced by Drioli (1947) in Italy as an overflow structure for dams in Napoli. Nowadays ‘Vortex Droppers’ is a well-known technology and these structures are widely used in sewer systems to connect sewer mains characterized by large elevation gaps. Since Drioli, others have contributed to this field of study including Echávez



and Sotelo (1970), Knapp (1960), Jeanpierre, Lachal and Thienen (1966), Pica (1970) and Hager (1985), Kennedy, Jain and Quinones (1988) and many other more contemporary experts.

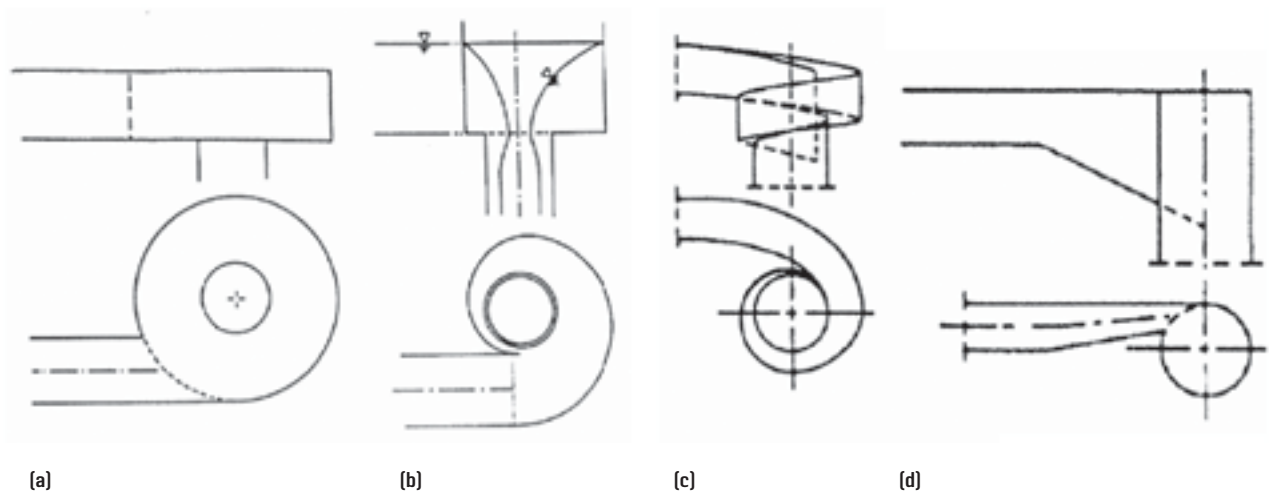
A vortex drop shaft is essentially constituted by three main parts: intake structure, vertical shaft, and outlet structure – of varying designs. In addition, a sufficient air circulation has to be provided to prevent choking phenomena and cavitation damage (Guidice, 2014). A vortex works by water and air entering the intake structure, where it is transformed into a swirling flow, that spirals down a vertical water pipe with both water and air pulled down the pipe (as an “air core”) that then collapses into turbulent mixing. This results in a complex two-phase air-liquid mixture, that ranges between subcritical and supercritical flow.

There are many different structure approaches (see Figure) that create this flow – circular (a), scroll/screw (b), spiral (c) and tangential (d) are among some of the more preferred. At the outlet structure there is typically a “catchment pool” to contain the dropping mix and return it to laminar flow at the new, lower elevation.

This air-water mixing behaviour in vortex drop structures delivers the following benefits to sewer networks:

- Reduced odour emissions at the point of the vortex drop structure.
- Increased aeration of the sewage – turning anoxic and anaerobic sewage back to near aerobic conditions, leading to lower H_2S (hydrogen sulphide) production downstream.
- Oxidation of the entrained and dissolved H_2S , reducing concentrations and potential for downstream release.

In sewers, encouraging laminar flow is the standard design ethos for aiding control of corrosion and odour management – to prevent undesirable H_2S and other odorous and corrosive gases entrained in liquid from



Different types of vortex intakes (adapted from Jain and Ettema, 1987).

release into a gaseous state. However, the introduction of turbulent flow in the vortex drop structures with the unique dynamics of spiral flow and air-water mixing in the drop pipe is how the above benefits are achieved. It uses the wastewater's own flow energy to suppress the turbulence which releases odorous and corrosive gases. The spiral flow creates a downdraft which traps airborne gases and forces air into the sewage flow to oxidize odorous gases.

Vortex drop structures deliver these benefits for no operating costs, with no additional inputs or controls – and reduce the reliance, costs, sizing and potential need for supplementary control systems such as chemical dosing and air scrubbing odour control devices – however every sewer design scenario is different.

Additionally, during installation of sewage infrastructure, the use of a vortex drop structure at a manhole means that excavation needs for incoming piping are significantly reduced, and the piping can be run at a shallower level towards the manhole.

The resulting lower H₂S concentrations in the sewer atmosphere and increased oxygen levels in the sewage lead to longer asset life and reduced corrosion, thereby lowering maintenance spend – a plus for all municipalities and a significant benefit to balance sheets.

Vortex drop structures can be designed in at construction

Page 40: Vortex dropper former – built by Armatec out of fibreglass and encased in concrete in Hobson Bay Auckland.

Opposite left: Vortex in operation.

(as shown on page 42), custom built as part of the sewage infrastructure, or integrated into existing infrastructure as inserts in manholes. They must be built in sufficiently robust, corrosion-resistant materials that can form complex curved shapes such as fibreglass, HDPE or stainless steel and be designed to handle the appropriate flowrates and contaminants with ability to function safely in high-flow events. Maintainability is also a key consideration.

The primary purpose of vortex droppers remains to safely transport liquid down a vertical distance while minimising gas release and asset damage. Vortex droppers have additional benefits of odour and corrosion reduction and cost savings that are not widely known and through the controlled turbulence they introduce, can greatly enhance the performance and longevity and reduce costs of sewage networks they are part of. [WNZ](#)

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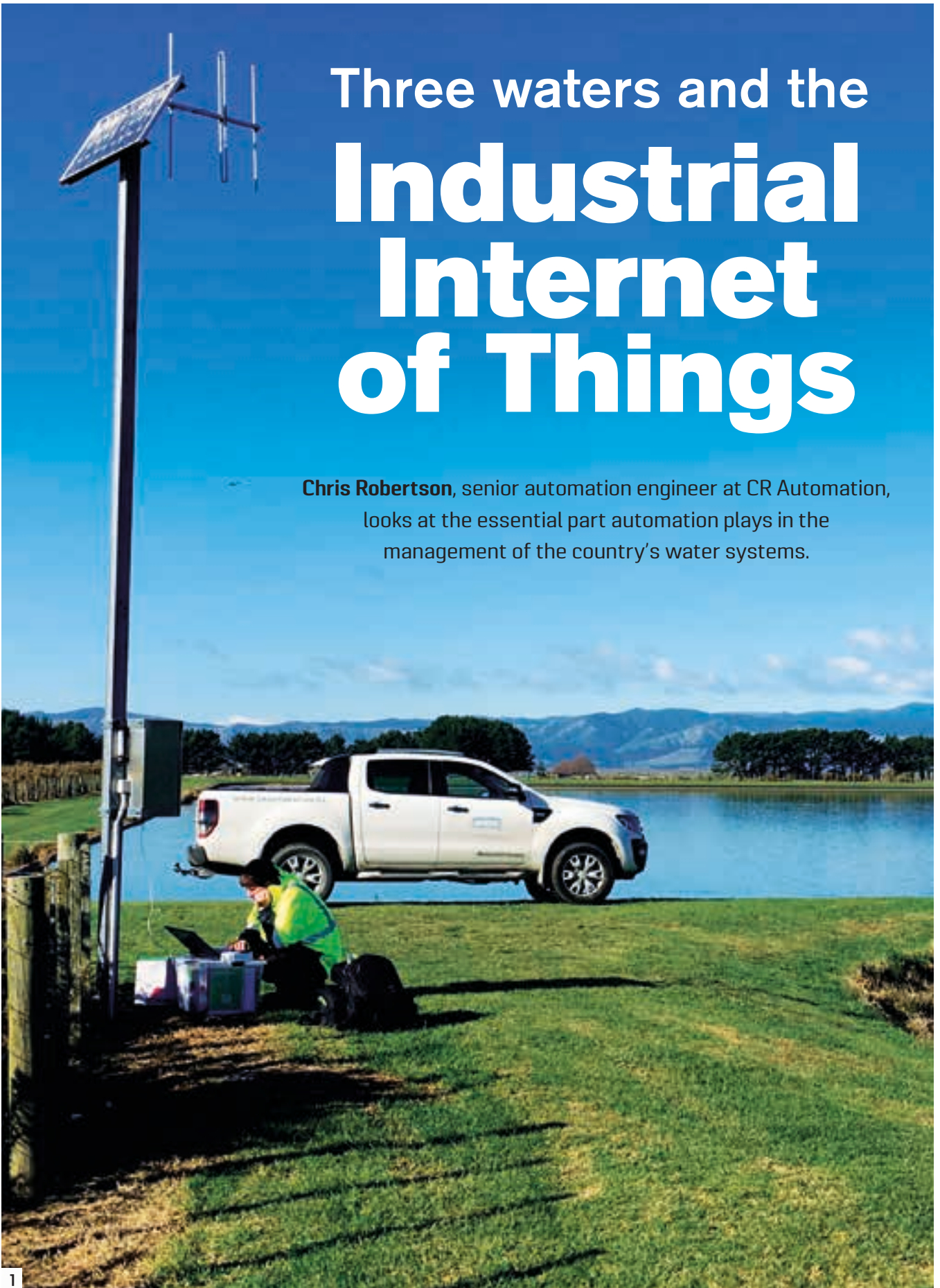
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Three waters and the Industrial Internet of Things

Chris Robertson, senior automation engineer at CR Automation, looks at the essential part automation plays in the management of the country's water systems.



With water becoming an ever-increasingly hot topic, councils are looking to have near real-time monitoring and control of their three waters assets.

The ability to be immediately informed of any issues or potential issues and respond to them immediately is now more possible, and more cost viable than ever, thanks to the Industrial Internet of Things (IIoT). The IIoT effectively delivers vast amounts of information to a user via a smart device, enabling them to respond to issues from anywhere at any time.

The concept of the IIoT is not possible without the interconnection of SCADA (Supervisory Control & Data Acquisition) servers and remote sites. Telemetry, or the remote monitoring and control of sites, is becoming a major focus of councils around the country.

While most councils have some existing degree of telemetry, this is often monitoring via slow and antiquated communication mediums. The level of control of these assets is generally minimal, as is the visibility into what went wrong, when and why.

Modern communication advancements with the likes of broadband fibre, cellular, and ethernet radios means that far more information and control can be achieved with a relatively small investment.

CR Automation, together with its telemetry alliance integration partner Schneider Electric, has provided telemetry solutions to a number of councils in

New Zealand, including Wanganui, Horowhenua and Taupo District Councils.

The solution in each case had to be scalable and sufficiently flexible, allowing the implementation of a mixture of completely new systems and the replacement or integration of legacy systems. One of the key challenges of installing a telemetry system is the terrain and accessibility into sites. In each of the cases above very different solutions have been implemented.

For smaller assets such as pump stations and small treatment plants ethernet radio is the preferred solution. Here a council would look to build its own network infrastructure utilising its own suitably positioned assets such as reservoirs. Often co-leased repeater sites are available, but these come with ongoing rental costs. The benefit of owning your own ethernet radio network is that you are not dependent on other service providers for the up time of your network.

Ethernet also offers a number of advantages over traditional serial networks, especially with network diagnostics and traffic monitoring. These networks have been achieved with Schneider's Trio Q series of radios throughout Horowhenua and Taupo.

To supplement the Trios, Ubiquiti WiFi bridges have also been rolled out. These have been used specifically around Wanganui where the close density of sites and smart infrastructure meant it was an easy roll out to the



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1. Marek implementing a 3G solution for pond level and flow monitoring at the Foxton Ponds for Horowhenua District Council.
2. Taking advantage of Taupo District Council's Acacia Bay Blueridge Reservoir for an ethernet radio repeater site
3. An iPad gives operators and service engineers remote control of plant while at a remote panel at Horowhenua District Council's Levin Water Treatment Plant.

30 odd pump stations and water assets around the city. With Taupo's vast terrain, a number of repeater stations are being installed around the lake to facilitate a district wide communications network. In all cases council assets have been used, such as that of Blueridge in Acacia Bay (picture 2) offering extremely good coverage of Taupo township.

Cellular technology offers a low-cost alternative where installing ethernet radios is not practical or has a long lead time to install.

This may be an outlying site that is not efficient to get radio comms to. Simple SMS units can be used for measuring flow and levels. 3G and 4G technologies can be used for smaller treatment plants, offering full remote control at near real time.

Cellular is a quick and cheap roll out, but comes with the disadvantages of being dependent on the cellular provider and monthly fees. One of the initial schemes that CR Automation upgraded for Taupo District Council was the Mangakino Water Intake and Water Treatment Plant. Due to the remote location of the sites, and the especially challenging terrain around the water intake, getting a reliable and cost-effective ethernet radio connection was not possible within the timeframes. Conveniently, a brand new 4G tower had been installed next to the water treatment plant. Utilising this infrastructure Taupo District Council now has near real-time control and monitoring of these very remote sites.

As has long been the case, broadband technology, including copper and fibre, offers real-time high-speed communications between plants.

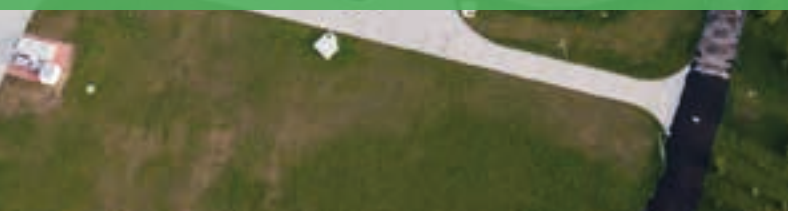
Generally these sites are larger treatment plants with local SCADA machines and PLCs. Likewise with cellular you are dependent on the network provider and monthly fees (short of installing your own fibre network). However, broadband technology means that sites can be fully integrated into an overall control system. In the case of Taupo District Council some of these broadband sites have served as data aggregation hubs for outlying sites.

One of the major advancements is smartphone technology. The ability for an operator to receive an SMS alert and then immediately respond via their smart device allows operators to make informed decisions, and in a lot of cases avoid the site trip that would have to be made otherwise. This has obvious benefits with health and safety, employee downtime and vehicle maintenance.

During weather events an operator can view all the assets at once and respond to where they are most needed without the need to physically check every site as they once had to. With smartphone technology, and the high level of remote control available, comes increased risk with cyber security. It is also important that the system is fully compliant with security policies and is resilient to cyber threats. **WNZ**



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5 new water qualifications



Tracey Mehrtens from Accento talks with Annie Yeates (left), Connexis Water Industry manager, about the new water qualifications.

Annie Yeates is a British/Kiwi who has called New Zealand home for the past 14 years. Before moving here she was an industrial wastewater technical consultant working across various industries including pulp and paper, dairy, and food processing plants.

As the Water Industry manager for Connexis, Annie is supporting industry with the programme design and delivery for five new water qualifications. I caught up with Annie to find out what the industry can expect in terms of the new NZQA qualifications.

What has changed with the New Zealand Certificate Qualifications?

A new naming convention from National Certificates to New Zealand Certificates is just the beginning. At Level 3 we have introduced two new qualifications for people entering the industry, and for those working with small water systems.

At Level 4 industry stressed the importance of

differentiating between operators of simple plants (bores/lagoons), and those operating sophisticated plants such as Ardmore or Mount Grand, Mangere or Moa Point. So, we have split the corresponding qualification with the New Zealand Certificate for simple plants, and the New Zealand Apprenticeship for plant with multiple processes. At Level 5 people will no longer be able to enroll directly into a diploma. Instead, they will need to hold the Level 4 qualification, or demonstrate the equivalent skills and knowledge.

What role has industry had in developing the new qualifications?

We have worked closely with industry to ensure the new qualifications meet requirements and are fit for purpose. All the water/wastewater unit standards have been reviewed, to better align with the Drinking Water Standards of New Zealand, and the new delivery and assessment model. We are fortunate in New Zealand to have passionate and knowledgeable people within the water industry who have offered their time and expertise to work alongside us. The current training provider Opus has also had valuable input into the process.

What delivery programme changes can we expect?

This is the exciting part! The Water Industry Group has researched international practices, and has seen the opportunity to develop world-leading technical training for the water industry that is currently not offered elsewhere. The amount

New NZQA Procurement Qualification extends to water industry

The first two graduates of the new version of the NZQA Level Six Procurement Certificate received their qualifications last month.

Marion Henton, from Bay of Plenty Regional Council, and Damien Wood, from Whanganui District Council, both volunteered that working through the qualification had a major positive effect on procurement practices in their roles.

"The skills and knowledge I gained have made our processes more efficient, more transparent, and significantly easier, and I am far more confident that we have appointed the best supplier when I complete an evaluation," says Marion.

Out of more than 40 candidates completing the assignments to gain their qualification, nearly a quarter have responsibilities for procurement in three waters sectors.

This new version of the procurement qualification uses core material from the NZTA procurement qualification that's been the mainstay for qualified tender evaluators since the early 1990s. But the new version widens the relevance of procurement skills to all of

infrastructure (and all of government procurement).

Focusing the skills needed in public sector tendering, this NZQA-approved qualification covers procurement planning, developing RFT documents, processing and evaluating tenders, and meeting legal and ethical requirements in tendering.

The process is now more structured and can be completed by motivated procurement practitioners in around six months, provided they attend the two-day Clever Buying course to get started, says Plan A director, Caroline Boot.

Most of the assignment work can be completed in the context of workplace tasks routinely undertaken by tender evaluators and other procurement professionals, but there is some assignment work that may need to be done after hours, she adds.

• For more information about the NZQA Level Six Procurement Qualification, see info@cleverbuying.com or phone Caroline Boot, Clever Buying, on 021 722 005.

of practical competency required of operators and technicians has greatly increased within the programmes, to maximise their preparation to handle off-normal conditions.

The new delivery programme will be a blended model, made up of block courses, online learning and assessment, practicums, and a final onsite assessment to confirm workplace competency. The development of practicums is particularly exciting: site demonstrations (at Ardmore and other facilities) will further demonstrate practical skills. A SCADA simulator will provide training on fault diagnostics, event management and problem solving.

What does this mean for trainees who are currently completing the old qualifications?

The National Certificate qualifications are still nationally recognised and trainees who are currently working towards their National Certificates and Diplomas have until December 31, 2018 to complete these qualifications. I would strongly advise trainees to complete their theory units, and on-job assessments by mid next year to avoid a last-minute rush for their onsite assessment.

When will the new qualifications be available for enrolment?

We are going to initially pilot our new training/assessment model with the New Zealand Apprenticeship in Water Treatment with strands in Drinking Water Multi-stage Processes,

and Wastewater Multi-stage Processes (Level 4).

We are currently planning for enrolments to open early in 2018, with the first courses running in the second quarter of 2018.

What role can industry experts play to ensure the delivery of the new qualifications is leading edge and fit for purpose?

Industry input is crucial for a successful transition to the new programmes; from subject matter experts to help create and review content, to those keen to become assessors, moderators, or even online tutors – this is your chance!

We will solicit feedback from trainees and employers as the first cohorts commence their learning journeys as the new programmes roll out. Our number one focus is on the trainee and ensuring that those first through the new system come out with the skills and competence expected by industry.

I would also like to thank all those that have been involved in the journey so far, your guidance and knowledge is greatly valued. What we are trying to do is ambitious, but we are intending to revolutionise training in the water industry and create many exciting opportunities for continued professional development along the way. **WNZ**

- To find out more or get involved, please visit: www.connexis.org.nz/qualifications/water-qualifications, or contact Annie Yeates on anniey@connexis.org.nz, or 027 440 0129.

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TP108

– where to from here?

Graham Levy, a technical director from Beca, won the 2017 Stormwater Paper of the Year with a review of the Technical Publication 108 (TP108) which was published by Auckland Regional Council (ARC) in 1999 and which has been used as the primary flow estimation tool in the Auckland region since. We incorrectly said in the last issue that he had won it for another paper that Graham co-authored with C J Oliver – Hydrology of Urban Development.



Graham Levy.

This is a short précis of his paper, which can be read in full on the Water New Zealand website. It is also worth noting that Graham was part of the Beca team that developed TP108 for Auckland Regional Council in 1999.

While Technical Publication 108 (TP108) is still in use, there have been moves within the stormwater industry, supported and promoted by Water New Zealand, to develop a national standard similar to Australian Rainfall and Runoff to establish consistent and reliable flow estimation methods across the country. In the absence of that guidance, many different flow estimation methods are in use, with variable reliability and suitability.

In the absence of national guidance, TP108, or the NRCS (Natural Resources Conservation Service of the US Department of Agriculture) method on which it is based, has been adopted and adapted in part, or in full, for urban runoff estimation in other parts of the country. It is widely used, but also in some respects misused. This misuse arises in part from a lack of understanding of the basis on which TP108 was adapted to the Auckland Region, and sometimes a lack of robust (or in some cases any) validation of the method to local conditions in new areas.

This paper sets out some underlying principles on which the application of the NRCS method to Auckland was based, and how it was adapted and validated to suit the particular requirements that ARC had defined.

It discusses some examples where the method has been used inappropriately, or in new areas, resulting in poor estimation of runoff characteristics. From there the paper provides some guidance on factors that should be addressed, particularly in relation to validation, when transferring the method to other parts of New Zealand. There is also commentary on appropriate contexts in which to use the method, and where other tools might be more appropriate.

Developed as a standard approach for designers and regulators for the calculation of stormwater flows for the Auckland Region, TP108 has a particular focus on urban stormwater, and on understanding the effects on catchment hydrology of the change from rural to urban land use. It is a relatively simple approach that avoids direct modelling of the physics of the hydrological processes taking place, but is instead strongly based on reproducing what is actually observed in hydrological basins.

The combination of this simplicity, and the connection to reality, make it attractive. Therefore, when ARC was considering options for a guideline, and settled on the

NRCS method, it was in the context of a significant effort to validate it to local Auckland conditions.

The attraction of the method, and the experience from Auckland use, has resulted in it being adapted and/or adopted in other parts of the country, sometimes with validation to local conditions, and sometimes not. Unfortunately, without that validation, as with any hydrological method, there is a risk of significant error in flow estimates.

This paper is intended as a thought piece to stimulate further discussion and action towards robust and standardised urban hydrological analysis in New Zealand, including the wider use of the TP108 approach.

It is important to recognise that the development of TP108 took place in a particular context, and if different performance criteria had been used, a different methodology might well have been adopted.

ARC was seeking a design tool that met principal criteria. There were notable omissions from the list of objectives, which might have influenced the choice for TP108 and might be pertinent in today's context.

Therefore TP108 cannot be treated as a "one size fits all" approach, and other methods are needed in some circumstances.

TP108 or related methods based on NRCS are being used more widely, but are not necessarily reliable or validated for the particular context where they are being used. The

NRCS method is often misunderstood or misapplied, leading to reduced reliability. If the method is to be used in a new area, there should be a focus on validation to local conditions, including specific consideration of both volume and peak flow rate.

The NRCS method is not suited to all situations – other tools are better in some contexts. In particular, it is not ideal for high definition detailed urban models. It is perhaps more complex than necessary for simple site-level runoff calculations where rational formula is simpler and potentially adequate. Neither is it ideal for a continuous simulation context that is needed for understanding lifecycle performance of urban drainage systems and devices.

The ideal would be a nationwide consistency of approach to rainfall runoff estimation that gave the industry and the public greater confidence in reliability. This approach would include different methods for different design / analysis contexts, but would be based on real flow data and appropriate validation in different contexts across the country.

Consideration should be given to methods that allow for continuous simulation, to better reflect the importance of environmental effects and everyday flows, rather than just for flood estimation. **WNZ**

• Read the paper here: www.waternz.org.nz

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The best of **Winnie's** **visit**



Oxfam International's executive director Winnie Byanyima, came to visit our country for the first time in June.

Before Oxfam, Winnie served in the Ugandan Parliament, was the Director of Gender and Development at the UNDP, served at the African Union Commission and chaired a UN-wide task force on gender and the Millennium Development Goals, and also on climate change.

While Winnie was here she spoke on everything from the huge number of displaced people around the world, the broken economic system and dangerous political power, to the unprecedented four famines across Africa and in Yemen, the US withdrawal from the Paris Accord and climate change.

Here's a collection of the top five things Winnie said on these important topics while here in New Zealand.

On the US withdrawal from the Paris Accord and climate change

"I think this American decision on the Paris Agreement is a real opportunity for the rest of the world to be angry and, therefore, more ambitious about tackling climate change... I'm seeing an opportunity to re-mobilise. And I think, New Zealand, you should lead. This is a region that's facing the consequences right now."

An evening with Winnie Byanyima, Q Theatre event

"This is a story that New Zealanders and people in the Pacific understand so well because you're already facing it."

"Everywhere I hear the stories of people who are being wiped out by cyclones, by hurricanes – you're at the forefront of this and you need to lead the world to demand that rich countries put down climate financing to help those who have not caused it, but who are facing the consequences."

Interview with Kim Hill, Radio New Zealand

"My uncle in my village in Uganda, who's just a herdsman,

would take 180 years to emit the same carbon [dioxide] emissions as an ordinary American citizen would in one year. It's not fair for them to walk away."

Interview with Kim Hill, Radio New Zealand

"This is the greatness that's in humanity. What we are seeing today is that actually the poor countries, the developing countries, are showing more leadership on climate change than the rich countries who have the means to solve the problem and who caused the problem."

On the refugee crisis

"Today my country, Uganda, a very poor country, has more than a million South Sudanese refugees."

"We open our doors and we say 'come and share what we have, we are poor, but we can't let you die'."

"That is the principle of humanity, of humanitarianism, that all these countries signed on in the United Nations and are now turning their backs on ... these are not people just escaping to look for a better future, they're fleeing for their lives."

Interview with Corin Dann, TVNZ's Q & A

Before visiting us, Winnie Byanyima visited Nigeria and South Sudan – two nations that are facing extreme, widespread hunger due to ongoing conflict.

Winnie saw first-hand how the crises are affecting those most vulnerable to it. Although a massive response and injection of aid is urgently required, there's hope, she says.

"We've seen communities sharing what little they have with others in greater need. We've been greeted with warmth and gratitude by people who have been through so much, and have so little... "In these past few days, in the midst of such suffering, we've had cause for hope." **WNZ**

- Read up on what Winnie said regarding the world's broken economic system and the unprecedented four famines at oxfam.org.nz/blogs.





Image by: Aidan Wojtas, Wellington, New Zealand

Living Lake Symposium 2017 welcomes you

Professor Ken Hughey, chair of the Living Lake Symposium, reviews a very large lake with very large challenges as preparations are made for the 2017 Living Lake Symposium.

The Waihora Lake Ellesmere is one of our largest lakes by area and a shallow brackish lake/lagoon located south of Christchurch and separated from the sea by Kaitorete Spit.

The lake and surrounding area is of immense importance to Ngai Tahu and other locals for multiple reasons that are captured in the Water Conservation Order over the lake.

But the lake is also a sink.

Its large catchment includes the central Canterbury plains, the upper Selwyn catchment, the Selwyn River and streams flowing from the south-western side of Banks Peninsula. This catchment, with its significant settlements and its dominant agricultural land use, contributes enormous quantities of nitrogen, phosphorus and other inputs to the lake – so much in fact that the lake is defined as being in a hypertrophic state.

Yet, despite this state of nutrient enrichment, the lake retains many of its most important values, relatively intact. It is an incredibly productive eel and flounder fishery and highly valued for birdlife, with more species of native birds having been recorded here than at any other place in the country.

Most noticeably reduced is trout fishing and the aquatic macrophyte beds (that did not return post the Wahine storm of 1968). Also impacted badly are some native plant species (by willow infestation), and the Australasian bittern (mostly by a combination of lake-edge habitat loss and predation).

Sustaining, restoring and improving these values is definitely challenging. The lake has no natural opening and is opened to the sea by bulldozer two to four times per year once it reaches trigger height levels.

These openings are informed by a lake opening group and strongly influenced by the needs of Ngai Tahu in terms of improving lake fisheries. For example, an autumn opening benefits migrating adult eels; a spring opening is good for juvenile eels, whitebait and juvenile flounder.

Within these and related contexts multiple parties are working together to better manage the lake and its environs. Ngai Tahu, Environment Canterbury, Selwyn District Council and Christchurch City Council have entered into a binding co-governance arrangement. Ngai Tahu and DOC have done similar regarding the bed of the lake. The Selwyn-Waihora Water Zone Committee then provides a collaborative frame around water management. And supporting all this is the non-statutory Waihora Ellesmere Trust.

The Waihora Ellesmere Trust (www.wet.org.nz) is involved in many activities associated with the lake and takes a coordinating role where it can – it is involved in management, research, advocacy and extension activities. Notably it is the driver of the biennial Te Waihora Lake Ellesmere Living Lake Symposium.

The Living Lake Symposium provides the forum for reporting on the state of the lake (a two-yearly snapshot of a core set of indicators) and for shining a light on new and promising initiatives.



This year's symposium will be held on November 9-10, and has a focus on the connecting influence of the streams and rivers that flow into the lake.

All are welcome and from experience this has become one of the key water management events in Canterbury. [WNZ](http://www.wnz.org.nz)

- For more information please email symposium@wet.org.nz or give the symposium project manager a call on 027 201 1000.

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RMA Amendment Act and tribal power

The Mana Whakahono a Rohe (MWR) provisions were among controversial law changes that delayed process of the Resource Legislation Amendment Bill. They give Maori tribes rights to demand more say in planning, monitoring and possibly consenting under the Resource Management Act 1991. The MWR provisions are now in force. **Stephen Franks** and **Pam McMillan** from Franks Ogilvie answer 15 question on what it could mean for councils.

What exactly is a 'Mana Whakahono a Rohe'?

MWRs are agreements made between a local authority, and iwi (Maori tribes) or hapu (sub-tribes) in an area (called "participating authorities") on how iwi or hapu participate in resource management and decision-making under the RMA. A MWR can be between multiple local authorities and multiple iwi/hapu, or there could be multiple MWRs within one local authority area.

An iwi authority can initiate a MWR with a local authority. A local authority can initiate a MWR with an iwi authority or with hapu. Once initiated eventual 'agreement' is compulsory (asking how that works is a fair question). Though MWRs with hapu could multiply the number of MWRs, confining the initiation of hapu agreements to a local authority mitigates this risk.

Are they new?

The statutory obligation to have MWR type arrangements is new and so are the stipulations for what they must contain. Some local authorities have existing similar arrangements. If iwi agree, a local authority may treat them as MWRs. The law doesn't say whether an existing arrangement must be amended to add the new mandatory requirements.

Existing arrangements under other statutes are preserved and not limited.

How far can MWRs go to authorising partnership governance of RMA matters? Could a MWR provide for iwi reps to sit with councillors?

The MWR provisions go further than the Iwi Participation proposal in the Bill as introduced and what was proposed in the *Next Steps for Freshwater* reform. The Select Committee report explained that MWRs have a "broader scope that includes consenting and monitoring". The drafting is permissive. Some scope issues may be resolved only with lawyer time (and litigation).

General rule of law principles may narrow the apparent scope, but joint committees are already permitted. MWRs

can probably agree for the delegation of particular decision powers to such committees or to iwi participation authorities directly. MWRs may not authorise iwi reps to sit as members of governing bodies (s 41 Local Government Act 2002 is clear). But they could provide for iwi rep membership of council committees, and for attendance, and speaking and information rights at governing body meetings.

Do councils have to agree to MWRs?

Yes, a local authority must agree a MWR within 18 months after an iwi asks for one. If agreement is not reached the parties must accept binding or non-binding dispute resolution, covering their own costs. If non-binding dispute resolution is unsuccessful the Minister of Local Government can appoint a Crown facilitator or direct the participating authorities to use a dispute resolution process (binding if the Minister directs).

What can a MWR be about?


The legislation does not specify MWRs. It describes them. A MWR "must" include some things and "may" include others. A MWR must specify (s 58R(1)(i) – (iv)):

- how an iwi authority may participate in the preparation or change of a policy statement or plan;
- how the participating authorities will undertake consultation requirements;
- how the participating authorities will work together to develop and agree on methods for monitoring; and
- how the participating authorities will give effect to the requirements of any relevant iwi participation legislation.

A MWR may specify (s 58R(4)(a)-(c)):

- how a local authority is to consult or notify an iwi authority on resource consent matters;
- the circumstances in which an iwi authority may be given limited notification as an affected party; and
- any arrangement relating to other functions, duties or powers under the RMA.

The "may include" section is arguably exclusive, but the last paragraph above (s 58R(4)(c)) is an imprecise 'catch all'



clause. Remarkably there appears to be nothing to prevent the transfer of practical exercise of any power, function or duty under the RMA (but not the LGA) to an iwi authority or hapu. This includes any RMA function or power of regional councils (under s 30) and territorial authorities (under s 31). Theoretically, it could extend even to the power to set charges under s 36(1) of the RMA.

A local authority must use its “best endeavours” to comply with a MWR when preparing a proposed policy statement or plan. The model in the drafters’ minds may have been a MWR that automatically has iwi authority joining a new collaborative planning process.

What about resource consents?

A MWR may specify when and how a local authority is to notify iwi authorities or hapu about new resource consent applications or consult with them on applications. A MWR may also describe circumstances (eg, what constitutes an “adverse effect”) for when an iwi authority or hapu is given limited notification as an affected party.

There could be tension with s 36A of the RMA that says local authorities and applicants have no duty to consult with any person about an application. If s 36A is respected a MWR will not be able to impose indirect iwi consultation obligations on applicants.

Who pays for the new arrangements?

This isn’t clear. A so called “guiding principle” in s 58N is that participating authorities must use their best endeavours to collaborate including by the “coordination” of resources required to undertake the obligations and responsibilities under a MWR.

MWR funding provisions will likely specify for iwi or hapu to be remunerated and/or reimbursed for their costs in carrying out MWR functions. Some guidance might be taken from the funding agreement between the Independent Maori Statutory Board (IMSB) and the Auckland Council. The first annual funding agreement emerged from settlement of a litigation threat on terms favourable to the IMSB. Auckland councillors

justifiably complained about serious uncertainty in the law establishing their funding obligation. That uncertainty seems to have suited the government, because this new law is no clearer.

The new law changes provisions governing council charges for RMA processes (s 360E). They are still confined to meeting council costs, but if MWRs provide for councils to meet iwi costs (for example for new monitoring powers), many of those amounts will become council costs that may be recovered by council charges.

What about conflicts of interest or disputes?

A MWR must record, under s 58R, a process for identifying and managing conflicts of interests. It is not clear what that should mean in practice. Conflict of interest arrangements can extend from simple advice of a conflict (to enable others around the table to take it into account) with no other disqualification or consequence, up to complete disqualification from participation. The “weak form” conflict provision in the Hawke’s Bay Regional Planning Committee Act 2015 could be headed “Conflicts Disregarded”.

Strong form conflict provisions could frustrate the new law’s intention. For example, when a proposed plan or resource consent application directly affects iwi or hapu land they would reasonably expect the MWR to give them direct and sustained input. That may be contrary to normal probity protocols for local government, but the Treaty arguments for the MWR regime would support the restoration to iwi of more control of their own properties. A MWR must also record the process for resolving disputes under a MWR. These processes are not prescribed. A dispute cannot cause a local authority to suspend any process under the RMA (s 58R(3)), presumably to prevent the use of disputes as de facto veto mechanisms.

Could councils be liable for losses caused by MWR processes? What financial oversight will there be?

The new law does not provide for MWR party oversight by the Auditor General, but judicial review will not be excluded. A council could be liable for wrongful conduct of iwi representatives exercising delegated powers if that should have been obvious to the council. Suitable wording in a MWR could mitigate but not eliminate such risks.

Could a council be liable for allowing too much iwi influence?

These provisions enter novel constitutional ground. They contemplate delegation of coercive powers that are usually confined to persons who are clearly appointed and supervised and subject to disciplines and prescriptions designed to limit room for whim and abuse. RMA consent and monitoring powers are wielded by people for whom councils have clear responsibility/liability, even where those individuals benefit from limitations on personal liability.

The new provisions contain no express safeguards for citizens. The Select Committee requirement that agreements contain ‘conflict of interest’ provisions do not provide for Auditor General protections against corruption, for example. There are no qualification, supervision or training requirements for iwi participants.

The powers exercised nevertheless remain those of the council so a court may be able to extend the common law and LGA liabilities of local authorities and members (ss 43-47) to ensure that citizens do not lose the remedies they would have had, if the powers had not been delegated to persons outside the normal appointment and accountability regime. Councils, for example, will likely be found liable if they do not show adequate precaution against abuses of authority, or against decisions made without reasonable foundation.

Could a council be liable if iwi representatives abuse their privileges, for example misuse or leak confidential information under a MWR?

Possibly, if it can be established that the council should have seen the risk and took inadequate steps to guard against the loss. But this will come down to circumstances including whether the iwi authority is acting within a delegation from the council at the time or is ‘on a frolic of its own’.

“The MWR provisions go further than the Iwi Participation proposal in the Bill as introduced and what was proposed in the Next Steps for Freshwater reform.”

Can the council change or cancel a MWR?

Once agreed to a MWR cannot be changed or terminated without the agreement of all parties (iwi authorities, hapu and local authorities).

Will it reduce the uncertainty about who councils must consult or engage with?

In practice the MWRs could work to reduce uncertainty. They are expected to result in identification of “participating authorities” (s 58R(1)(b)).

However, the existing RMA provisions giving special rights to iwi have been supplemented, not replaced by these changes. A council, for example, will still need to consult with “the tangata whenua of the area who may be so affected, through iwi authorities” during the preparation of a proposed policy statement or plan (clause 3(1)(d), Schedule 1 RMA). The existence of an MWR does not eliminate the scope for contesting claims over the rohe affected and who is entitled to be involved.

There may be increased dispute where some iwi are without MWRs or where there are internal or inter group disputes about authority and mandate or rohe.

The changes do not require iwi or whanau (tribal members) to be authorised by their members before initiating a MWR. This is a little surprising. The Marine and Coastal Area (Takutai Moana) Act 2011 has resulted in the Ministry of Justice developing procedures for iwi, hapu or whanau to send public notices to their members.



Can a council decide which side to agree with in a divided iwi?

The new law does not address this problem. Section 58S on the “resolution of disputes that arise in the course of negotiating Mana Whakahono A Rohe” applies to disputes that arise among “participating authorities” (ie, the iwi authority or local authority) and not within them.

The prudent course for a council will probably be, as now, to try to deal with all factions without appearing to prejudge the outcome of internal wrangling until that becomes impractical. A council should ask the right questions about the scope of the rohe, and the authority of individuals claiming or purporting to represent iwi.

Can a council agree that iwi are experts on their tikanga (Maori custom) so as not to get caught in the middle of arguments about things like whether a taniwha (mythological water monster) exists or must be respected?

Such an approach may appear to lower the risk of becoming embroiled in arguments which a council is not equipped to resolve. The Auckland Council’s Unitary Plan has a policy that: “recognises Mana Whenua as specialists in the tikanga of their hapu or iwi and as being best placed to convey their relationship with their ancestral lands, water, sites, wahi tapu and other taonga” (RPS B6.2.6.(e)).

However, we think courts will find that the council remains the decision maker on plans, policies and resource consent applications under the RMA. It will need adequate evidence and will not be entitled to accept untested claims.

The Marine and Coastal Area (Takutai Moana) Act 2011 invites courts to refer to the Maori Appellate Court or pukenga for an opinion or advice on tikanga. MWR agreements could stipulate a process for investigating and deciding on such matters. [WNZ](#)

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This article was originally published in *NZ Local Government Magazine*.

Then and now 20 years of freshwater challenges



**By Peter Cochrane, Discipline
Director – Science, Tonkin + Taylor**

At the recent LGNZ Freshwater 2017 Symposium I had the privilege of hearing from Dr Nick Smith, Tina Porou, Sir Peter Gluckman, and others around the freshwater quality issues facing New Zealand.

The overwhelming consensus was the importance of managing and protecting our freshwater resources, and the impact our activities are having on fresh water. But listening to the issues canvassed in the symposium got me thinking, has anything changed?

It's been more than 20 years since the first national *State of New Zealand's Environment* report was published, but as a contributing author to that report I realise that many of the same issues still exist as they did then.

The impacts on fresh water from nutrient runoff are still pertinent but are now more acutely felt. Land is now used more intensively for agriculture in many parts of the country, and this is evidenced by an increase in areas of land under irrigation and the increased use of nitrogen fertilisers. The MfE's recent publication – *Our fresh water 2017* – shows that in the urban environment nutrient loads on freshwater bodies from urban land uses are higher than those from agricultural land uses. Quite simply, the deterioration in freshwater quality is an issue that cannot be attributed to one sector of our economy.

Twenty years ago, obtaining quality data was (from bitter memory) a significant barrier to the timely completion of the first *State of the Environment Report*. As a science user, access to data has fundamentally improved. But the processes and

technology for collecting data are still inconsistent across the country, and the capturing of high quality data is a work in progress.

It's somewhat embarrassing to admit, but the role of Maori in managing resources was only mentioned twice in the first *State of the Environment Report*. The co-management of water resources with 'tangata whenua' is now starting to take effect. Their unique perspective on the intrinsic values of freshwater challenges our perception about what management and protection of freshwater might look like.

So what does this mean for the way in which we look after fresh water, manage its use and begin to restore its value?

The voice of others – particularly Maori – will become influential. The role of science will continue to be central, but integration of a range of views will challenge science and positively influence decision making.

Good decisions are reliant on good data, but there is still work to do to provide data consistency at a national level. Developing and standardising approaches to freshwater rehabilitation is a huge opportunity for improved fresh water outcomes.

Many of the discussions in the LGNZ Freshwater Symposium were around the legacy of poor freshwater quality.

Although this is being tackled through rehabilitation or restoration activities, the manner in which this is done is rather ad hoc. At times our efforts seem to address the community's desire to do something, rather than waiting for the science to catch up and provide guidance on what might be most effective.

Finally, our ability to effectively communicate an inherently complex topic remains a challenge.

We will need to find ways to communicate what our monitoring and science is telling us in a technically credible but understandable manner. This will allow all parties to meaningfully engage in the discussion. **WNZ**

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Peter Cochrane

Peter is T+T's Discipline Director for Science and is strongly focused on supporting public and private sector clients through his wide ranging technical expertise in water resource management. This includes groundwater hydrogeology, surface water quality, stormwater monitoring, contaminant modelling and treatment design, and assessment of catchment-scale hydrological changes brought about by land use changes.



Dean C. Miller

Dean has been working with the National Policy Statement for Freshwater Management (NPS-FM) since 2013. He supports his clients to understand the science behind the National Objectives Framework and the implications of the NPS-FM's regional implementation on practical responsibilities. Dean's commitment to client care is equal only to his technical expertise. His contributions range from large scale water quality and ecological evaluations to assessments of environmental effects on freshwater and marine receiving environments.



Challenging times for councils



John Pfahlert, CEO, Water New Zealand, delivered a speech at the LGNZ Freshwater Symposium in Wellington back in May. **Alan Titchall** summarises his presentation.

The first stage of the [Havelock North] inquiry, as you probably know, has identified deficiencies in terms of the way in which councils have managed the processes of water treatment. It has identified issues about relationships between regional and local government, and identified deficiencies in professional training and professional development, among others.

I think it's reasonably clear from the summary of the first phase of the inquiry that we're likely to see some fairly significant regulatory change recommended in the second phase. And it's likely to focus on issues such as the training and qualifications of the staff that councils employ.

It's also going to focus on technical matters around water sampling and testing. It's going to look at issues like water safety plans, what they are and what should be in them. It's going to look at the relationship between regional and district councils and whether they have the most functional dialogue to ensure risks are being managed effectively. It's going to look at the role of the Ministry of Health and whether it is the most appropriate agency to continue administering water management and drinking water standards.

It's also important to look at the standards themselves. They are 250 pages long with a 750 page explanatory addendum. Can you be confident as a water service manager or chief executive or member of an elected council that your staff fully understands them?

All of these changes are going to cost councils some considerable amount of money to implement. It will involve potentially recruiting more staff, and it may well require you to invest more in infrastructure. That's things like water treatment plants and upgrades to your reticulation network. Wellington Water for example is in the process of purchasing a new ultra-violet-light water treatment processing facility for Lower Hutt. I understand that's costing something in the order of \$15 million.

About 40 percent of the source of drinking water for most communities is sourced from the ground and a very significant chunk of that is untreated. So 'treatment' will certainly affect, in the years to come, council spending priorities.

Local Government New Zealand research during the Three Waters Project pointed to the fact that at least a third of councils had static populations, as well as declining or static incomes. And with communities expecting first world water quality, there will be some real challenges in small town New Zealand about that disconnect between a lack of money, and the desire to have a level of water treatment in this country, that may not necessarily be affordable. And if we think that central government is going to stand in the wings and say, "oh yes, we'll pay for that", history suggests they haven't been wildly enthusiastic in supporting local government.

Historically, the Government has provided subsidies for drinking water treatment in small communities. There was \$100 million invested over the 10 years up to 2015 and both LGNZ and Water New Zealand have called for a reinstitution of that particular scheme – one I would be happy to stand alongside LGNZ and have a conversation with government about.

One of the issues that the Inquiry has come up with is the development of water safety plans, which are a risk management exercise often outsourced by local government to contractors and consultants. I think the Inquiry has been quite clear that it's not good enough to simply pass the management of that activity on to a consultant and expect that they will manage your risks for you.

Going forward, you might want to think about that issue as a council, whether you're across water treatment as a risk management issue.

The things that focus people to stand for local government and get elected are probably somewhat different from the sorts of things that focus the minds of a water service manager who has an engineering training.

You're thinking about electoral cycles, you're thinking about rates increases, you're thinking about a whole bunch of other things that your community wants to pay for. And water and sewage and stormwater are simply not very sexy,

let's be honest. We take \$55 billion worth of water pipeline assets in this country and we bury them in the ground where the ratepayers can't see them. Obviously, that's where they've got to go but it's not a vote winner for the next local body election, is it?

And of course the elephant in the room, which no-one wants to talk about, is the structure of local government and that's excluded, quite rightly, from the Inquiry's terms of reference.

Going forward, I notice that buried in the detail of the scope for the second phase of the Inquiry is whether water service entities might be a topic for conversation. Is there a different way of delivering water services? This is something the judge obviously wants to have a look at.

Councils consistently, for political decisions, decide not to treat water simply because their constituents don't like the taste of the chlorinated water, and they don't want to be criticised by their local communities.

But I'm just going to say here, get over it, because one of the issues that the second phase of the inquiry is going to look at is whether water treatment should be mandatory in this country.

I'm not saying that's what they're going to come down to, but they are going to ask the question, and that obviously it has important ramifications in terms of costs for local communities. [WNZ](#)

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New consultancy – Alta



New specialist construction consultancy, Alta, says it has made an impact since setting up shop in Auckland. The three partners heading up Alta Consulting are Rory Bishop (pictured), Tim Lancaster and Daniel Williams and the trio have previously held senior roles at McConnell Dowell and Hawkins and worked together on many diverse, major projects in the UK and New Zealand.

“We occupy a unique space in the infrastructure market and the time was right to set up a consultancy that provides independent construction insights to clients early in the project cycle,” says Rory Bishop.

“Our experience as senior decision makers on projects makes our analysis insightful, our advice robust and our approach efficient

and cost effective. We’ve launched in a very positive time for the sector.”

Rory Bishop: chartered engineer and chartered environmentalist and an associate of the Camborne School of Mines. From tunnels and underground construction, to roads, bridges and marine constructions, Rory has over 20 years’ experience.

Daniel Williams: chartered engineer. Daniel is an experienced constructor of more than 15 years and he has led a wide range of projects and contract models.

Tim Lancaster: commercial specialist.

Tim has over 15 years’ experience in commercial and cost-related roles across the construction industry. He has also held senior operational roles.

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If the sand is too coarse, there will be no capillary action and the effluent will drain through too rapidly. If too fine the sand will become impermeable/anaerobic and drain through too slowly. If the silt content is above two percent, the silt migrates to the base of the bed and the soil can become less permeable, meaning the effluent disposal field has the potential to bind and fail.

Each installation uses around 20 to 40 cubic metres of sand for most domestic premises, depending on the receiving soil. Environment Technology tests sand samples free of charge to ensure correct sizing and has been adding suppliers’ contact details to its website

www.et.nz. It invites sand suppliers throughout the country to contact it and send suitable, labelled samples (around two cups) for testing.

The AES system is currently being tested at the national testing centre – OSET in Rotorua – although it has already received SAI Global certification as a secondary treatment system in Australia, as well as NSF in the US, BNQ in Canada and Belac in the European Union.

The company believes once it has proven its performance here, the uptake around the country will be considerable.

Contact: info@et.nz or 03 970 7979, or www.et.nz for further information.

Stormwater detention and retention

Under the unitary plan in Auckland most newly built houses and higher density infill require stormwater detention and retention.

Aquacomb uses the space in the concrete floor slab of dwellings – in place of the polystyrene blocks – to turn part of the floor slab into stormwater retention or detention.

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Since Aquacomb is placed within the slab, no valuable land is used up like with existing options, and it works out to be a cheaper

option in most sites when all costs are accounted for.

The product also solves high invert level issues as the system is laid at grade, and doesn’t affect impervious surfaces as it uses existing coverage.

Proven in Australia for 10 years and over 3000 installs without issue, the company offers a 20-year guarantee.

More information: www.aquacomb.co.nz.



Measuring nitrate concentrations

High concentrations of nitrates and phosphates may cause serious algal blooms, creating a risk to humans and animals. The Dutch algae control company, LG Sonic, has integrated a nitrate (NO_3) sensor into its water quality sensor package to offer water companies a complete water management solution. By real-time measurement of the nitrate concentration, it is possible to predict algae growth and detect excessive algae growth caused by elevated nitrate concentrations.

Eutrophication is characterised by a high concentration of nitrates and phosphates in the water. These increased nutrient levels are often caused by industrial or even municipal discharge into a waterbody. Excessive concentrations of nitrates in lakes and reservoirs, can cause accelerated eutrophication and loss of dissolved oxygen.

The NO_3 sensor is integrated in the water quality sensor package delivered with the MPC-Buoy, a solar-powered system for monitoring and controlling algal blooms. The water quality sensors measure essential algae indicators (chlorophyll-a, phycocyanin, and turbidity) and water quality parameters (dissolved oxygen, redox, pH, and temperature) every 10 minutes to monitor and control algal blooms.

The measured data can be viewed in real-time via a web-based software called MPC-View. The MPC-Buoy system also provides an environmentally friendly solution to control algae growth. Based on the received water quality data, a specific ultrasonic program is activated.

This makes it possible to reduce 70 to 90 percent of the algal bloom and to prevent new blooms. Currently, LG Sonic is running MPC-Buoy projects in more than 20 countries worldwide.

The MPC-Buoy product has already been installed in several systems in a reservoir that supplies water to Auckland.



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