

# water



SEPTEMBER / OCTOBER 2017 ISSUE 201

## **Havelock North Stage 2 Inquiry**

**Profile of Conference keynotes**

**Water in Auckland's Unitary Plan**

**Wastewater energy case study**

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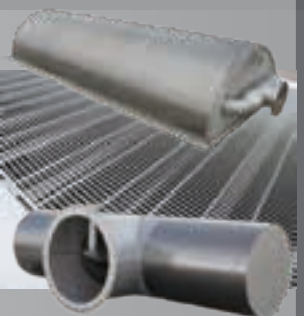
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*A consistent approach across the 3 waters sector.*



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.



# Government sets sights on three waters review



**Dukessa Blackburn-Huettner,**  
**President, Water New Zealand**

**W**ell, it's clearly the year for water services to be reviewed. In our last edition of the *Water* journal, our pre-election political article revealed that if re-elected as government, National's key priority would be three waters reform. This was iterated at the Local Government New Zealand conference in late July when the Minister of Local Government, Anne Tolley announced a Three Waters Review.

The Government's review is to focus on the management of three water services to "better support prosperity, health, safety and environment". The Government has indicated that a series of recent events indicates that the current approach may not be 'fit for purpose', citing the Havelock North campylobacter outbreak as an example of the problems it sees with three waters management.

The review will seek to understand the challenges associated with managing finances, infrastructure and compliance and monitoring systems.

Of interest are some of the areas that the Government has decided not to investigate: funding of renewals in areas of declining population; restraints placed on Councils due to capability and capacity constraints and functions of government at the national level. The Government argues that the rather narrow focus of the review will allow them to "optimise the current system before pursuit of more ambitious reform".

The first of the three work streams has been called the

"financial incentives work stream". This would seek to identify practices and incentives which may detract from appropriate funding, financing and pricing of three waters services by local authorities. The review will consider the regulatory framework for financial management, the role of the Crown and sector bodies in relation to local authorities' financial management practices.

Funding issues at the local government level are as much a matter of political choices by elected politicians. To address the real issue of lack of money at the local government level Central Government will need to look at alternative mechanisms to fund Local Government in addition to reviewing the Local Government Act.

The second work stream is an asset management practices work stream. This would seek to identify the range and distribution of practices across three waters. It would aim to look at the particular challenges and/or deficits in practices; the incentives, interventions or other initiatives that may contribute to an overall improvement in practices; and the extent to which regulation could assist to improve practices.

The review would take a broad view of asset management practices (eg, engineering, asset planning, strategy, policy and finance) to investigate issues and develop recommended solutions.

In this space we see ourselves being able to contribute information from the National Performance Review. The review may also be able to identify which of the various guidance manuals produced by Water New Zealand (and other organisations) applicable to this field are being used across local government. There may be also some learnings from other sectors that can be brought to the table – such as the electricity sector.

It may also be an opportunity to remind Government it invested several million dollars in the development of metadata standards, the implementation of which is at risk in the water space without resource and funding being



allocated to progressing this initiative. After all, improving national consistency in data collection and recording will enable better reporting of information on three waters assets – something the Auditor General has commented on.

The last work stream relates to compliance and monitoring. This seeks to identify a compliance and monitoring framework that supports national and local community outcomes. The review would consider all aspects of governance related to compliance and monitoring (e.g. gaps in information, performance monitoring, evaluation and direction) for the three waters services to understand what activities across the regulatory spectrum could be valuable.

It's not clear how this part of the review relates to work undertaken routinely by the Office of the Auditor General.

The review is not going to resurrect the proposal by LGNZ for a co-regulatory model – so any hint of a more structurally focused reform is off the table – for now.

The review will be done in two stages: stage one will explore the issues and opportunities with three waters services by gathering and analysing information. The aim

**“ It may also be an opportunity to remind Government it invested several million dollars in the development of metadata standards, the implementation of which is at risk in the water space without resource and funding being allocated to progressing this initiative. ”**

would be to complete this by the end of this year. Stage two will look at options for improving three waters services, the aim is for this to be completed in 2018.

The Government has indicated it would work closely with councils and stakeholders with an interest in three waters services. The work programme would be led by officials at the Department of Internal Affairs.

Water New Zealand will seek to be actively involved with officials during the review and to communicate members' views. Local Councils can probably expect to be contacted directly for information by officials. **WNZ**

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# Big opportunities for stormwater group



By Michael Hannah,  
*Stormwater Special Interest Group Chair.*

**Welcome to the first article** in what will be a regular feature in Water New Zealand's magazine.

Modern stormwater management is a new and emerging field of only 40 years old. Historically, stormwater has been considered as drainage. However, Central Government has mandated better stormwater management through the National Policy Statements for Fresh Water and the coastal environments.

Never in the history of the water industry has stormwater management been as significant as it is at present. The challenges from Southland to Northland are constantly reported in the media as the effects of climate change, population growth and land use change are perpetuated.

This brings new concepts and techniques that need to be integrated into our traditional way of thinking.

This was largely why the New Zealand Stormwater Group was formed in 2002 from the NZWWA Drainage Managers Group. The objectives of the group are:

- To provide a forum for discussion of matters to the Stormwater Group;
- To advise Water New Zealand on matters both positive or negative which could likely impact on the Stormwater Group;
- To assist Water New Zealand policy staff with expert advice on

the appropriate advocacy position for Water New Zealand to take in relation to policy initiatives likely to impact on the Stormwater Group;

- To determine the most appropriate mechanism to further learning and skills development with the membership of the group;
- To assist Water New Zealand in developing cost effective and efficient methods for the group's members to achieve compliance.

The Group holds a very successful annual national stormwater conference as well as regional representations and workshops.

In fact, the Auckland Regional Meeting will be held on October 5 at the offices of Tonkin & Taylor in Newmarket. Presentations will be made concerning Auckland's coasts by Paul Klinac, Coastal and Geotechnical Services Team Manager, Auckland Council as well as a paper on 'The validity of rain gauge data' from the Hydrological Society's Conference by Jon Rix – Senior Water Resources Consultant, Tonkin & Taylor.

This year the group would like to extend its engagement with the industry. We will be holding training sessions, facilitating submissions on policy and be abreast of technical developments and advancement.

We invite all members to sign up to the Stormwater Group's Linked in page at <https://www.linkedin.com/groups/6743160> to obtain the latest news in the stormwater world both locally and internationally. Any meeting minutes and documents about the group will also be communicated through this platform.

New Zealand's Stormwater Group needs you! Join the group now and help solve some of our biggest water challenges both now and in the future!

## Water New Zealand board considers proposed Industry Certification Scheme

By John Pfahlert, Chief Executive, Water New Zealand.

**The Havelock North campylobacter outbreak** in August 2016 highlighted to industry the importance of ensuring that the systems in place to supply drinking water are robust and effective.

The resulting Government Inquiry has raised questions about the training and competence of staff involved in the management, supervision and operation of the water treatment and reticulation system.

It is now evident to many in industry that the absence of an effective system for the training, qualification, competency assessment and continuing professional development of staff is a serious gap in the provision of safe drinking water to many New Zealand communities.

While the Inquiry will eventually make recommendations in this space which may or may not be acted on by Government, it is the responsibility of industry to step up and take a leadership role in this area now. While regulation may or may not follow, there is a view we need to implement such a scheme on a voluntary basis as soon as possible.

To that end the board of Water New Zealand circulated a

proposed certification scheme for industry comment in July. It dealt with those involved in the water treatment and wastewater sectors. It proposed to include managers, supervisors and operators. The extent to which we initiate a system of continuing professional development for those holding water reticulation qualifications has yet to be resolved, but under consideration.

The consultation paper detailed the requirements the board believes are appropriate for such a certification scheme. The board recognised that what was included in this paper is a major change for industry.

Feedback from industry was considerable. Over 30 submissions were received, most supportive of some system of certification being developed. However most thought that the proposal was under-developed, with many comments about the workability of certain aspects of the proposal.

The board decided to table the proposal as a draft with the Havelock North Drinking Water Inquiry, noting that plenty of industry feedback had been received and that the scheme would need changes to be acceptable to industry. The board is now considering how to proceed.

## Consumer report unveiled at conference

One of the keynote features of the Annual Conference this year will be the release of the findings of the Water New Zealand's New Zealand Water Consumer Survey.

The survey of nearly 5000 respondents from all over the country has revealed that nine out of 10 New Zealanders want to see a change on water bottlers (see story on page 8). The survey is the first ever nationwide examination of what we think about critical issues around water – from drinking water supply to issues around water pricing and how customers rate service from their supplier.

There has been a large regional and age distribution of respondents so that provides us with a good indication that it will be very reflective of the views of the New Zealand population.

Following the release of the findings at the conference, the report will be posted on the Water New Zealand website.

Its aim is to provide valuable information for water sector leaders across the country by providing councils and water sector leaders with an accurate gauge of consumers' attitudes. It is hoped this will be a valuable tool in helping members develop sustainable, relevant and robust policies. It will also help members understand where services can be improved.

A particularly exciting development in this survey is the inclusion of a new "slice and dice" option for online viewers. This user-friendly, inbuilt data visualisation tool will allow online viewers to delve into a matrix of sub-sets of respondents based on gender, age, geographical location and so on. It will be particularly beneficial for more indepth analysis of findings or for users seeking more specific details.

The key results of the findings will be presented on Wednesday September 20 by David Lambert from international water services consultant, Arup, which conducted the survey.

## Update of three joint standards on membrane filtration

**Standards NZ has advised that** it is seeking expressions of interest from groups wanting to participate in the review of three membrane filtration related Joint Standards with Australia. They are to serve on the FT-020 committee for:

- Revision of AS/NZS 4276.5-2007 Water microbiology, Method 5: Coliforms – Membrane filtration method
- Revision of AS/NZS 4276.9-2007 Water microbiology, Method 9: Enterococci – Membrane filtration method (ISO 7899-2:2000, MOD)
- Revision of AS/NZS 4276.22-2007 Water microbiology, Method 22: Packaged water – Coliform bacteria and Escherichia coli – Membrane filtration method (ISO 9308-1:2000, MOD)

In the past the Ministry of Health has supported these Standards by making representatives available to serve on the Standards Committees.

If companies are interested in contributing to or participating in the review please contact John Pfahlert at [ceo@waternz.org.nz](mailto:ceo@waternz.org.nz).



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## NZers want water extractors to pay

A recent survey reveals an overwhelming nine out of 10 people surveyed want a charge for extracting water levied on the bottled water and similar industries.

The New Zealand Water Consumer Survey 2017 received nearly 5000 respondents and is the first nationwide examination of our attitudes to a wide range of issues associated with water.

While the survey revealed that 89 percent want a charge for water bottlers, more than three quarters (77 percent) believe there should be a cost when taking water from the environment for agriculture and horticulture.

Water New Zealand CEO John Pfahler says the findings make it very clear that New Zealanders strongly believe that private businesses that profit from the use of water should pay for it.

He says that while the overwhelming support for charging water bottlers is understandable it's also important that there is wider discussion about water pricing and how to ensure efficient and fair use of our water resources.

The survey also reveals that three in five people (59 percent)

believe that all users should pay for taking water from the environment.

"What's interesting is that the results are consistent across urban, regional and rural areas," says John.

"The survey shows that New Zealanders are generally in favour of paying for the water they use although it reveals many are unsure of what they currently pay for.

"It shows many people (74 percent) already believe they pay for the water they use as well as its delivery.

"This suggests that there is a lack of understanding around water charging. Under current law, local councils can charge only to cover the costs involved in treating, transferring, maintaining and operating water infrastructure."

The survey was undertaken in May and June this year and covers a wide range of consumer attitudes – from issues around quality and future concerns to service delivery and costs.

Full results will be released at the Water New Zealand Conference in September.

## 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.

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- » **treatment process** – manipulate an on-line process to achieve desired quality criteria

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## A crowdfunding website for waterway restoration

The **Million Metres Streams** project was set up in 2014 by the Sustainable Business Network (SBN) in partnerships with the Department of Conservation.

For more than 15 years SBN has been uniting Kiwi companies actively making business better. Today the network has nearly 500 member companies.

The idea and early momentum came from a philanthropic SBN supporter who spotted the opportunity to harness the power of the network to address the nation's water quality issues.

"What we do is gather companies around a sustainability issue and say, 'what can we do together?' This was an issue screaming out for some intervention," says SBN CEO, Rachel Brown.

Million Metres created a crowdfunding website to showcase projects in need of help. The team helps land owners and community groups list their projects on the site and advises them on how best to promote themselves. Each project also works with an expert field partner, usually the local council or a trust.

Georgina Hart, Million Metres project lead,



Restoring Rangihoua Wetland on Waiheke Island.

says: "The process can start with an individual family, often farmer, a local volunteer group or a local authority.

"We provide a new window on the world and a way to tap into funds they would otherwise miss out on. For businesses this provides a really easy way to show they care and are willing to take action on this.

"Together we let people know that there is no time for waiting on this, and no need to, they can get stuck in and help with a solution right now."

So far the Million Metres platform has

crowdfunded for 21 planting projects across the country and has fundraised nearly half a million dollars.

"Kiwis are passionate about water," says Georgina. "We know as a nation we want to get this right. Our job is to channel some of that passion into immediate practical action.

"The next stage for us is looking to catchment wide projects and efforts to protect the waters of entire bays and offshore areas. There's heaps to do, but we believe this is a challenge we can all rise to."

More information at: [millionmetres.org.nz](http://millionmetres.org.nz).



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## Onsite wastewater technical manual

**Water New Zealand has contracted Andrew Dakers** from ecoEng in Christchurch to develop a comprehensive technical manual, in updatable format, about onsite wastewater management for services (OWMS), specifically for New Zealand conditions.

For this purpose, the intention is to use, as a starting point, the relevant resources written for the Auckland Council GDO6 publication (a recently updated version of TP58). Auckland Council will be working with us on this project.

The manual will primarily be written for designers and regulators.

**Designers** are those who are engaged, by the land-owner, to provide a compliant, sustainable and effective onsite wastewater service that is the optimal design for the specific site conditions.

**Regulators** are the local regulators (from the local regional and/or territorial councils) who are required to audit and consent the proposed designs and inspect and approve the installed service, in the context of their Council's rules and regulations.

At this stage, the content details for the manual are to be decided through a process of consultation with invited stakeholders. The manual is not intended as 101 course notes for inexperienced and uninitiated practitioners. There are a number of other resources available for these people.

The reason for assuming a reasonable level of knowledge and experience is to enable the document to be formatted as a series of easily accessible, user friendly focused chapters on a specific topic with highly relevant tools and information that will be eagerly used by those in the field actively doing designs.

The most informed and qualified people who can guide the development of the document are practitioners with many years of design experience at the coalface. To this end the proposal is to establish an advisory group to be inclusive of this wealth of knowledge and experience.

If you would be interested in participating, please contact Andrew Dakers at [andrew@ecoeng.co.nz](mailto:andrew@ecoeng.co.nz).



# Water treatment with sound

**Sound waves are being used** to kill algae at a water-supply lake in what is believed to be a first for the country.

Algal blooms in summer can render water in the Lower Nihotupu Dam in west Auckland expensive to process or unusable and a trial of ultrasonic technology, monitored and adjusted by LG Sonic in the Netherlands, has shown promising results in keeping good water flowing from the dam.

"We are not trying to get rid of the algae, just get it to levels that don't cause us problems," says Amy Holliday, water quality and environmental analyst for Watercare.

"It gives that extra assurance that when people turn on the tap the water that they are drinking is safe. This technology is just adding another tool to our toolbox."

Watercare says the project cost \$384,100 in capital expenditure and, if adopted, another \$20,000 each year in running costs. The one-year trial started in December, and if it worked would save money at the water



treatment plant, where less chemicals would be needed. An American company recouped the cost of deploying the technology in 1.8 years, says Holliday.

So far it appeared to be a great success here, with the blue-green algae count over summer 90 percent less than the year before. However, the weather in Auckland had been

cooler than most years so it is difficult to be certain yet.

The ultrasonic vibrations cause the cell walls to resonate and break – similar to a glass breaking from a high-pitched sound. They did not harm humans, animals, fish or aquatic plants.



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## Industrial wastewater innovation

Researchers from Edith Cowan University says they have developed a way to modify the atomic structure of iron to create a metal that can strip impurities from water in just a few minutes.

The breakthrough, recently published in the journal *Advanced Functional Materials*, offers new applications in industries where large amounts of wastewater are produced.

Associate Professor Laichang Zhang from ECU's School of Engineering was able to change the atomic structure of iron to form what is known as metallic glass (its atomic structure resembles that of glass). Whereas the atomic structure of traditional metals is very ordered, with the atoms forming a grid like structure, metallic glass atoms have a much more disorganised composition.

"It is this disordered atomic structure that gives metallic glass its very interesting and useful characteristics," says Zhang. A thin strip of the iron-based metallic glass developed by Zhang can remove impurities such as dyes or heavy metals from even highly polluted water in just minutes.

"It works by binding the atoms of the dye or heavy metals to the ribbon, leaving behind useable water.

"This offers a number of benefits compared to the current method of using iron powder to treat wastewater. First, using iron powder leaves you with a large amount of iron sludge that must be stored. Second, it is expensive to produce and can only be used once.

"In contrast, the iron-based metallic glass we have developed can be reused up to 20 times, produces no waste iron sludge and can be produced as cheaply as a few dollars per kilogram."

## Chance to comment on RITS

**Water New Zealand members** who operate in the Waikato region have until October 4 to comment on the Waikato Local Authority Shared Services' (a company owned by 12 councils in the Waikato region) Regional Infrastructure Technical Specification (RITS).

The RITS is a document that sets out how to design and construct transportation, water supply, wastewater, stormwater and landscaping infrastructure in the participating councils' areas.

Prior to developing RITS, each council had its own Infrastructure Technical Specifications, which resulted in different standards having to be met across the Waikato region. The purpose of RITS is to provide a single regional guide and specifications for building public infrastructure.

The Waikato Regional Council is also preparing two guidelines that are expected to be available for comment later this year. The two guidelines are: Waikato Stormwater Management Guideline (to replace Auckland Council's TP10); and the Waikato Stormwater Runoff Modelling Guideline (to replace Auckland Council's TP108).

It was previously expected that these guidelines would be available for release by now, but work on them is still underway. Association members with an interest may wish keep an eye on this work, with the view to providing feedback when the documents are released.



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## Health Ministry conference presentation

**The Ministry of Health has been allocated** a late slot at the Water New Zealand Conference to cover a range of topics arising out of the Havelock North Inquiry.

Ministry representatives will discuss the change in approach to the management of drinking water that has arisen from the Inquiry.

This includes: A review of the drinking-water standards, possible changes to water safety planning (and a move towards a best-practice risk management framework with critical control points); suggested changes to the Drinking Water Register and the requirements for annual reporting; and strengthening the management of non-compliances with the Health Act and the drinking-water standards.

It also involves setting up an expert advisory group to provide high quality, independent scientific and technical advice to the Director-General of Health on current and emerging health issues relating to drinking-water; and strengthened collaboration and cooperation between drinking-water suppliers, freshwater management and public health.

A revised framework for Water Safety Planning is currently being developed for consultation and will be available for discussion and the paper will be presented at noon on Thursday 21 September.



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### **James Hughes** **Infrastructure Resilience Specialist**

James is a risk and resilience expert with unique insight into risk management approaches. A member of the MfE's Climate Change Adaptation Technical Working Group, he has more than 18 years' experience working in the infrastructure and environmental sectors. His particular experience and understanding of natural hazards - including climate change - add real value to our water advisory group.



### **Wageed Kamish** **Senior Water Resources Engineer**

Wageed is a water quality assessment specialist with extensive experience working on hydrodynamic and CFD water quality modelling projects. His 20+ years' experience as a consultant and university lecturer in South Africa add a powerful dimension to our modelling expertise. Wageed's current focus is working with our team to develop pragmatic methods for managing New Zealand's water quality issues.

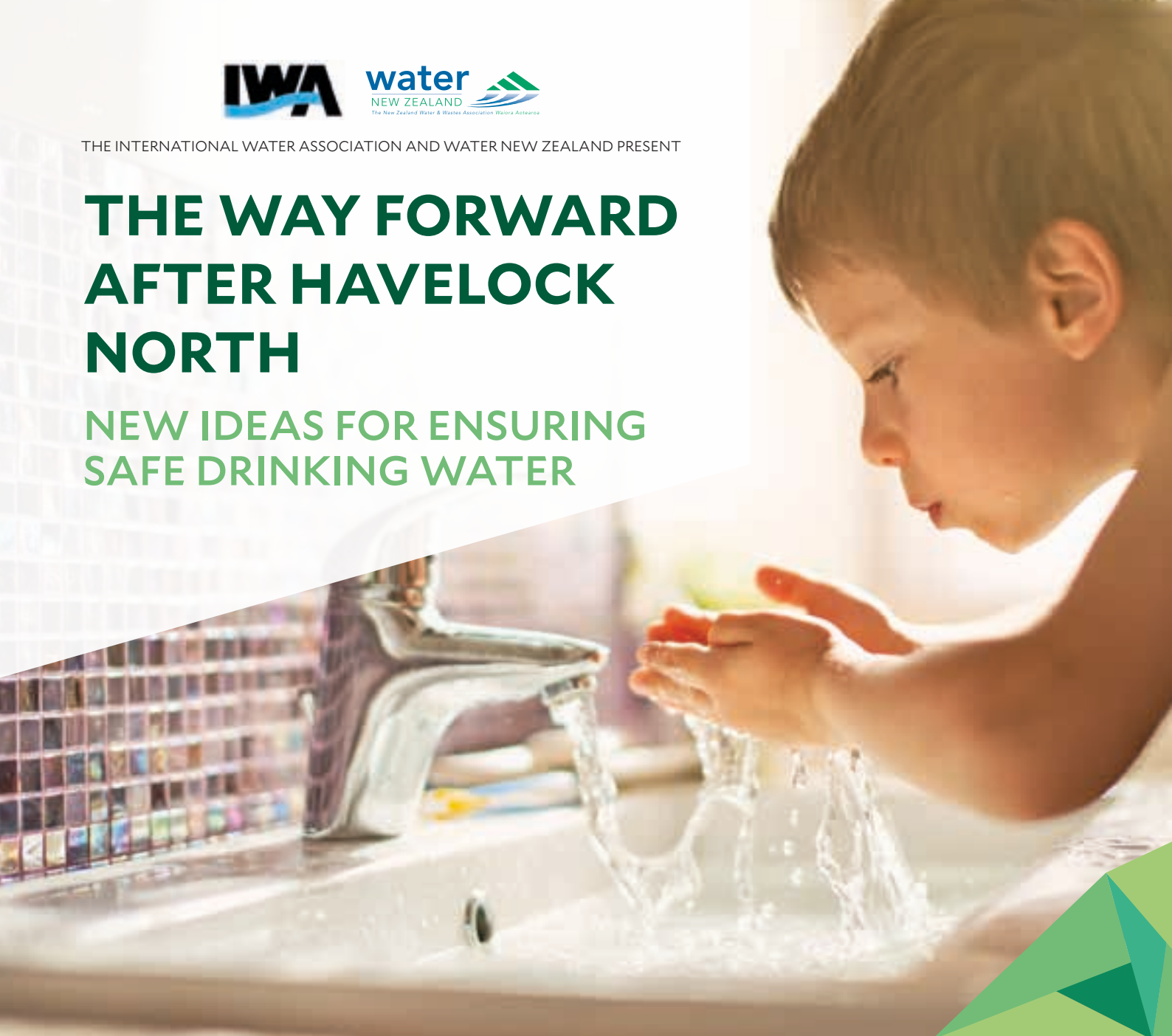




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- » Analysis of water quality management data – what it tells us (human health, animal waste and water quality)
- » Where we can go from here

# INTERNATIONAL KEYNOTES

**Steve Hrudey – 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**

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## Strong international focus at this year's conference

Message from association chief John Pfahlert.

This year's **Water New Zealand Conference and Expo** will focus on many of the challenges facing the water sector – from ensuring safe drinking water, to meeting customer needs in a fast-changing environment, to improving water quality in our rivers and urban environments.

These are challenges that echo those facing our counterparts in other parts of the world, firmly reminding us that we are part of a global environment.

So perhaps it's not surprising that we have the biggest line up of international speakers we've had at a conference – from the US, Denmark, India, Scotland, the Pacific and Australia.

We'll be covering a myriad of issues from sustainable development

goals, to the mammoth task of restoring the Ganges River in India, through to lessons from the Flint water contamination crisis in Michigan. See below for more details on some of these speakers.

An extra highlight this year, and certainly a must-attend event for all drinking water decision makers, will be the Drinking Water Workshop on September 19. See pages 14 – 15 for more information.

You can also go to our website to see the main conference programme and the line-up of presentations including the very successful Thought Leadership stream that we introduced at last year's conference.

Last but not least, I'd like to thank our sponsors and hope that everyone attending this year has a most enjoyable and inspiring time.

## CONFERENCE KEYNOTE SPEAKERS



**Dr Steve Hruhey, University of Alberta, Canada**

9.15, Wednesday 20 September

**International experience and learnings from water contamination events in affluent countries**

Steve Hruhey is a Professor Emeritus, Faculty of Medicine and Dentistry. He has served on many expert panels, dealing with high profile environmental health

issues including the Walkerton Inquiry (2000-2002), and the Expert Panel on Safe Drinking Water for First Nations in Canada (2006). He is co-author of *Safe Drinking Water – Lessons from Recent Outbreaks in Affluent Nations*.

Steve has been recognised with several major awards including a Queen Elizabeth II Diamond Jubilee Medal from the Royal Society of Canada for service to scholarship in science and the top research award (2012 A.P. Black Award) of the American Water Works Association.



**Daniel Lambert, ARUP**

10.00, Wednesday 20 September

**Water New Zealand Customer Satisfaction Survey**

Daniel led the development of the first two national water surveys in Australia – the Australian Water Consumer Outlook (in 2015 and 2016). These surveys provided valuable insights for the water sector in

Australia on their views on the customer.

He is a member of the International Water Association's Strategic Council, a Fellow of Engineers Australia, a member of the National Urban Water Reform Steering Committee and he advises on the Infrastructure Partnerships Australia Water Taskforce.

His work developing solutions to the water and sanitation challenges in Asia includes providing advice to clients in Asia through the Australian Water Partnership's Expert Review Panel and the Australian Water Association's Expert Advisory Committee.

In 2016 Daniel was recognised by Engineers Australia as one of Australia's 'Most Innovative Engineers'.



**Dr Paul Byleveld, Manager Water Unit, Environmental Health Branch, New South Wales Health, Australia**

8.30, Thursday 21 September

**Water and sanitation safety in humanitarian emergencies**

Paul 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. Paul led the development, and





# water

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**Main Conference and Expo 20–22 September 2017**

**Drinking Water Workshop 19 September 2017**



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oversees implementation, of the \$200 million Aboriginal Communities Water Supplies and Sewerage Program. He has contributed to the development of the Australian Drinking Water Guidelines and the WHO Guidelines for Drinking-Water Quality.

Paul has international experience with the Red Cross and the Australian Government in conflict, post-conflict and natural disasters (tsunami, earthquake, typhoon and floods). He has worked in the Middle East, South Asia, South East Asia and the Pacific. He has established refugee/displaced persons camps and emergency water supply, sanitation and vector control, built community water systems and coordinated health programmes.



**David Kay, University of Aberystwyth, Wales**

9.15, Thursday 21 September

**How emerging science in Europe is challenging regulatory assumptions for bathing and shellfish harvesting waters**

David is a Director of CREH Ltd and Professor of Environment and Health at the University of Wales,

Aberystwyth. He has acted as consultant and/or adviser 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.



**Raveen Jaduram, Watercare**

9.00, Friday 22 September

**Customer centric digital utility**

A graduate from Auckland University, Raveen has been working in New Zealand since 1987. In 1992, while working as a civil engineer for Auckland Regional Council, he was part of a team tasked with

setting up and running a new regional wholesaler called Watercare.

In 2000, he moved from Watercare to be operations manager of Auckland city's Metro Water for three years. His next roles were as general manager and then chief executive of the former Manukau City Council's Manukau Water, which ceased to exist in the regional integration of bulk and retail water and wastewater services under Watercare in November 2010.

Back at Watercare, he became chief operations officer until 2012 when he moved to New South Wales as managing director of Murrumbidgee Irrigation. Raveen returned to New Zealand a year later as Watercare general manager and then as acting chief executive until the appointment was made permanent in November 2014.

He has been an independent director of Wellington Water, president and chairman of the Water and Wastes Association (now Water New Zealand), chairman of the water sector Senior Executives Forum and, currently, is on the Business Leaders' Health and Safety Forum.



**Dr Vinod Tare, Indian Institute of Technology**

9.30, Friday 22 September

**River basin management – the need for multi-disciplinary approach**

Dr Vinod Tare is the founding head of CGanga (Centre for Ganga River Basin Management and Studies), a new think tank established at IIT-Kanpur under the

aegis of the National Mission for Clean Ganga, the executive body of India's Ministry of Water Resources, River Development and Ganga Rejuvenation.

His presentation will focus on one of the most ambitious river basin management programmes in the world – restoring the River Ganges to its pristine health. More than 45 percent of India's population (550 million people) depend on the river for their daily needs. However, decades of urbanisation and industrial activity in the river basin have caused unprecedented levels of pollution and fracturing of the river creating an existential crisis of epic proportions.

The government's restoration programme is expected to run over the next 20 years and requires over US\$100 billion in capital investment.



**Ken Hutchison, Scottish Water**

10.45, Friday 22 September

**What do you need to do to truly put the customer at the heart of your business?**

Ken is the Managing Director of Scottish Water International. Ken's prime focus is to export Scottish Water's skills, experience and knowledge around

the globe to help utilities transform their performance and customer satisfaction.

He is the former Director of Capital Investment for Scottish Water and he provided overall direction and leadership for the development and delivery of a customer focused, safe and efficient capital investment portfolio (c£500m/year).

Ken's career spans over 25 years in the water industry in Scotland and he has held general manager roles in Asset Management, Investment Planning, Capital Delivery and Operations.

Ken has led significant change projects which have transformed Scottish Water's operational and capital efficiency and customer focus and have delivered significant customer value.



**Colin Crampton, Wellington Water**

11.30, Friday 22 September

**The new water manager of the 2020s – fast and loud**

Colin Crampton is the Chief Executive of Wellington Water. He was previously Group Manager, Highways and Network Operations for the New Zealand Transport Agency.

Colin has spent 25 years in the infrastructure sector. He says his job is to work to a repeatable strategy and continually enhance the capability of people who deliver 3 waters services to Wellington's customers.

## Invited Speakers



**Jesper Danniso, Danish Water Forum**

11.30, Wednesday 20 September

**Denmark does not take access to water for granted**

Jesper, an aquatic biologist, is Director of the Danish Water Forum. He has worked with water-related issues in more than 40 countries focusing on water resources management, promoting the design of

good monitoring networks and the use of biological indicators for surface water.

Jesper has led numerous training courses on water and environment which has given him insight into water-related problems in various climates. He has worked at the DWF for more than 10 years and is responsible for the training programme "Women's Water Initiative",

which aims to promote the development of women in water sector management.



**Laurie McNeill, Utah State University**

10.30, Thursday 21 September

**The drinking water situation in Flint, Michigan**

Laurie McNeill is a Professor of Civil and Environmental Engineering at Utah State University (USU) in the United States. She has been researching the behaviour of trace inorganic contaminants in water distribution networks for more than 20 years. She is also the faculty adviser for the USU chapter of Engineers Without Borders.



**Mads Warming, Water and Wastewater, Danfoss**

11.00, Thursday 21 September

**Turning the water industry into energy neutrality**

Mads is Global Director for Water & Wastewater at Danfoss Drives. He has been Global Strategy Business Manager for Danfoss' previous Instrumentation and Flow business unit as well as CEO for Danfoss Analytical (developing a new groundbreaking analytical sensor for the global water and wastewater industry). Mads received an Innovation Award at WEFTEC in the USA for these developments while Danfoss got an innovation award from CAMBICA

in the UK for the energy neutrality concept in 2016.

Mads has recently become a board member of Danish Environmental Technology Association.



**Pitolau Lusie Sefo-Leau, Pacific Water and Wastes Association**

4.30, Thursday 21 September

**PWWA's role in the Pacific**

Pitolau is Chief Executive Officer of Pacific Water and Wastewater Association (PWWA), an organisation of Pacific water and wastewater utilities across 22 countries, and allied and affiliated members from around the region and the world. PWWA is based in Apia, Samoa.

Pitolau joined PWWA late 2016 as its first CEO to head the newly created Secretariat and start the process of establishing the organisation in Samoa as a regional organisation for Pacific water and wastewater.

She has more than 30 years' experience in economic, finance and tax policy development, and development programme management in the public sector and with international organisations. During this period, she held senior leadership roles for 25 years and led major institutional and capacity building reforms and projects including some government-wide programmes.

Pitolau is a recipient of the 2013 Samoa Public Service prestigious excellence award for Inspirational Leadership.

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Richard Kruse.

# In the swim

The duties of a water treatment operator are demanding but rewarding, according to Richard Kruse. By **MARY SEARLE BELL**.

**U**ntil he was recently promoted to assistant manager water and wastewater for the Taupo District Council, Richard Kruse was its water treatment supervisor. It is a job he loved – both the highs and lows.

“I enjoy pressure situations. Overcoming a big issue and getting things up and running again is a huge high.”

Richard is responsible for 19 water schemes around the district. These vary in size, ranging from the lake-fed main Taupo supply, which boasts a \$28 million membrane plant and serves the city’s 30,000 population (rising to 60,000 during the peak tourist season), down to a number of small bore schemes that each serve a handful of households.

Richard says the main supply is the easiest to operate as “it has all the bells and whistles” and causes very few problems. Some of the others, however, are a lot more basic.

There are seven other lake-fed schemes, six bore supplies that Rich says are “really good”, and the rest are simple river- and stream-fed systems.

“Basically, we draw from the source, screen and chlorinate.

“All of the schemes are constantly monitored. We check chlorine, pH levels and turbidity. And we keep an eye on arsenic levels – we’re geothermic and that does mean elevated arsenic levels.”

Richard feels a big responsibility for the public’s health

– all too aware of the potential consequences if something goes wrong.

“The disaster in Havelock North was a good wake-up call for water treatment operators – they had a range of issues that resulted in a disastrous outcome. We can learn a lot from their mistakes, and ensure we have good processes in place to prevent it happening to us.

“It’s a huge responsibility we have,” he says. “I would like to see the different bodies – councils, inspectors and regulators – working closer together. We need to focus on getting these relationships working better to ensure this kind of thing never happens again.”

Rich began his career with a drainlaying apprenticeship after leaving school at the end of his fifth form year. Within two years he was qualified, and he spent eight years in the trade until the constant repetition of the work got too much for him.

“It was endless digging trenches and laying pipes. It wasn’t as challenging as I had hoped,” he says.

“A position came up with the Taupo District Council – they were looking for a water service person. I didn’t really know what that was but applied anyway. I took a hit in pay, but I’ve never looked back.”

That was 2006 and Rich was 25 years old. Three or so years later, when the role of maintenance team leader

came up, he applied for the position and got it. And three years after that he was made supervisor, responsible for the operation and maintenance of all the district's water schemes.

Along the way, Rich has picked up the necessary relevant qualifications – he holds a National Certificate Level 4 in Water Treatment and a National Diploma Level 5 in Water Treatment. He is currently studying towards a National Certificate in First Line Management Level 4.

“My new role has me overseeing wastewater as well as drinking water, and I still have lots to learn,” he says. “I have had the luxury of growing in the role – and I’m never bored.

“I have been very fortunate to have had supportive managers that have given me so many opportunities along the way – Taupo District Council are fantastic employers,” he says. “I wouldn’t be able to do my job well and also contribute to the WIOG (Water Industry Operators Group) committee without their support.”

Rich has been a member of WIOG since 2014, was named Operator of the Year in 2015, and was elected to its committee earlier this year. He says the group has opened up many opportunities for him and is a fantastic organisation to be involved with, to share knowledge and strive for excellence.

**“ We prioritise our work – we have our scheduled and planned jobs but then it all goes out the window with unplanned maintenance. I have to juggle staff when we’ve been called out at night – it keeps me on my toes. ”**

It comes as no surprise, considering his career progression with the council and success in the industry that one of the highs of his role is seeing his staff develop and grow, and learning off one another.

For himself, his focus is moving to plant optimisation and utilising new technologies.

“We’re always looking to improve.”

Rich is a big fan of the current review of industry qualifications, saying “it’s a huge responsibility we’ve got for the public health”.

The current revision of the drinking water standards is also something close to Rich’s heart. In Taupo, they have been unable to upgrade a number of their smaller schemes as the ratepayers simply can’t fund it. However, Rich says the council is looking at its funding methods to try and improve this.

His primary focus is to maintain compliance across all 19 schemes. His limited budget sometimes means things have to be done the long way or the hard way – with more site visits, and some schemes particularly labour intensive.

“Accessing some of our sites in adverse weather can be tricky.”

Rain and mud aside, Rich says staff management is one of the bigger challenges of his role.

“We prioritise our work – we have our scheduled and planned jobs but then it all goes out the window with unplanned maintenance. I have to juggle staff when we’ve been called out at night – it keeps me on my toes.”

The night callouts are one of the few lows of the job.

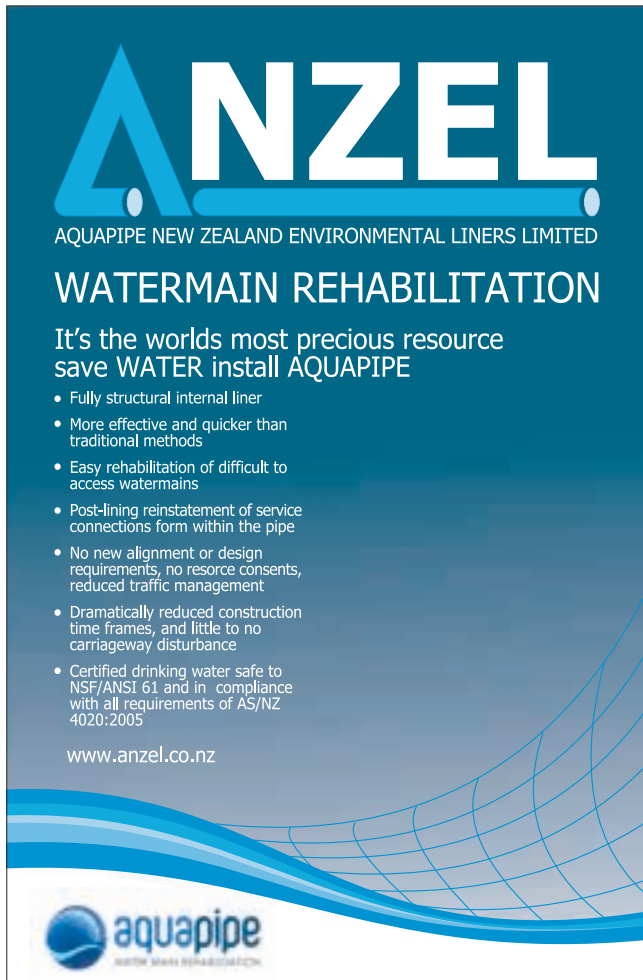
“One-offs are okay, but sometimes you get a week of it – one thing after another. It’s probably because we have so many different schemes, we can get a ‘perfect storm’ of issues – the weather will cause problems, then the comms will play up, then we’ll get a burst main...”

“It can be challenging!”

This, combined with a young family, can have a big impact on home life. Fortunately, Rich has an understanding wife, and he loves his job.

“We have plenty of laughs at work too,” he says. “Our team has a pretty good relationship – we take the job seriously, but still take the mickey out of each other.

“We sometimes have to work some very long hours at pretty anti-social times. In an extreme weather event, we can spend hours trying different options to fix a problem, but when we do find success and get things up and running again, it feels great.” **WNZ**




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# NPSFM obligations

## – a council case study

Auckland Council plans to implement the National Policy Statement for Freshwater through the Auckland Unitary Plan. Article by Dr Claudia Hellberg, Wai Ora Strategy Manager at Auckland Council, and Ian Mayhew, Principal Planner with 4Sight Consulting.

**A** key purpose of the National Policy Statement for Freshwater Management 2014 (NPSFM) is to set enforceable freshwater quality and quantity limits that reflect local and national values and freshwater objectives. Regional councils are required to implement the NPSFM by December 2025, or by December 2030 if implementing it earlier is not practicable. Regional councils are required to adopt and notify a Progressive Implementation Programme (PIP) outlining the stages and timeframes by which implementation of the NPSFM will be achieved.

Auckland Council notified its revised PIP in December 2015, outlining the stages and timing of its implementation programme. Its PIP included a programme of progressive changes and variations to the Auckland Unitary Plan (AUP).

The council's state of the environment monitoring provides evidence of the degradation of freshwater arising from intensive land use activity. This includes elevated levels of *E. coli*, temperature, nitrate, sediment and heavy metals and lowered levels of dissolved oxygen in the water. River ecology monitoring indicates that half of the monitored sites are characterised as having 'poor' ecology quality.

Collectively, the results indicate that there are likely to be numerous failures of the NPSFM National Bottom Lines (NBL) in Auckland's rivers. Importantly, it is recognised that it is not just water quality that drives degraded ecosystem health. Auckland's typically small urban rivers suffer from 'Urban Stream Syndrome', which is a response to a range of changes such as land clearance, loss of riparian vegetation, increased impervious surface, stream burial and modification and increased contaminant sources that combine to reduce ecosystem health and diversity<sup>1</sup>.

In respect of water quantity, the total amount of water allocated in the Auckland region (July 2012 to June 2013) was 107.6 million cubic metres.

Surface water accounted for 63 percent and groundwater 37 percent of the total. Of the amount of water allocated in the 2012/2013 year, municipal supply accounted for 62 percent of the allocation, followed by irrigation (15 percent), industry (12 percent), community (two percent) and other (nine percent). For those identified water catchments in the AUP, the surface

water resources in the Auckland region are not currently over-allocated<sup>2</sup>. Similarly, major groundwater aquifers were not fully allocated in 2013<sup>3</sup>.

### Auckland Unitary Plan

The AUP contains a comprehensive set of provisions for freshwater management and ecosystem health across all levels of the plan (Regional Policy Statement, Regional and District Plan).

The Plan contains numerous objectives and policies that have relevance to freshwater with several key themes, including:

- An overall improvement in water quality and ecosystem health. This reflects the generally degraded state of Auckland's urban freshwater (and coastal) waterbodies and is characterised by objectives and policies that seek to 'maintain where good and enhance where degraded' and progressive improvement/reduction in adverse effects.
- An emphasis on freshwater systems<sup>4</sup>, and strong provisions to manage/minimise stream loss/modification and hydrological change. This recognises the interconnected nature of freshwater systems and the importance of managing hydrology during urban development.
- Integrated land and water management. This is an important aspect of improving outcomes from urban development including greenfield development and urban intensification.
- The efficient allocation and use of water within identified limits.

The AUP also includes provisions for the identification and acknowledgement of mana whenua values and uses, the mauri of freshwater and the (future) development of objectives and limits for freshwater in conjunction with mana whenua.

### Alignment of provisions in the AUP against the NPSFM

To assess the extent to which the AUP gives effect to the NPSFM the respective provisions were aligned and a qualitative

1. Paraphrased from M Neale AUP IHP Evidence Topic 046

2. From A Millar AUP IHP Evidence Topic 006

3. Derived from Stansfield, B and Holwerda, N (2015). *State of the environment monitoring: Auckland water quantity statement 2012/2013*. Prepared by EIA Ltd for Auckland Council. Auckland Council technical report, TR2015/005

4. In the AUP, a freshwater system is defined as: The beds, banks, margins, flood plains and waters of rivers and natural lakes and wetlands, and groundwater systems together with their natural functioning and interconnections.

assessment made on the basis of the comprehensiveness and relevance of the Plan provisions in directing the outcomes sought by the NPSFM. The following conclusions were drawn in respect of the various NPSFM objectives and policies.

### **Objectives A1 [quality], B1 [quantity] – Safeguard life supporting capacity of water and health of people.**

These provisions have been largely given effect to by the provisions of the AUP. While it is acknowledged that the Plan does not explicitly address the National Objectives Framework (NOF) and associated NBL for secondary contact, provisions for stormwater/wastewater and staged stock exclusion from waterways provide for a progressive reduction in existing adverse effects (primarily through network discharge consents and redevelopment of existing land use) on the assumption of a generally degraded current state.

A primary freshwater ecosystem management issue in Auckland is stream loss and physical modification and the effects of hydrological changes associated with urbanisation. Accordingly, the AUP incorporates a framework for the holistic management of freshwater systems, with an emphasis on the management of stream loss/modification, urban hydrology and the implementation of an integrated stormwater management approach. Preservation of minimum stream flows and aquifer water levels also assist in managing instream habitat and contribution of groundwater to stream baseflows.

It is considered that in some aspects the AUP provisions for freshwater systems (particularly the management of hydrological change and stream loss/modification) go beyond the water quality focus of the NOF.

### **Objectives A2, B4 – Maintain/improve overall quality & protect freshwater/wetlands.**

The AUP largely gives effect to these objectives for both water quality and quantity. Maintaining water quality/freshwater systems where they are good and a progressive improvement in water quality and ecosystem health where they are degraded is a key objective of the Plan.

Wetlands and outstanding (or in this context regionally significant) freshwater bodies are subject to additional ‘overlay’ provisions to assist in protecting their general values – although it is acknowledged that the specific values have not yet been identified through full NPSFM implementation.

The Plan includes a range of activity based rules to manage land use activities, contaminant discharges and stock access to waterways etc, although these are not subject to established water quality limits.

### **Policies A1(a), B1 – Establish freshwater objectives/limits/targets.**

The establishment of objectives for water quality has yet to be given effect. In contrast, allocation limits, flows and water levels have been established for Auckland’s main rivers and aquifers. Hence it is concluded that the outcomes sought by the NPSFM for water quantity have been given effect to, albeit not through the NPSFM NOF process.



#### **INFRASTRUCTURE WITH AESTHETICS**

The Kopupaka Reserve, near the Westgate Town Centre in northwest Auckland, forms reserve features walkways and water-retaining areas over the 50-hectare site. ICB Retaining & Construction was contracted to construct the feature walls for the retention of the stormwater ponds, the inlet and outlet structures, public viewing platforms and various other backfilled retaining walls. This work picked up an award this year in Berlin.

### **Objective B2, Policies A1(b), B5 – Methods/rules to avoid over-allocation.**

The AUP gives effect in part to these provisions for water quality and largely gives effect for water quantity.

Establishing freshwater quality limits and targets is complex due to the variety of considerations and influences.

However, the Plan establishes the objective of maintaining water quality where it is ‘good’ or ‘excellent’ (B7.4.1 (2) and E1.2(1)) and includes numerous policies and rules to manage water quality and minimise adverse effects of new development as far as practicable – including discharge, land use/development and subdivision provisions.

The Plan also includes numerous rules that manage activities that may result in contaminant discharges. Additionally, the AUP includes significant provisions in respect of freshwater systems – including managing stream loss/modification, hydrological change, stock access etc – with a view to not just managing water quality but holistically protecting the health and values of aquatic ecosystems.

In contrast, the water quantity section in the AUP has established allocation limits and provides a statutory framework to assess resource consent applications for water takes to ensure that these limits are not exceeded.

### **Objective B2, Policies A2, B6 – Address/phase out existing over-allocation.**

In respect of water quality, a key objective of the AUP is to progressively reduce existing adverse effects and improve areas of degraded water quality and ecosystems. This is particularly pertinent in the urban area, which is the key area in Auckland that has degraded water quality.

This objective is delivered through a range of policies and rules that are focused on taking the opportunities provided by redevelopment to progressively reduce existing adverse effects, although the Plan does not specify by how much or by when. More specific targets will be established by subsequent stages of implementation. In the interim the aim is an upward trajectory in terms of water quality.



Water quantity over-allocation is not identified as an issue in Auckland. However, the AUP includes a policy (E2.3(10)) that outlines how management will be undertaken where water allocation exceeds or is close to exceeding the established minimum flow/levels and availabilities in Appendices 2 and 3.

Accordingly, it is concluded that the AUP gives effect in part to these provisions of the NPSFM for water quality and largely gives effect for water quantity.

### **Policy A3 – Conditions/BPO rules to meet limits and targets.**

The AUP gives effect in part to this policy. There are significant rules relating to land use and discharges in accordance with the Plan objectives and policies. However, limits and targets have not yet been set and hence conditions will reflect policy direction rather than specific limits and targets as envisaged by the NPSFM.

### **Objective B3, Policies B2, B3, B4 – Efficient allocation, use and transfer of water.**

It is considered that the AUP largely gives effect to this objective and these policies. A key objective for the water allocation and use provisions of the AUP is to manage water to maximise is efficient allocation and use (E2.2(4)).

This objective is given effect to through a range of policies that apply to water takes and include establishing priorities for water allocation, requiring applicants to justify the amount of water required for their needs and consider methods of water conservation and methods to optimise the use of water across users including facilitating transfers (within the same surface water catchment) and encouraging shared use and management of water.

### **Policies A4, B7 – Interim provisions.**

As the AUP does not give full effect to the NPSFM, the interim policies required by the NPSFM (Policy A4 and B7) have been included in the AUP.

### **Part C – Integrated management.**

This requirement has been largely given effect to in the AUP, with strong emphasis on the integrated management of land use and development and water quality and freshwater systems. The RPS includes a policy specifically related to integrated management of land use and freshwater management.

Given the development and resource management issues faced by Auckland, this is focused on urban development. It requires the provision of water and other infrastructure to support new growth/intensification, catchment management planning to support structure plan processes and the control of both land use and discharges to minimise adverse effects and progressively reduce existing adverse effects.

This RPS objective is in turn given effect to by numerous policies and other provisions that seek to ensure integrated management of land and fresh and coastal water including land use, subdivision and discharge provisions.

A key aspect of integrated management in respect of urban development is the requirement to apply an integrated stormwater management (water sensitive design) approach for

greenfield and major redevelopment. This approach details a range of requirements to ensure that effects on freshwater systems and coastal waters are minimised and reduced where possible.

### **Part CA – National Objectives Framework.**

This has yet to be given effect to.

### **Part D – Tangata Whenua roles and interests.**

The AUP includes provisions in respect of the involvement of Mana Whenua in freshwater management, including integrating Mana Whenua (territorial rights) values, matauranga (Maori knowledge) and tikanga (Maori way of doing things) when giving effect to the NPSFM (B7.4.2(3)), developing specific objectives and limits for freshwater with Mana Whenua (E1.3(7)) and acknowledging Mana Whenua values in the allocation and use of water. Other provisions, including those in Section B6 Mana Whenua, recognise and provide for Mana Whenua values and opportunity for Mana Whenua to be actively involved in sustainable management.

At this stage, the AUP signals the intent to involve Mana Whenua in the establishment of freshwater values and objectives and reflect these values in decision making. For this reason, it is concluded that the AUP gives effect in part to this section of the NPSFM.

### **Parts CB, CC & E – Monitoring Plans, Accounting, Progressive Implementation Programme.**

The requirements of these sections of the NPSFM largely lie outside of the AUP. However, it is noted that the council:

- Notified its revised Progressive Implementation Programme in December 2015. This will be further revised as the implementation programme is refined.
- Has a significant river and groundwater monitoring programme including quality, ecosystem health, flow levels and a range of other metrics.
- Receives comprehensive compliance data on water use and is well placed to develop a freshwater accounting system for water use.
- Is still in the process of setting up a water quality/contaminant accounting system.

The assessment is summarised in the table on page 27.

### **Conclusion**

The assessment of the extent to which the AUP gives effect to the NPSFM indicates that the Plan gives significant effect to many of the requirements of the NPSFM, notwithstanding that specific freshwater objectives, limits and targets have yet to be established through the process specified in NPSFM section CA. In particular, the AUP:

- Includes significant objectives and policies to progressively improve overall water quality/progressively phase out water quality ‘over-allocation’<sup>5</sup> in the context of a generally degraded current state (primarily in urban areas) and a range of activity based rules that give effect to the policy direction

5. Under the NPSFM, over-allocation means where a resource has been allocated to users beyond a limit or is being used to a point where a freshwater objective is not being met. This applies to both freshwater quantity and quality objectives and limits.

of the Plan – albeit without defined targets and timeframes at this time;

- Takes a holistic approach to freshwater systems/ecosystem management in recognition of the significant impact that stream loss, modification and hydrological change associated with land use and development and stock access has on freshwater ecosystems and other freshwater values;
- Sets water flow, level and allocation limits for Auckland's most utilised rivers and groundwater aquifers; Includes provisions to manage to these limits, on the basis that Auckland has not identified water quantity overallocation;
- Includes provisions relating to efficient water allocation and use and transfers of allocations;
- Adopts an integrated land use/water management approach, particularly in relation to urban development and intensification/redevelopment;
- Signals the intent to develop freshwater objectives with Mana Whenua.

Much of the AUP freshwater framework is targeted at urban land use and development, given the demand for urban growth and existing effects urban development has had on Auckland's urban freshwater and coastal environments. However, the Plan also includes a range of activity-based objectives, policies and rules for managing the water quality effects of rural production and other activities in rural areas, again in the absence of

NPSFM Provisions	AUP Provisions	
	Quality	Quantity
Objectives A1, B1 - Safeguard life supporting capacity & health of water		
Objectives A2, B4 - Maintain/improve quality & protect freshwater/wetlands		
Policies A1(a), B1 - Establish freshwater objectives/limits/targets		
Policies A1(b), B1 - Methods/rules to avoid over-allocation		
Policies A2, B5 - Objective B2 - Address/phase out existing over-allocation		
Policy A3 - Conditions/rules to meet limits and targets		N/A
Objective B3, Policies B2, B3, B4 - Efficient allocation, use and transfer of water	N/A	
Policy A4, B1 - Interim provisions		
Part C - Integrated management		
Part CA - National objectives framework		
Part D - Targets, Whenua rules and interests		
Parts CC, CC & E - Monitoring plans, accounting, progressive implementation programme	Delivered by functions outside of the Uniform Plan	

freshwater objectives, limits and (where necessary) targets as expected by the NPSFM.

As indicated in the PIP and the AUP itself, it is anticipated that changes to the Plan will be progressively introduced to replace the current general provisions with more specific requirements as they are developed. [WNZ](#)

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# Improving security of groundwater supplies

By **Mike Thorley**, Associate, Hydrogeology, Beca

**G**roundwater is a nationally critical resource and there are nearly 1500 registered water supplies in this country, with a good proportion of those taking from groundwater bores. Groundwater has many advantages over sourcing drinking water from rivers and lakes, as the water has been naturally filtered and stored away from the various activities at surface; yet only a small proportion of the population understand bores or even recognise where their water comes from.

People generally want clean fresh drinking water. However, funding the infrastructure required is usually the challenge. Drinking water contamination in the Havelock North water supply in August 2016 highlighted the importance of secure bore water. Many in the industry are now asking if our drinking water supplies are as secure as they could be and what constitutes a secure bore water?

Bores are our gateway to vast underground stores of

drinking water. Bores need to be designed, installed and operated in such a way that the quality of the groundwater is maintained from source through to its delivery point.

If we think of a bore as delivering a food grade product, then logically a bore and the bore-head should be clean and form a tightly fitting seal into the underground reservoir from which it draws. Ideally it should be sited away from sources of contaminants although in some cases this is not possible and treatment processes are needed to clean it up and/or reduce the risk to an acceptable level.

Generally, the most vulnerable part of a bore to contamination is the bore head because it provides the physical connection between the land surface and the underlying well. A bore head can be a hive of componentry with pipes, valves, cables, joints, access points and connections to pumps.

It's a challenging multi-disciplinary design question as the bore head brings together elements from nearly all of the engineering disciplines (mechanical, electrical, structural, civil, and environmental).

Traditionally, wells were placed into underground



chambers. Ironically this was thought to protect the well head when in fact it is now recognised these structures can create both a hazard to the bore from contamination, and, a hazard to operators due to the confined space access. Following the Christchurch earthquakes, some of these heavy concrete structures caused damage to water supply bores and hindered the reinstatement of the water supply. A more secure, resilient and efficient approach to bore heads is to install them above ground, allow for movement through flexible connections, and locate them so potential sources of runoff and contaminants are excluded.

An air vent acts like a snorkel for a well. Each time a well is pumped, the water level inside the bore is drawn down which inevitably displaces the air sitting inside the well. If no vent is provided, then the air and/or water can be drawn in across openings or gaps in the bore head or casing. A vent provides a controlled conduit for the well to “breathe”. Ideally bores should be sited outside of areas that can be flooded, but this is not always possible, and a vent will assist in preventing flood water entering the bore if it becomes submerged so that the supply can continue during such events.

Cement grout seals are also an area for improvement in secure drinking water bores. Historically, grout sealing of the space left between the bore casing and the strata was not always done. This leaves a potential pathway open at

the bore allowing water to preferentially migrate down the outside of the casing and into the screen.

Many supply bores that were drilled 20-plus years ago are still in service and many do not meet the criterion for secure bore-head status under the Drinking Water Standards for New Zealand (DWSNZ). While it is difficult to retrofit grout seals, it is relatively straightforward to install them during the construction of a new bore and should be included for any new drinking water supply bore, particularly one for which secure status is sought.

Action is required to improve the consistency and quality of bore design and construction. The authority over how bores are designed and constructed usually sits with the regional councils, however many do not have specific rules or standards for drinking water bores or perhaps the rules have not taken into account the requirements in the DWSNZ.

Regional councils could readily raise the bar for drinking water bores and play a more active role in improving good practice across the industry.

### Improving aquifer security

Some aquifer systems are more resistant to contamination than others, depending on the hydrogeological conditions found in the wellfield itself and also the up-gradient recharge area.



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Some aquifers are shallow, thin and close to rivers and act as an extended river braid with a strong, direct connection to the surface water, whilst others are deep and may receive their recharge water from many kilometres away and over a long duration.

These factors, combined with how an aquifer is tapped, will determine how secure a supply is and how much additional treatment is required to make it safe as a water supply.

Similarly, discharges into or onto the ground can affect groundwater quality; ensuring a “safe” distance is maintained between our bores and the discharges is a very important step in managing the first line of defence for our drinking water quality.

Bores are stationary objects, but the activities around them are not, especially when you consider the life of a bore is normally 20-30 years.

As many in the industry will know, what can be the edge of town can rapidly become a very different place over the course of 30 years. What may have been a low risk site and a reliable source of clean drinking water can over time become affected by changing land use: septic tanks, ditches, agriculture, urban sprawl, and abandoned bores all increase the risk profile of a drinking water bore to potential contamination. Ongoing vigilance and management is required.

Groundwater age is an important indicator of flow paths and risk; but on its own should not be given too much emphasis when determining if a drinking water source is “secure”.

Just because an aquifer contains “older” groundwater doesn’t necessarily mean it is not vulnerable to contamination, and conversely, younger groundwater may be more “secure” if its source catchment doesn’t contain sources of contaminants that can affect human health, and providing that appropriate land use controls are in place.

It is important that ongoing monitoring of water quality continues and is regularly reviewed and tailored to the specific catchment contamination risks.

The role of vertical leakage in delivering water to a bore is important when considering where the water is coming from.

Models of aquifer systems readily demonstrate that after relatively short time periods, most of the flow to a well can

occur as leakage into the pumped layer from the overlying layer. Initially the pumped layer will drawdown laterally, but once a wide enough area is drawn from, the overlying layers start dewatering. If pumped long enough, the vertical flow can reach the surface and thus can draw in any surface or shallow contamination that is present.

The degree of this vertical leakage varies from one aquifer to another.

This has implications for the risk of contaminants migrating through the ground and to a drinking water bore. Those bores which show high rates of vertical leakage, which can only be assessed via robust pumping testing, should be treated as more vulnerable to local sources of contamination at the surface. The Havelock North contamination event has demonstrated just how quickly and severely contamination can reach a bore in a semi-confined aquifer setting, and why more thorough assessments of localised flow patterns and leakage is required. The assessment of ‘semi-confined’, or ‘leaky-confined’, aquifers in the DWSNZ needs further clarification.

Secure bores need thorough design and planning, and are more likely to be successful when there is collaboration between a skilled hydrogeologist or engineer and an experienced drilling contractor. The role of a recognised “expert” in the planning, design and installation of a drinking water bore is important in maintaining standards and assessing contamination risks to a water supply, as is identified in the DWSNZ.

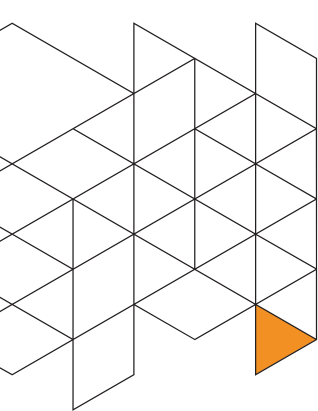
Such specialist knowledge should be more routinely included in water safety plans and the auditing by Drinking Water Assessors.

Improving bore and groundwater source security is an important step towards achieving meaningful change and protecting the health of all New Zealanders.

Getting the basics right in bore design and construction is critical to delivering clean and safe water. Our underground reservoirs are vulnerable to contamination and robust assessments of the hydrogeological conditions assist in understanding the first line of defence.

Vigilance around land use activities around drinking water sources is required by councils, planners and community health agencies.

We owe it to the people of Havelock North and the New Zealand community to improve the quality of infrastructure and ensure our drinking water resources are safe and secure. **WNZ**



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# Wastewater thermal energy mapping



Dunedin City Council worked with Smart Alliances and other suppliers to calculate and map the thermal energy available within one of the city's three wastewater networks. Based on an article originally published in *NZ Local Government* magazine, also published by Contrafed Publishing.

**G**lobally, buildings use about 40 percent of the world's manmade energy. However, in cities, which have high concentrations of buildings, this figure is often higher at around 60 percent and around half of the energy used by buildings is used in heating or cooling systems.

Every house, apartment and building in a city has a hot water system the contents of which go down the drain every day. This makes wastewater a huge energy resource which is currently almost totally ignored.

There are already an estimated 700 to 1000 established systems around the world that recycle thermal energy from wastewater for heating and air conditioning, and this number is starting to rise rapidly.

The first such systems were installed in Switzerland more than 30 years ago and there are at least five wastewater heat transfer systems operating in Australia, including the Hobart Aquatic Centre, which has been running successfully for over 20 years using the city's wastewater heat.

Although the concept is new to this country, technically it's quite simple so long as the systems are designed appropriately.

Nick Meeten (pictured) is buildings, water and sustainability consultant at engineering consultancy Smart Alliances, and an expert on this topic, having worked globally on it for the past seven years.

In 2015, he returned from Germany to New Zealand and is now working for Blenheim-based engineers Smart Alliances.

He says wastewater is an enormous untapped source of thermal energy available in every one of our towns and cities and the potential energy savings are huge.

Independent research from the US shows wastewater energy can lower heating – or cooling – electrical energy use by about 40 percent when compared to conventional air-based solutions and

it makes better use of existing wastewater infrastructure.

In June this year, Bloomberg reported that wastewater in London could provide around a third of the city's heat needs (see [bit.ly/GreenHeatSource](http://bit.ly/GreenHeatSource)).

"Dunedin City Council recognised this untapped opportunity after hearing my presentation at the August 2016 IPWEA conference in Melbourne," says Nick.

"In late 2016, the Council commissioned Smart Alliances to help it get started by calculating and mapping the thermal energy available within one of the city's three wastewater networks.

"The project was completed earlier this year and showed up to 10,000kW of thermal energy is available within the network studied. Dunedin has three wastewater networks, but we only studied one of these. So this 10,000kW is estimated to be approximately 60 percent of the overall total, if all three systems were taken into account."

He says the system studied could provide enough thermal energy to heat about 1000 typical houses (or equivalent commercial buildings and industries) and Dunedin City Council now has information and energy maps allowing it to develop a strategy to start utilising this wasted energy.

Nick says that as a thermal source wastewater is stable and neutral in temperature all year round.

This makes it relatively warm in winter and relatively cool in summer compared to ambient temperatures. This temperature stability, together with the excellent energy capacity of water, means buildings' heating and cooling systems do not have to work so much against nature to provide heat or take heat away from buildings.

This simply translates to significant increases in efficiency of the heating and cooling systems, and savings in electricity needed to power these systems.



Wastewater is simply pumped out of a street trunk sewer and put through a special wastewater heat recovery system, before it is pumped back into the sewer. Everything else within the building is conventional heating/cooling equipment.

Other benefits include allowing heavy heat exchanger equipment, which is normally mounted on the roof of a building, to be located down at ground level.

In a seismically active country like New Zealand, removing this weight from high up on a building lightens the load on the building structure.

### The Dunedin survey

The project team consisted of Dunedin City Council wastewater manager Laura McElhone as the client, and Smart Alliances in Blenheim as project leader.

Smart Alliances teamed up with collaboration partners Applied Energy also Blenheim based and Kerr Wood Leidal (KWL) engineers in Vancouver, Canada.

Despite the project team being widely distributed geographically, the entire project was delivered smoothly and

without requiring any travel, which Nick says kept costs down.

As project leader, Smart Alliances was the single point of contact with Dunedin City. KWL provided the specialist calculations and Applied Energy the mapping skills. KWL had previously developed a specialised calculation model for this purpose for wastewater energy projects it had previously undertaken for Metro Vancouver (a federation of 21 municipalities that collaboratively plans for and delivers regional-scale services for the Vancouver region).

However, before the collaboration started with Smart Alliances, the calculation modelling service had never been provided for other cities outside of Canada.

The Smart Alliances/KWL/Applied Energy team started working together in early 2016 by trialling the calculation and mapping process on Blenheim as a test project, and this ironed out initial teething problems.

For the Dunedin project, a variety of council data was used such as wastewater infrastructure data, temperature data and hydraulic modelling data. Other criteria required by the KWL calculation model were discussed and agreed.



**Project managers for the Dunedin wastewater energy modelling project**

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## Revenue generation

The thermal energy available in wastewater could become a new source of revenue for cities which want to utilise it. There are different ways it can be monetised, and at least two different commercial models are being used in other parts of the world. Quebec City charges an annual connection fee for tapping

into the energy from its wastewater network.

Scottish Water adopts a different approach by metering the amount of energy withdrawn by a college campus and charging per kilowatt hour of energy.

Other commercial models will evolve and every city should view its wastewater flows as potential energy with a value attached.



Dunedin energy maps.

Once the necessary data and inputs were in place, this was delivered to KWL – which ran its calculation model and delivered the results back to Smart Alliances. This calculation data was sent on to Applied Energy which displayed the data as thermal energy maps for Dunedin City.

A variety of maps were generated at differing scales to provide high-level overviews down to detailed maps for parts of the city.

Once the maps were generated, a number of locations within the city presented themselves as good candidates for potential energy from wastewater projects. These locations ranged from the existing university campus, and the hospital, to areas identified as possible future development sites for the Council itself.

Apart from the maps, a comprehensive report was also provided to Dunedin City. This report covered the topic of using wastewater as an energy source, the agreed inputs used in the calculation model, and discussion of the findings.

A comparison of the wastewater temperatures from Dunedin with a number of other cities was provided to illustrate that the southern city is well within the normal expected range.

The report also covered variations in thermal energy due to daily flow profiles and, for the wastewater plant operators, where the threshold limits are to ensure possible impacts in the wastewater treatment plant's biological processing are managed. A number of example projects from overseas were shown within the report, to give Dunedin City some ideas for what could be suitable candidates within the city.

Now that it has the vital energy maps to guide it, Dunedin City Council is proactively taking the concept forward by approaching suitable site owners who are located close enough to take advantage of the opportunity. The City Council is also alerting new developments to this possibility as they come up.

Since the completion of the Dunedin project, Smart Alliances has also been commissioned by another New Zealand city to assess the feasibility of heating a large aquatic centre using wastewater heat.

Aquatic centres require significant amounts of heat all year around, and are typically one of the most expensive energy using facilities a city has. They are a perfect candidate for using wastewater heat.

It is worth noting that this project was also a finalist in the 2017 Deloitte Energy Excellence Awards – 'Innovation in Energy'. [WNZ](https://www.wnznz.org.nz)

- Nick Meeten is buildings, water and sustainability consultant at engineering consultancy Smart Alliances. [nick@smartalliances.co.nz](mailto:nick@smartalliances.co.nz)



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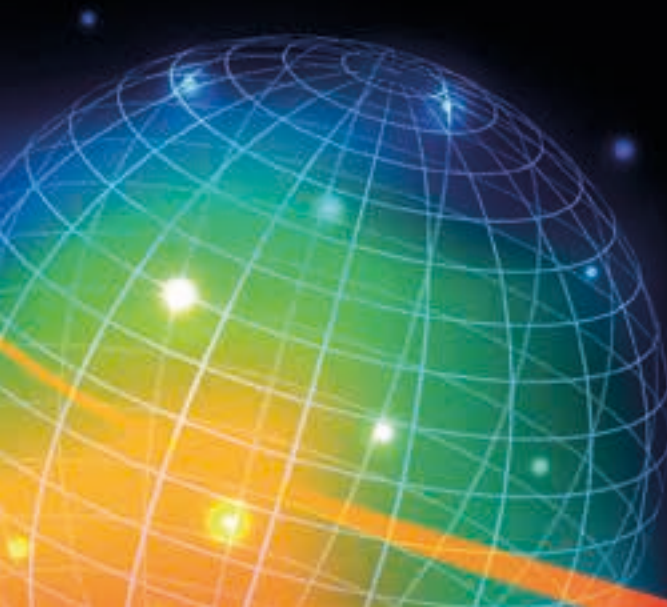
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# Charlie Littlefair

The implications of water mismanagement are life threatening to Kiwis' health and our environment. Industry veteran Charlie Littlefair has a few ideas around this subject. By **MARY SEARLE BELL**.

**C**harlie Littlefair sees a future where water management is not subject to short-term political influence, and is placed instead in the care of Central Government or Local Government appointed independent boards, with strong business leadership.

"It worries me that we can have instances like what happened in Havelock North," he says.

Many will agree. But what should be done about it? The answer, for Charlie, is to get short term politics out of decisions around water. ►



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◀ “The council management does have a role and responsibility in this. I think we need the distance provided by business-like boards, which aren’t swayed by short-term political goals.”

But Charlie is not in position to make these changes, in fact, he’s not even in the country.

Currently a general manager at South East Water, a state-owned corporation that provides water and wastewater services to 1.7 million customers in the southeast of Melbourne, Charlie’s been in Australia for nearly 10 years now, joining South East Water in 2008 in the middle of the Millennium Drought.

“I’d married a Melbourne girl, Sam, and our baby girl, Sophie, had just arrived. My wife wanted to go home to be near her family, so I started looking for work over there.

“Joining South East Water in the middle of a major drought was interesting. I got exposure to all sorts of things, including recycled water and desalination. Crisis always does it – it pushes boundaries on water technologies.”

Charlie’s heart is still in New Zealand, however, and the family still owns a home in Auckland. Returning is definitely an option “if the right job comes up”.



**Water quality is risk management. It needs to be professional and business-like. A corporation with a sole focus on water will have a strong approach to water quality – it can’t be done as a tack-on business to council.**



“I’ve had good exposure to how Aussies do it,” says Charlie talking about water management, and he’s certainly advocates the state of Victoria’s model of having water out of the hands of local government.

Victoria has a population of around six million, so is not too dissimilar in size to New Zealand. Charlie says it has 19 state-owned water corporations, with State Government appointed boards leading their strategic direction and providing good business governance. Their sole focus of delivering the essential water services their communities need.

“A similar number (or less) of water corporations could take care of all of New Zealand’s essential water services,” he says.

“Water quality is risk management. It needs to be professional and business-like. A corporation with a sole focus on water will have a strong approach to water quality – it can’t be done as a tack-on business to council.

“The debate always seems to end up at the asset ownership question. This should not be the debate, in fact I believe that essential water services assets should remain public assets. The debate should be about focus and business-like governance. These corporations don’t need

to be private companies. But a water corporation should be fully self-funded,” he says. “Watercare has shown we can do this.”

Charlie’s career in water began in the mid-1980s after he completed a Bachelor of Engineering.

“My father was brought out from the UK to work at Glenbrook Steel Mill, and I used to help out in the school holidays, which led to a civil engineering degree.

“Auckland University was strong in hydraulics and public health engineering, which led to water-related subjects. I’d always mucked about with water in the backyard as a child so I took all the water subjects I could at the options end of my degree.”

While studying, Charlie won a cadetship with NZ Forest Products. As a graduate, he ended up at Kinleith pulp and paper mill, working in the waste and water part of the operation, and responsible for the operational management of three water supplies, two trade effluent systems, and one domestic sewage system.

“The flows probably exceeded Hamilton’s at the time,” he says.

In 1990 Charlie headed overseas, nabbing a job with an engineering firm that looked after Severn Trent water. Returning 18 months later, he got a job in Tauranga as branch manager with Works Consultancy Services (later Opus International Consultants).

“The early 90s wasn’t a great time to find work in New Zealand,” he says. “My role with Works was very general – predominately roads, and only a little bit of water.”

But in 1995 he shifted to a national environmental engineering role, which was predominately about water and wastewater. After five years he was appointed Water Sector Leader – Global for Opus.

He joined Water New Zealand (then NZWWA) about the time he joined Opus. He was soon seconded onto the board.

“I got a good insight into the governance of the association. I enjoyed the role so much that I put my name forward the following year and was elected.”

In 2005 he was nominated for the role of vice-president, then held the position of president in 2006-07. At that time he was working for Metrowater (later integrated into Watercare) – initially as General Manager, Infrastructure Services, then later as General Manager, Assets and Investments.

Just after he completed his tenure as immediate past president, Charlie’s wife led the family to Australia. It was a move that made perfect sense, and which has offered him experiences and learning opportunities he wouldn’t have here in New Zealand.

But Charlie’s career is far from over, so don’t be surprised if you find him on this side of the Tasman again in the future. Perhaps leading a charge to take water services away from short term political sway, and into the care of professional and business disciplined organisations that have the expertise in and passion for water.

“This should have happened 20 years ago,” he says. “It’s the change I’d love to see in New Zealand.” **WNZ**

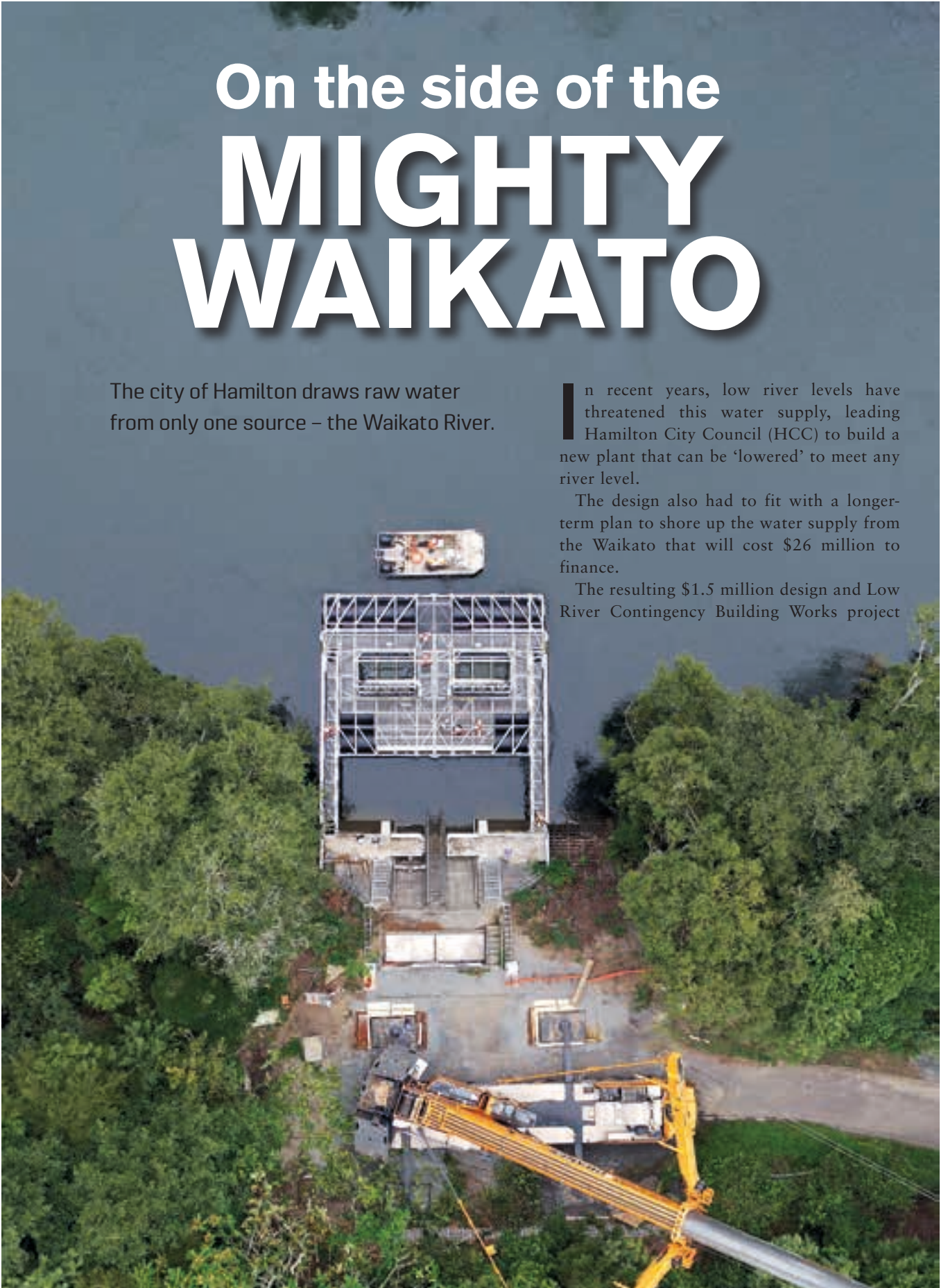
# On the side of the **MIGHTY WAIKATO**

The city of Hamilton draws raw water from only one source – the Waikato River.

In recent years, low river levels have threatened this water supply, leading Hamilton City Council (HCC) to build a new plant that can be ‘lowered’ to meet any river level.

The design also had to fit with a longer-term plan to shore up the water supply from the Waikato that will cost \$26 million to finance.

The resulting \$1.5 million design and Low River Contingency Building Works project





was awarded to Brian Perry Civil (Fletcher Construction).

This project involved a floating platform and pump system on the banks of the river that can pump water into the Waikato's intake structure if required when river levels get too low for the existing outlet. It is also designed to be integrated into future plans for upgrading the water intake structure.

Both the contractor and the council conceded it was an extremely challenging project, particularly after the initial

tendered plans required an extensive redesign. Working on a river bank and over fast flowing and fluctuating water also had its unique safety risks. The contractor had to work closely with Mighty River Power, which controlled the Karapiro Dam, to ensure river levels were safe to carry out platform works. The site was also within a 'live' water treatment plant (WTP) with the use of heavy machinery operation five metres from the river bank.

In the end the project eventually scored a 92 percent 'Excellent' rating by the HCC health and safety assessments.

### **Taking a new approach**

The change in the platform's design also led to a change in methodology for building it and delivering its structure in the river. These additional works altered the contract conditions and increased costs to the council.

The original plan involved placing a pump platform in fluctuating river levels, then bolting four separate sections together to complete that platform – which was an enormous physical risk. It would require personnel working in the river and beneath the steel structure inside the water for extended periods.

When they designed the water intake structure and floating pump platform, the original designers estimated the river to be at certain levels. In the past 10 years, however, the water levels were often above the upper operating range. This had not been brought into the design.

"We just changed the way they planned to do things. It wasn't difficult to convince the HCC of this new methodology," says Eamon Stynes, the project manager.

"We worked through this with them. There was little input from them as to how we were to put it in the river. It was open skies."

Placing the pump platform into the river in one lift greatly mitigated environmental risks to the river so, instead of a 100-tonne crane being used to drop four sections of the floating platform into the river, it was decided that a 400-tonne crane would do a single, if not complex, lift and drop.

The ground under the mobile crane needed extensive geotechnical testing to see if it could support a much heavier crane, one of the largest in the country.

Unfortunately, there had been no geotechnical investigation into the ground conditions. Once the geotechnical results did come through, the contractor saw the ground was filled with backfill material from when they built the intake structure.

Being only five metres from the banks of the Waikato, Brian Perry Civil (BPC) was concerned about slip circles, where the ground could slip and give way. The solution was platforms and then special steel plates put in under the crane to spread the load more evenly.

### **The platform**

The new methodology allowed them to fully assemble the platform in the car park area adjacent to the low lift pump building. It was far more productive to build the floating platform on the ground.

The four pump platform sections were fully assembled



This project involved a floating platform and pump system on the banks of the river that can pump water into the Waikato's intake structure if required when river levels get too low for the existing outlet.





with all the webforge decking and handrails installed, before two pivot arms were attached to the platform.

After a lot of redesign work, geotechnical investigation and changing the build to land instead of in the river, the focus was on getting the structure of the floating pump platform right.

The platform fabrication company Eastbridge, a Kiwi company that specialises in the supply of steel structures and heavy steel fabrication, was tasked with building the platform in its factory in Napier.

Mill certificates for all steel components were required to fabricate the platform. This showed that all the steel used was of the correct grade.

The same was expected of bolts and fixings. The welds were inspected by third party inspectors to verify that they were completed to specified quality and procedure. Test samples were taken during the painting process to confirm the paint systems being applied were to the correct film thickness.

Brian Perry Civil also carried out its own inspections, visiting the Eastbridge plant in Napier on five occasions.

Other quality assurance tools included work plans, testing, engineer and building inspections, producer statements and warranties, all of which were carried out through the life of the project. These were used to ensure quality requirements were being met for everything from

concreting, pipes and joins, to the electrical ducting used.

Working closely with Mighty River Power, the river could be held back by using the Karapiro Dam, allowing river levels to reach an acceptable level for project work.

Once onsite the Brian Perry Civil team did the lift design, strengthened the platform and added new lifting points.

By attaching the platform by the pivot arms to the intake structure before it was lowered into the river, they removed the risk of river currents side-loading the boom. The procedure worked so well that HCC has adopted this methodology for all future deployments of the pump platform.

Subcontractor Hennessy trained the operators who drive the pump platform and systems through the WTP's computer system. A SCADA program allows full automation of the pumps, and monitors rising river levels with the platform's stilling wells. This means WTP operators do not have to be onsite in order to check river levels, and can monitor the treatment plant system remotely.

The project began in July 2015, and was completed in August 2016, falling within a revised deadline. It also came in under budget by \$750,000.

Since then Brian Perry Civil has been awarded the contract to deploy the pump platform when necessary over the next four years for the council. **WNZ**

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# Small town upgrade

In what is a major investment by the Marlborough District Council, the upgrading of the council's ageing sewer infrastructure is progressing well. Stage one was completed in 2012 and now stages two and three are underway.

By **Richard Silcock.**



**F**ulton Hogan secured the Picton wastewater contract for the current two upgrade stages under a tender process that saw three contractors invited to bid.

Bruce Oliver, projects engineer for Marlborough District Council (MDC), says: "At a cost of \$19.4 million it is a sizable amount of money for this small town of only 2500 properties, but the old system, which is 85-years-old, was failing in parts and was well overdue for replacement.

"During times of extremely high rainfall, some untreated sewage was being discharged into the harbour and this was exacerbated at times during the summer with the influx of visitors.

"With the town an important tourist hub, a mecca for boaties, and it being the inter-island ferry terminus, there is an expectation the town will grow in size over the coming

years so it was important to have a more robust system in place able to cope with the increasing demand."

Physical work on stages two and three began in May this year and will take through until April or May next year to complete, with stage four expected to commence in 2020 as funding becomes available.

The current work involves replacing almost all the old, main-trunk sewer pipeline and some of the lateral lines. The contract also calls for the construction of three new pump stations that will pump the sewage to the treatment plant (STP) on the west side of the town, and the construction of a new bypass treatment facility. Discharge of the treated effluent will be into deep water in a part of the harbour that is well away from the Picton foreshore and marina at Waikawa.





1. Excavating a section of trench along Waikawa Road.
2. The bio-filter housing for the Dublin Road, bypass plant.
3. Some sections of the trench were excavated to a depth of 4.8 metres and braced using trench shields to protect staff working in the trench. The box shield (foreground) is used to support the trench wall during excavation.
4. Driving sheet piles using a vibro-hammer for the new Dublin Street pump station.
5. Excavators digging a section of trench prior to laying new sewer pipes.



Rowan Gardner, project manager with Fulton Hogan, says there have been no delays or issues so far, albeit there are variable ground conditions ranging from dense clays through to organic soils and rock along the project.

“Our subcontractor Tru-Line Civil is doing most of the trenching work and pipe laying.

“They are excavating to a depth of between 1.5 to 4.8 metres due to the undulating ground and the need to maintain a consistent gradient of the PVC and PE pipes which range from 375mm to 500mm in diameter,” he says.

“In some areas they will utilise trenchless methods to avoid disruption to rail traffic.”

Rowan says this has allowed them to concentrate on the construction of the three pumping stations, the largest of which is at Dublin Street, with the others at Surrey Street

and Fisherman’s Reserve. The Dublin Street facility is being built adjacent to the existing pump station.

“So far we’ve driven sheet piles nine-metres deep at Dublin Street using a vibro-hammer in preparation for the inlet and wet-well excavations.

“As the pump stations are all at low points of the topography and will be largely below ground level we can expect groundwater issues so we will be dewatering using pumps and wells to control the water level.

“As there is a proximity to some local streams precautions are being taken to ensure there is minimal discharge of silt into those waterways.”

In addition to the new pump station at Dublin Street, this building will also house the bypass treatment station.

“The bypass plant will comprise a series of mechanical



screens and UV treatment to ‘process’ the sewage and will be housed in a concrete building to maintain water tightness and ensure there is no egress or ingress,” says Rowan.

“There is also a bio-filter system, to minimise odours, housed in a timber outbuilding. This plant will be used to treat any excess sewage that cannot be ‘processed’ at the main STP during times of high throughput.”

The three pump stations will comprise inlet chambers and ‘wet-wells’ excavated to a depth of up to 6.7 metres. Electrically driven ‘flygt’ pumps will be bolted to a concrete slab and will be capable of handling 130 litres of sewage per second. There will also be standby diesel generators in the event of power outages.

The upgraded system will operate using gravity and pressure due to the undulating nature of the terrain and the location of the STP which is on a hill above the town.

In addition and as part of the project, a 180mm diameter PE pipeline is to be laid to carry treated effluent from the STP under pressure to some of the public parks around Picton for irrigation purposes.

Disruption to traffic, businesses and households has been minimal with the council running a public information website and communicating with stakeholders that include DOC, road authorities, KiwiRail and affected property owners on a regular basis.

Fulton Hogan is also providing advance notice of the work where it impacts on properties and residents. To minimise traffic disruption, work along Waikawa Road is being programmed to take place during the quieter ‘off-season’ winter period of the year.

“Pavements will be reinstated to an ‘as was’ status as the work progresses as there is an expectation that other utilities may be looking to upgrade in some areas,” says Bruce.

“Once complete, it can be expected that Marlborough Roads will be assessing the status of the roads during their usual maintenance assessments.

“Plans for landscaping the various sites have also been prepared and will include plantings to screen the new pump stations.

“Once complete the capacity to pump and treat sewage will be significantly increased and there is an expectation that the water quality and the marine environment of the harbour will be greatly improved.

“It will also reduce the potential health risk of polluted water in the harbour that was of some concern especially at times of heavy rain and severe storms.”

This sewer and plant upgrade follows the \$14.4 million upgrade of Picton’s new water treatment plant at Speeds Road, which was commissioned earlier this year. **WNZ**



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# Three years on



By **John Pfahlert**,  
Chief Executive,  
Water New Zealand.

**W**ell, it's coming up three years since I was appointed to Water New Zealand – an appropriate amount of time to consider how the association is faring.

Water New Zealand and its predecessor associations had their origins in the provision of technical advice to water service and drainage managers. Through the 2000s that emphasis shifted to advocate structural changes to local government and promotion of alternative entities that might be possible for delivery of water services to consumers.

We moved away from our technical focus toward lobbying government for change to those arrangements. Overseas models of delivery as exist in Scotland and Tasmania were promoted quite actively here as alternatives. The consequence was that, in the end, our relationship with local government started to become strained.

The direction shifted again from late 2014.

The new board and I charted a new direction which saw value in the pursuit of a vision of “determining our own future”, rather than risking the Government imposing one on us. We agreed on a three-fold strategy of how to get there:

- Collaborating and engaging with industry and external parties again to agree on consistent technical practice;
- Advocate on behalf of the sector as the “go to” technical advisor; and
- Progress technical issues and provide guidance to industry.

We saw ourselves doing that by:

- Analysing the results of our annual National Performance Review data to gain key insights;

- Using sector expertise to capture and promote good practice;
- Demonstrating leadership by advocating on water-related issues to central and local government;
- Promoting effective professional development within the sector;
- Encouraging a collegial working environment within industry.

Creating that strategic clarity was important. It emphasises the importance of trying to get industry doing things in a consistent manner so we can improve sector performance.

But getting there has required some changes to be made. We've had to make changes to the people who work for us to ensure the staffing and expertise was aligned to the strategy. I have recruited several new staff to work on the new direction: media, public policy, event management and technical staff.

We've had to accept that our relationship with local government had deteriorated and required rebuilding. I have been out to visit every city and district council water service manager at their office at least once, sometimes twice. I encourage my technical staff to do the same.

We've developed in the office what we call our “strategic alliance framework”, which identifies in three categories all the industry and external groups with whom we need to work cooperatively if we are to make a difference.

That involves having met with all of them and attending many of their conferences. We like to think that this “bridge building” has borne fruit with much closer working relationships with related trade associations.

We've developed a business plan that aligns the details of everything we do to the strategy, and an environmental scan document that registers issues external to Water New Zealand that may affect our business. I do my best to keep the board focused at the strategic level, but I suspect some of them were mechanics in a previous life who love getting their hands dirty under the bonnet!



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In 2016 I spent a great deal of time working with industry via the Water Utilities Association to get their agreement to what they saw as the work priorities for the Association. We now have half a dozen major pieces of work underway to deliver to those priorities.

I like to think we've built a cohesive team at the office here in Wellington who know how their respective roles contribute to the strategy.

Our efforts to try and energise the Special Interest Groups of the Association has not been as successful as I'd have liked – reflecting I think that the employment world is changing and people within industry have less time to contribute.

We continue to communicate our new direction to industry. The *Water* journal has moved away from just running long-winded technical articles to include more articles about people, more topical news and more articles about water-related issues that aren't just reticulation focused. We've also taken a much more proactive and open approach in responding to and dealing with the media, with our profile in the media considerably enhanced.

The emphasis on providing technical guidance has seen the publication of around half a dozen guides over the past 12 months or so, with several more in preparation. We've made a dozen submissions in the same period to discussion papers and proposed legislative changes here in Wellington on public policy related issues. Our conferences and events continue to attract record numbers.

But there are big changes and challenges ahead.

The Havelock North Drinking Water Inquiry has been hugely absorbing of staff time and will likely continue to do so for several years. Our proposal to establish a certification scheme for water and wastewater operators, supervisors and managers will also require considerable effort and resourcing. Implementation of consistent metadata standards by councils is also on the agenda, but resourcing the initiative is proving challenging.

Externally the big challenge facing the country continues to be how to deliver three waters services in a manner which delivers on community expectations of first world services in a first world country. The state of many small towns, with static or declining populations and incomes, suggests a serious conversation in the years ahead over levels of service. Conversations about alternative entities for delivery of services are ongoing in the Wairarapa and Waikato, but progress is glacial.

I'm encouraged by the participation of the membership in many aspects of our operations. We are starting to deliver more regionally focused meetings and workshops to ensure that provincial members can actively participate.

As a membership-based organisation our job is to ensure we respond to the needs of industry. The work we do here in Wellington must reflect the priorities of the sector.

That's why your involvement continues to be important. We work with the councils and service providers who actively participate.

I look forward to your continued engagement with myself and the team. **WNZ**

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# Mastering the art of persuasion in bidding



By **Heather Murray** (left) and **Erica Welsford**, senior consultants at Plan A. Over the past six years, they have been working with local and international clients, including many in the water and wastewater sector, to develop winning proposals.

**L**ong gone are the days of throwing together a tender response using a bunch of previous bids to answer a set of generic questions.

Procurement professionals are producing tender documents with targeted questions and stringent evaluation criteria to ensure they are getting the best value from their supply chain.

With the supplier quality premium model being used more and more, price is not always king. Tenderers have an excellent opportunity to demonstrate why they are the best for the job without being beholden to submitting the cheapest bid.

Tenderers with high scoring attributes have succeeded in persuading the evaluator that they are the best. Writing persuasively may seem like a challenge. It's not. If you have taken the time to understand your client and their objectives, and linked your solution to them in a way that demonstrates clear benefits – you have mastered the art of persuasion in bidding.

The three steps to mastering the art of persuasion are demonstrating understanding of your client, providing clarity and commitment to your solution, and communicating this effectively.

**1. Understand your client and their drivers:** When your client feels understood, they will feel compelled to buy from you. First and foremost – take the time to do your research.

It is important to focus not only on 'what' your client needs, but 'why' they need it. Carry out an assessment of their risks, values and objectives to ensure your solution is fully aligned with what they hope to achieve.

It's not just about a client-focused introduction to your executive summary. Showing you know what they want, and proving you can deliver it must be interwoven through your entire bid. Every aspect from explaining the relevance of projects to presenting your team must demonstrate an understanding of their objectives. The closer these are aligned, the more likely it will be that they'll see your proposal as the winning solution.

**2. Be clear and commit:** Create clear links between your content and what your client is looking for by explaining relevance and providing examples and evidence. Often evaluators have a lot to read so make it easy for them to see the value you will bring. This requires some thought. A cut and

paste approach will only get you average scores. Thoughtfully written answers, tailored to the exact bid questions, will score more highly.

Simply telling evaluators you bring the most experienced team means nothing if you cannot make the connection between your team's expertise and the added value they will bring. What really lights up evaluators' eyes are clear benefit statements that are well evidenced.

Put some skin in the game. Make a promise that your solution is achievable and measurable. And commit.

**3. Communication:** Speak to the client and use the language of persuasion. When you want a client to buy from you, they are more likely to do so if you give them a reason why. This makes 'because' an important word as it is the lead-in to the reasons your client will select you.

Avoid waffly language such as 'we will try to' or 'we aim to'. There is no promise in that! Rather, state what you 'will' do, how it will benefit your client and where you have done it before.

Unless you are certain your evaluation team are technical experts, avoid technical jargon. If your reader gets bogged down in terminology they do not understand, they will feel frustrated and will become harder to persuade. For example, instead of setting out the very technical tasks required to upgrade a water treatment plant, rather focus on the value and benefits your approach brings to minimise risk and disruption.

Make it about them. Avoid broad-brush statements and most importantly, don't talk about yourself too much. Remember this is about your client. Tender evaluators are not looking for a company overview. They want to know how you will minimise their risk and deliver a solution.

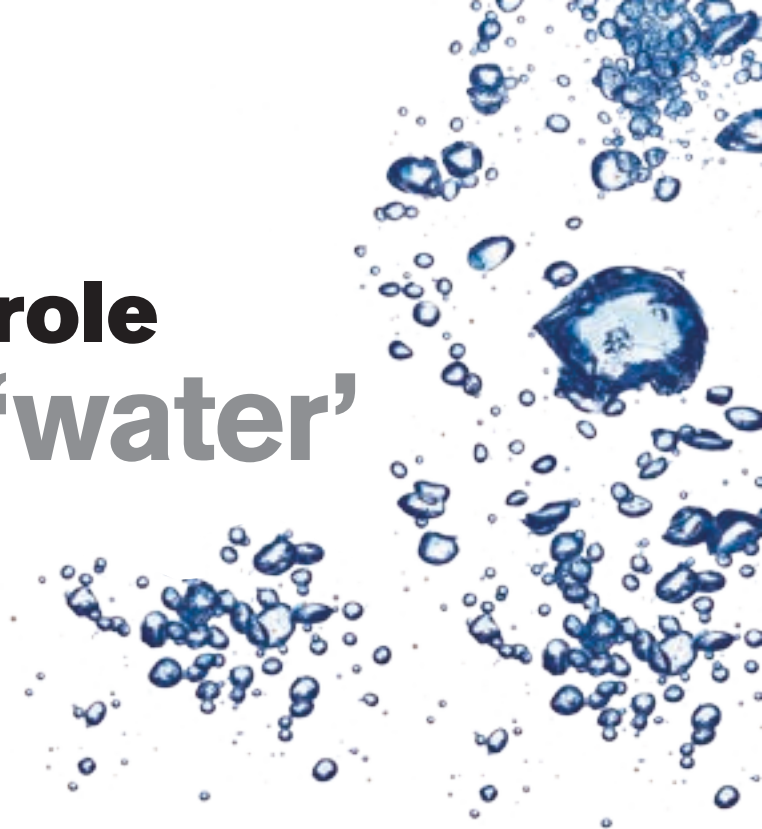
This is how the art of persuasion is used: by focusing on what the client wants and linking to how you can provide it with clear evidence, you'll show your credibility and convince the evaluators that you are the company for the job. **WNZ**

- 
- Plan A is New Zealand's largest and longest established tender writing company, specialising in support for bid teams. For more information, see [www.plana.co.nz/resources](http://www.plana.co.nz/resources) for more advice about tender writing.

# The critical role staff play in 'water'



By Connexis interim chief executive **David Worsnop**.



**T**his is my final contribution to *Water* magazine as interim chief executive of Connexis. Peter Benfell has been appointed as chief executive and will join Connexis this month (September).

Peter has been director of innovation and research at the infrastructure consultancy firm, Opus International Consultants, for the past six years. During this time, Peter led Opus' R&D team of 50 and was responsible for Opus' research and innovation activities globally. Prior to this he was general manager, agriculture & environment at AgResearch, leading a nationwide team of 300 scientists and technical staff.

Peter is a chemical and materials engineer with over 30 years' experience and has held general management roles in the private sector and government agencies. We look forward to welcoming him to the company.

Recent events, such as the Havelock North campylobacter outbreak in August 2016, have highlighted to industry the importance of having robust and effective systems in place to supply drinking water. Connexis is responsible for ensuring there is an effective system available to operators for the training and qualification of employees and contractors that fits with their requirements. We have been working with industry over the past few years to develop and put in place a revised suite of water treatment qualifications.

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 increased focus on practicums will further ensure workers are equipped with the practical skills and knowledge for fault diagnostics, event management and problem solving.

The new qualifications will become available for enrolment in early 2018, and Connexis is now working closely with industry to ensure that the methodology for training delivery and assessment meets NZQA and industry requirements.

Connexis has also worked with Water New Zealand and the Water Industry Operations Group (WIOG) to establish a voluntary registration initiative (Water Industry Professionals Association: WIPA) to recognise the critical

and key role operational staff play in the operations and maintenance of water and wastewater networks.

This proactive professional registration programme is to be initially voluntary but it has been proposed to move to mandatory registration in the future. This important work, coupled with the first phase of the Havelock North government inquiry highlighted to industry that a more formal and definitive certification scheme should be considered by industry. Such a scheme would be similar to the Civil Trades Certification scheme, which already includes certification for personnel installing and maintaining reticulation schemes.

While the inquiry is likely to make recommendations to Government related to training, qualification, competency assessment and continuing professional development, the release to industry of the consultation paper on a proposed New Zealand Operator Certification scheme, is a further proactive step towards a formal certification scheme.

The consultation paper goes significantly further and faster than was initially proposed in the WIPA scheme, however the Water New Zealand consultation paper identifies that: whilst the inquiry will eventually make recommendations, which may or may not be acted on by the Government, it is the responsibility of the industry to be proactive and take a leadership role.

Any certification scheme, established by industry following the consultation process, will identify the competency assessment methodology (including qualifications) followed by appropriate professional development. Connexis' role, through its industry ownership, is to ensure that the qualifications we develop continue to meet industry needs, and the training and assessment in place allows industry to demonstrate that the people who build, operate and maintain their assets are appropriately qualified.

We commit to support the concept of an operator certification scheme that is established by industry, and we will work closely with any organisation established to administer such a scheme to ensure competency through relevant qualifications and current training along with the appropriate experience to undertake the job. **WNZ**





# Reflections on our water future



By Beca's **Sean Newland** (left), business director, primary advisory, and **Keith Frentz**, technical director planning.

**W**e have been grappling with the issue of water quality for some time with the initial focus on point source discharges.

The issues here, once there was agreement that action was required, were ones of technology availability, how much the actions took and who paid for them. Identifying who was responsible was easy; the ones making use of the pipe.

Now our national focus is directed to diffuse contaminants, transported by overland flows or through groundwater, and often associated with land use. Things in this area are not so simple.

At the same time as this change in focus at policy level, there has also been a change in the expectations at the community or “grass roots” level. Almost all discussions on water quality now show an expectation of water at a much more natural state, where the ability to swim in safe natural water is the bottom line for many.

Again the question as to how to achieve this desired state comes down to technology and cost. But this time ‘technology’ includes land management practices and land use applied over many hundreds (or in some cases thousands) of individual land holdings encompassing entire catchments. The costs too, are

now more spread and the outcomes less known.

While the objectives for water quality – to improve it and provide the community with water bodies that have the values the community wants – are understandable and a positive step, do we currently have the technology to deliver this outcome? Is the path we have taken to achieve the desired outcomes aspirational or one we can realistically follow to the end?

## Why do we care?

Of course we care about water. We care about access to it, about our ability to harness it, to be able to interact with it culturally, recreationally or spiritually, and as an intrinsic part of our environment. As a nation we are lucky to have the access we have to the volume and quality of water we have. Water underpins our environment, our businesses, and our culture.

Having the water resource we have places this country in a wonderful position. It underpins our way of being and our economy. It is a resource we need to treasure and treat with respect to ensure a sustainable future.

Each of us will, however, bring a different perspective to what priorities should be given to water and to the extent to which we should protect or improve its quality. The National Policy

Statement for Freshwater (NPSFM) attempts to recognise this – it provides a mixture of compulsory values for waterways while allowing communities to determine specific values that resonate with them, and then it provides the mechanisms for managing water resources to achieve these values.

So far, so good.

But do we have it under control? Perhaps.

We would all agree on the importance of freshwater to our country and communities, but it seems to us that we are struggling to agree the values to be applied to water bodies and in implementing effective mechanisms to achieve these values.

The values associated with a waterway will be, almost without doubt, a key determinant of the extent to which new technology or behaviour change will be required. The setting of a compulsory primary contact value within the NPSFM sets a high bar. The degree of priority given to different values for freshwater varies across our communities. Achieving consensus on these values will always be difficult as we all see the ‘value’ of water, of what it means to us, through our own lens.

Having determined water body values we turn to the next steps of identifying what needs to change and who will be tasked with making those changes.

Questions of impacts, policy frameworks, resource allocation (to name but three considerations) bring with them the need for a solid basis of information to work from. The call on council science resource to understand and then articulate current water state, what the water quality issues are and where they originate has always been high. This will only increase in the future, especially where a collaborative approach to policy development is taken, given it is often a lay audience, the community, who receives this information.

If this becomes a common trend this will impact on the ability of councils to meet the timelines of the NPSFM.

The NPSFM has moved water management to a limits-based context. When dealing with quantity this has proven (relatively) simple. We can measure volumes, rates, takes – both at a water body and a user level. With quality it is not proving so simple.

Nitrogen (N) loss has been a key focus of limit setting to date. This has been for very practical reasons; as a means of controlling land use intensification and because in some catchments N is a key contributor to sub-standard water quality.

If we are honest though it has also been driven by the fact that there is little else that we can measure (or even model) and link from a water body load back to specific activities on land. Without this ability some leaps of faith are required – a landowner’s modelled N losses from the root zone at point A contribute to the in-river load at point B in such a way.

This may well be the case, but what is the extent of the linkage and is it a similar linkage for other land owners losing N within the catchment? Does the complexity of the spatial and temporal context of N loss mean we should be making such assumptions?

Are we being honest with ourselves about the extent of our ability to connect N losses from the root zone and then to water body loads? Perhaps we are.

Are we trying to convince ourselves that a more ‘accurate’

model makes up for a lack of actual knowledge of the degree of contribution any particular kilo of N has to water quality outcomes? Can we say with much certainty who is using which ‘pipe’ in this situation?

We do know that some land use activities will have a degree of impact on water quality. There is no disagreement on that. So is a better starting point on this journey to improve water quality to ensure the key land use activities identified transition to at least good, if not best practice? We would suggest so. Perhaps we should achieve this in the first instance at least.

This is not to say there are not places where the link of land use to contaminant loads can’t be made clearly, there are. But this isn’t always the case.

So, having determined what we want from our water bodies by way of established values, gathered information and followed a pathway, be it a collaborative or more traditional consultative processes, to determine our framework of action we finally reach implementation.

And the question is – are we being realistic as to how we expect many aspects of these water management frameworks to be implemented?

As a country we only have so many Farm Plan advisors, so many trained nutrient advisors, so many people to fence waterways, plant plants, and monitor activity available to turn these plans into a reality that delivers improved water quality.

Are we expecting and asking that this resource is available everywhere across the country, delivering on all plans at the same time, and that the resource delivers across a range of different implementation systems?

At times it seems we are, with each region now developing their plans in line with the requirements of the NPSFM, but with seemingly little coordination of resources. Do we actually have enough trained people to do the job we expect to be done? Perhaps, but initial indications are that implementation is causing councils serious problems. You can write a plan but making it work in practice is a very different thing.

Are there alternative ways to do things that may help?

It may be time to look at national tools, national approaches and a degree of national prioritisation of where efforts are expended. Perhaps a planned approach to this, led by central government in conjunction with the regional councils, will give greater hope of us achieving the water quality outcomes our communities have decided upon. At the least such an approach should deliver increased efficiency and effectiveness.

This doesn’t mean moving away from communities determining the values for their water bodies, but it may mean, for example, a single national farm plan system, a commonly held and used information system, or common agreement on what good (or best) practice is.

Perhaps we have everything right – perhaps the NPSFM will be delivered through the approaches we are taking now and with the resources we have available.

Or perhaps we should be willing to take a breath every so often and ask whether the path we are on really will take us to our final objective.

Perhaps. But if our water resource is as important to us as we say it is, are we willing to bet our future on a ‘perhaps’? **WNZ**



# In hot water



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

Water – we all need it, we all want it, but how we best protect it, value it, and safeguard it, are open to debate. And debate we do!

In this article, we provide an overview of some of the water issues making headlines of late. We start with an update on the Havelock North Drinking Inquiry where the current focus is on learning from past mistakes to ensure better systems are in place in future.

We then move on to discuss the key water policies of the two major political parties – National and Labour. This includes an overview of the changes to the National Policy Statement for Freshwater Management (NPSFM) as well as Labour's controversial proposed water tax. Finally, we close out this article with a brief overview of the Supreme Court's decision on the Ruataniwha dam and explain the reasons behind the decision as well as the possibility for amendment legislation in the near future. We hope you enjoy the read!

## **Havelock North drinking water inquiry update**

The Havelock North Drinking Water Inquiry continues to move through the Stage 2 submission and hearings process. Stage 2 concerns the lessons to be learned from the Havelock North outbreak and what reforms to the system may be needed to ensure the safe provision of drinking water.

### **Initial Stage 2 hearing**

An initial hearing for Stage 2 was held on 27-29 June 2017. The key matters considered at that hearing were the steps being taken to ensure safe drinking water is provided to the community of Havelock

North, as well as drinking water partnerships and collaboration.

The issue of partnerships and collaboration arose due to the formation of a Joint Working Group (JWG) following the outbreak. This JWG is comprised of members representing Hawke's Bay District Health Board, the local authorities (Hastings District, Napier District, and Hawke's Bay Regional Council), as well as technical consultants.

The Inquiry was interested in the extent to which collaboration is occurring elsewhere in the water industry and whether JWG's should be utilised more.

### **Further Stage 2 submissions – July 2017**

Throughout July 2017 the parties to the Inquiry filed submissions concerning the remaining issues which relate to the functioning of New Zealand's drinking water system and areas of potential reform. The matters falling in these categories are wide ranging and include:

- Drinking-water safety and compliance levels in New Zealand;
- The 2005 Drinking Water Standards for New Zealand and whether the "secure" category in DWSNZ 4.5 and definitions should remain;
- Drinking water guidelines;
- Whether all drinking water should be treated;
- Drinking water suppliers, including whether there should be a dedicated drinking water supply entity or entities;
- The National Environmental Standard for Drinking Water (NES);
- Consenting by Regional Councils under the NES;
- Regional Councils' approach to first barrier protection for drinking water – other than under the NES;



- Drinking water assessors;
- Water safety plans;
- Monitoring and testing;
- Laboratories;
- Protozoa risk;
- Bore works and casings;
- Potential reforms to the Health Act 1956;
- Emergency response plans; and
- Communications during outbreaks.

Detailed submissions on these matters have been lodged by the participants to the Inquiry, including Water New Zealand. Water New Zealand's submission was collated through a collaborative process involving a cross section of members including water suppliers, consultants and industry experts.

In summary, Water New Zealand's overarching position in relation to Stage 2 of the Inquiry is that:

- Changes need to be made to the legal and operational framework for drinking water so that there are clear and enforceable minimum standards for safe drinking water, and all the personnel and agencies involved in the sector have clearly defined roles and accountabilities.
- From a public health perspective all drinking water should be treated.
- The Drinking Water Standards require review and this review should be undertaken by an expert working group outside the Inquiry process.
- There is a pressing need for those working in the drinking water supply sector to be properly qualified and trained to do the task they are commissioned to do. There should be a mandatory system of training, qualifications, ongoing professional development, and certification to be held by all persons operating, supervising and managing drinking water treatment plants and reticulation systems in New Zealand.
- The question of whether there should be a dedicated drinking water supply entity, or entities, is not necessarily a question of scale, but rather about the legal and regulatory

framework and the competency of those involved in the delivery of drinking water services.

The full submissions of Water New Zealand and other participants can be located on the Inquiry's website [www.dia.govt.nz/Stage-2-Submissions](http://www.dia.govt.nz/Stage-2-Submissions).

### Further Stage 2 hearing – August 2017

A hearing in relation to the above issues was held on 7-11 August 2017. Evidence was heard from panels of witnesses with expertise in relation to the matters under consideration. The Inquiry will now produce a further report to the Government containing recommendations for reform of New Zealand's drinking water system.

The report is likely to be finalised after the general election on 23 September 2017. What happens to those recommendations will accordingly depend on the views of the post-election Government – whoever that may be!

### Water policy – the hot button election issue

Water has emerged as the hot button election issue with various parties releasing their water policies and proposed changes ahead of the election.

In this section we look at the policies and proposals put forward by the two major parties – National and Labour.

### National party – key changes are to NPSFM and irrigation funding

For National, its water policy is a continuation of the freshwater reform proposals that it has introduced over the past few years. It is continuing to work on finalising the proposed new national stock exclusion regulations, on developing a policy for the allocation and pricing of freshwater and on best practice management guidance for various sectors.

The most significant new developments are the announcement of further funding for irrigation (some \$400 million), and the introduction of changes to the NPSFM.

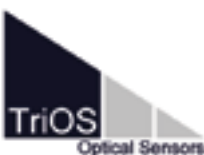
In terms of the NPSFM, the Government, following a consultation

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process earlier this year, announced in August, that it had made changes to the NPSFM in order to ensure that freshwater quality improves over time. The changes:<sup>1</sup>

- Support the Government's target of making 90 percent of the nation's lakes and rivers swimmable by 2040. These include requirements on Regional Councils to improve water quality, to set regional targets, and to report on how they are tracking with achieving regional targets every five years;
- Impose new monitoring requirements using macroinvertebrates, indigenous flora and fauna and matauranga Maori, require the establishment of methods for responding to monitoring, and that monitoring information be made publicly available;
- Impose new requirements – including setting the target nutrient level – for managing nutrients such as nitrogen and phosphorus in rivers;
- Clarify the meaning of Te Mana o te Wai;
- Require regional councils to consider the economic well-being of communities when setting environmental limits;
- Provide clarity about the meaning of requirement to maintain or improve "overall" water quality;
- Clarify the exceptions to national bottom lines in the case of significant infrastructure;
- Clarify how the requirements apply to coastal lakes and lagoons.

The amendments came into force on September 6, 2017. National has also signalled that further work is proposed on the NPSFM next year starting with consultation on what infrastructure is to be included in Appendix 3.

### Labour's water policy

Labour shares the same goal of restoring rivers and lakes to a clean swimmable state and has proposed a ready for work programme to get young people involved in fencing waterways, riparian planting and other improvement works.

However, Labour's key water policy which has grabbed all the headlines is its proposal to impose a royalty on the commercial consumption of water to assist with the cost of keeping water clean. Such a royalty would apply to bottled water and irrigation but would not apply to households or councils.

The amount of any such royalty is not specified and is proposed to be determined after consultation with stakeholders and to be flexible to reflect the different regions' water abundance and quality.

Reactions to the policy have been strident from both supporters and opponents. Key concerns are around the application and the levels of such royalties.

In terms of application, it is not clear if the policy is intended to apply to all commercial uses or just those (being irrigation and water bottling) which have been singled out.

As Water New Zealand CEO John Pfahlert noted in a recent media article: "It is important there is a consistent approach to any policy on water and water pricing and not a knee-jerk response to opinion polls."<sup>2</sup>

It is also not clear whether there are proposed to be exceptions for small takes – such as those applying to small hobby lifestyle blocks.

In relation to royalties, because no levels have been specified, there is considerable uncertainty as to effects any such royalties will have on the profitability or indeed continuing viability of a commercial operation. The flow-on effects of increased costs of production and the end cost to the consumer are also unknown.

Indeed, at the extreme, NZ First leader Rt Hon Winston Peters estimated that the price of a cabbage could treble to \$18. While other commentators have disputed that, it is certainly food for thought!

### No 'Dam' Way – Supreme Court says no to land swap for Ruataniwha Dam

In July 2017 the Supreme Court released its decision dismissing appeals which sought to validate the proposed Ruataniwha Dam land swap.

At issue was the Director-General's decision to revoke the conservation park status of 22 hectares of the Ruahine Forest Park so that the land could be exchanged for other land provided by the proposed dam developer, Hawkes Bay Regional Investment Company. The reason for the exchange was that it would be inundated by the dam that the company was proposing to build on the Makaroro River.

The Director-General's decision was upheld in the High Court but overturned on appeal by a majority in the Court of Appeal. The key issues considered by the Supreme Court were whether:

1. Refer to the Ministry for the Environment's website at [www.mfe.govt.nz/fresh-water/national-policy-statement-freshwater-management/2017-changes](http://www.mfe.govt.nz/fresh-water/national-policy-statement-freshwater-management/2017-changes) for further details.

2. [www.scoop.co.nz/stories/PO1708/S00178/labours-water-policy-raises-many-questions.htm](http://www.scoop.co.nz/stories/PO1708/S00178/labours-water-policy-raises-many-questions.htm)



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- it was lawful to revoke the conservation park status in order to allow it to be exchanged as stewardship land; and
- revocation decisions can be taken on the basis that the exchange will enhance the conservation values of land managed by the Department and promote the purposes of the Act.

There were also a number of subsidiary issues relating to consistency with other statutory planning instruments and the creation of marginal strips. In a split decision [3:2] the majority of the Supreme Court found:

[127] In summary, we agree with Harrison and Winkelmann JJ that the revocation decision was unlawful because the Director-General was driven by the s 16A test for exchange. It was acknowledged throughout that revocation of the special protected status of the 22 hectares was justified only on the basis of the proposed exchange. The conflation of the two steps circumvented the statutory prohibition on exchange of other than stewardship land. There was no assessment of whether the intrinsic qualities of the land warranted its special protection, despite the scientific reports which showed it had significant conservation values. There was no consideration of whether continuation of protected status was inappropriate or indeed whether the additional protection of ecological area should have been applied to the 22 hectares following the identification of ecological values in the scientific report. Nor is there any discussion of how the values in the

unprotected Smedley land might have been protected without the exchange. As the majority in the Court of Appeal remarked, the Department was not concerned with the correct level of protection. The distinct steps were in fact all driven by the proposed exchange. [Our emphasis, footnotes omitted].

Interestingly, the minority judgment claimed that the majority approach required reading words into section 18(7) so that the revocation decision was subject to an express limitation regarding the intrinsic values of the land no longer warranting it being held as conservation park.

The minority found that no hint of such limitation was found in the language of that section – unlike s 24(3) of the Reserves Act which expressly contained such a limitation. The minority found that if Parliament had intended the Minister's revocation decisions to be constrained in that way the provision would have said so.

While some guidance on the principles and processes that should be used for conservation benefit was subsequently provided by the New Zealand Conservation Authority in May 2016, such guidance does not overcome the statutory interpretation issues.

Given the differing opinions between members of the superior court, and the importance of this issue to future revocation decisions, we consider this is an area where further legislative guidance would be helpful and indeed is likely once the outcome of the election is known. **WNZ**



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# Havelock North Inquiry Stage 2

## Recommends urgent changes

With the Stage 2 Inquiry hearings now complete it's timely to look at the possible direction the Inquiry is headed. Water New Zealand's Technical Manager **Noel Roberts** attended the hearings and these are some of his observations.

It's clear that the Inquiry will result in a raft of recommendations that will likely have long-term implications for the way drinking water is managed in this country.

During the week-long hearing in August, it became clear that there was considerable frustration by panel members at the lack of leadership being exhibited by the Ministry of Health. Justice Stevens was clear that he wanted the Ministry to take a "broad and liberal" interpretation of the Health Act to do whatever can be done in advance of the Inquiry reporting in December to get on and make changes.

Those changes have already begun. In the weeks following the hearing the Ministry has done the following:

- Started the process of establishing a drinking water expert advisory committee that will provide independent scientific and technical advice on current and emerging issues related to drinking water quality;
- Drafting a consultation with industry document on changes to the drinking water register to collect a broader range of information (see below);
- The inclusion of critical control points in water safety plans.

The Inquiry heard evidence on the lack of compliance with the NZ Drinking Water Standards, and expressed dismay at the lack of enforcement of the regulations by the Ministry over the past 10 years. It seems likely that there will be a more rigorous approach to enforcement going forward.

There was considerable discussion on the shortages of drinking water assessors (DWAs). Changes were suggested

to their qualification requirements (having to also be a Public Health Officer) and could be better suited in a drinking water assessor having an industry background. Whether changes are also made to their placement with District Health Boards remains to be seen. There was quite a bit of expert evidence that in the UK virtually all DWAs are drawn from industry. The observation was – how could they effectively police the sector if they didn't know how a water treatment plant operated?

There was discussion on the need for a separate regulator for the water sector. That is, removing the function from the Ministry of Health and DHBs and establishing a separate unit reporting directly to the Minister of Health. This may be a bridge too far, but in any event may not be needed if the Ministry of Health takes a greater leadership role and DWAs are better resourced to do their job.

Most of the expert evidence supported the mandatory treatment of public water supplies. There seemed to be agreement that untreated supplies might be able to be approved – provided the decision was made by an expert group based on the source demonstrating certain technical criteria yet to be determined. However the general view was that this would occur rather rarely.

The topic of certification for treatment plant operators, supervisors and managers also had a good airing. The Association was asked to report back to the Inquiry by 22 September on progress with the proposal we tabled, recognising that it would be the subject of change. There seemed to be general support for making some form of certification mandatory.

There was discussion on the inadequacy of training and certification for people taking water samples, whether the drilling standards and bore construction standards are fit for purpose (not really); whether the process for recognising approved water testing laboratories was appropriate (serious doubts); whether continued use of *E. coli* as an indicator of contamination was appropriate (no); and whether the secure bore water status in the DWSNZ should be retained (probably not). Expect changes in all these areas.

An area of considerable interest was the idea that all water suppliers should be registered. In the UK this is enforced by the Drinking Water Inspectorate. The DWI has the treatment processes in use by each supplier listed and is able to revoke a water supplier's licence to operate.

In Australia, a water supplier is essentially a monopoly service and therefore it's a privilege to have a licence or permit to operate and this can also be revoked. The military or another agency can step in if the supplier fails. As part of the registration of a water supplier they must name a support agency as part of the registration / licence process – these vary from a neighbouring supplier to a multinational company.

To do this in New Zealand the Health Act would have to be changed – so this won't happen in a short time frame. It is an interesting concept that may get recommended in the final report due on December 8 2017.

The Ministry of Health has been asked to review the drinking-water register under Section 69J(5) of the Health Act 1956 that states that: "The register may also include any other information relevant to a drinking-water supplier, specified self-supplier, or a drinking-water supply that the Director-General considers appropriate."

The reference to an airline exposition was made where they are required to provide continuity, competency and capacity, insurance, maintenance to ensure reliability of an essential service.

So, big changes are coming and we at Water New Zealand are lining up to respond on behalf of the sector. It's important that councils and service providers stay across developments – as a number of these changes are likely to happen quite quickly. [WNZ](http://www.wnzn.org.nz)

- Contact me directly [noel.roberts@waternz.org.nz](mailto:noel.roberts@waternz.org.nz) if you have questions you'd like to discuss.

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# Proposed planning standards lacking

By **Charlotte Cudby**, Water New Zealand  
Senior Policy Analyst.



**T**he Government's National Planning Standards, aimed at reducing the time and cost involved in developing and using planning documents, looks unlikely to be of much benefit to the water sector in the near future unless the Government changes tack in response to submissions.

The initiative aims to create a nationally consistent framework of all planning documents – such as regional policy statements, coastal policy statements, regional plans and district plans – that councils will have to follow.

The Government aims to develop the standards in phases. The first set of standards is currently under development and must be gazetted by April 2019. The implementation period for councils is expected to be between one and five years after that.

Water New Zealand sees value in the principle of having national planning standards. A consistent approach to planning would make navigating the planning and consenting system much easier and quicker, and could potentially reduce disputes about some technical matters such as the use of metrics.

Unfortunately, the proposed scope for the first set of standards has so far excluded many elements that would have been of most value to the sector.

The bulk of work has been on how to develop a common approach to the structure, format and accessibility of planning documents. This includes how objectives, policies and rules are organised, some standardisation of mapping conventions, as well as requirements for the electronic functionality and accessibility of planning documents.

Some work is being done on harmonising the zones used in district plans as well as some definitions and metrics identified through a prioritisation process. The prioritised definitions and metrics largely relate to building and infrastructure related matters, although those of most relevance to the three waters sector were kicked for touch.

The initial engagement phase was completed at the end of July 2017 and was about testing whether the proposed scope is about right or not. In our submission, Water New Zealand said



that a flawed prioritisation process was used – it was assumed greater benefits could be gained by focusing on terms found in district plans rather than in regional planning documents.

Not enough attention was given to identifying which definitions and metrics are the most problematic and therefore are associated with the most costs. We understand these views have also been expressed by other stakeholders the Ministry for the Environment has heard from across the country.

Water New Zealand also encouraged the Government to consider how the national planning standards could support more consistent implementation of national direction that is currently underway. For example, the Land and Water Forum (of which Water New Zealand is a member) recently completed a commentary on implementation of the National Policy Statement on Freshwater Management (NPSFM).

It identified a number of implementation challenges where greater consistency and national direction was needed. For example, there is confusion and too much inconsistency in how freshwater objectives and the methods to achieve them (including limits) should be laid out in regional plans. With implementation of the NPSFM into regional plans due to be completed by 2025, it is an opportune time to tackle these issues now.

Similarly, there will also be some matters currently being investigated as part of the Government Inquiry into Havelock North drinking water that could be anticipated and picked up

in the first set of standards to ensure they are addressed in a timely way.

For example, there could be a requirement to identify 'source protection zones' for drinking water supply areas as spatial layers in plans. This is not currently a regulatory requirement, although it is an emerging good practice to help manage the land use and environmental variables affecting the security of drinking water sources.

There is no doubt that some tough prioritisation will be needed to deliver the first set of standards by 2019. While no timeline has been provided for subsequent phases of standards development, regional and local planning processes do need some stability to manage the cost impact to ratepayers. Frequent changes to the standards would not be desirable.

This is why Water New Zealand has said that some issues should be tackled now rather than later. It would mean more effort up front, but it would deliver benefits that would not be realised to the same extent if the work was delayed to subsequent phases.

The next step is drafting and testing and this will continue until at least April 2018 followed by a further round of submissions.

Water New Zealand will continue to monitor developments and advocate for members. If you have views about the standards, we'd love to hear from you.

You can find our submission on the Water New Zealand website. **WNZ**



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# Civil Defence review aims for **Better emergency response**

By **John Pfahlert**, Chief Executive, Water New Zealand.

In early June the Government decided to undertake a review of matters around civil defence with a view to getting better responses to natural disasters and other emergencies.

Because disruption to water reticulation networks is significantly impacted in earthquakes and flooding events Water New Zealand decided to work with the Engineering Leadership Forum to develop a submission to Government.

The review will provide advice to the Minister of Civil Defence on the most appropriate operational and legislative mechanisms to support effective responses to natural disasters and other emergencies in New Zealand. The purpose is to ensure that our emergency response framework is world leading, and well placed to meet future challenges. In light of recent events it is appropriate to see how we can further enhance and strengthen the current system.

## **Surge capability**

In disasters, territorial authorities need support that integrates into existing business processes, operational frameworks and organisation culture without causing disruption and dysfunctionality. The Engineering Leadership Forum recommended the creation of properly trained teams of experts to be deployed by the Ministry of Civil Defence and Emergency Management (MCDEM) to assist local authorities and lifeline utilities, and to take over regional controller roles in significant emergencies.

This is what we have called ‘surge capability’. The surge capacity should come from Civil Defence and emergency management leaders. They should be properly trained including in ‘judgement and decision-making’. There are no schools that currently teach that in this country.

## **Training**

Our submission suggested that there needed to be a system of centralised civil defence training re-established in New Zealand.

MCDEM should re-open the civil defence training school that once existed in New Zealand. The surge capacity needs leadership training for situations which are overwhelming. The problem with modern training is that it doesn’t deal with situations where resources and capability to respond are overwhelmed, and doesn’t teach understanding of judgement with limited information.

Since the 2010/11 earthquakes, a new and comprehensive Controller’s Training Programme has been established and run out of Massey University.

This is a three-stage programme commencing with a six- to eight-week course of self-directed study supported with an online series of videos, exercises, resources and networking forum with the training cohort. This is followed by a week-long residential component of lectures, presentations and exercises, and is followed up with a personal development plan and learning journal.

While this is an excellent course, there are concerns from smaller councils about the cost and time commitment required from their staff with CDEM functions.

MCDEM should be tasked and funded to deliver a national civil defence and emergency management (CDEM) training programme for both CDEM professionals and prospective volunteers. CDEM leaders, specifically MCDEM, need to be operationally focused, and engaged in training and capability building, establishing minimal requirements for councils and utilities for compliance with the Act, and implementing compliance audits.

## Risk reduction

The CDEM system is wholly focused on the improvement of emergency preparedness and response. In our view, risk reduction initiatives can substantially reduce the impact of natural events on communities and should be an important and mandated part of CDEM processes.

The Act requires utilities to be resilient, but there is no systematic assessment of utility resilience, nor of the resilience of utility systems.

Furthermore, one of the most serious deficiencies in the current CDEM system is the lack of incentives and process to enable lifeline utilities to be more resilient and to improve the resilience of their networks.

Utilities should be encouraged to deal with these issues as building resilient systems can involve quite different programmes than building more capacity or the replacement of ageing assets, and interdependency issues between utilities can significantly threaten emergency responses.

The establishment of agreed service targets after a disaster would provide a basis for planning the improvements required.

The engineering profession would like to see a rational and measured approach to the defence of communities from natural disaster and other emergencies and detailed consideration of a wider range of risk reduction programmes.

## Governance

The placement of MCDEM within the Department of Prime Minister and Cabinet diminishes the status of the Director. It is considered MCDEM would be better placed within a 'practising' Ministry. The 'maximum autonomy' status of the Director should be reinstated with direct and unequivocal reporting to the Minister. The appointment of the Director should reflect the decision-making powers implied by this – it is a practising role – not an oversight or policy role.

The Act has a number of provisions for setting expectations, monitoring progress and giving direction – the CDEM groups have been unwilling to exercise these and the provisions and the accountabilities need to be made more explicit.

The requirements on lifeline utilities need to be reinforced and the notion of 'best endeavours' disposed of – it is not a condition under the Act – neither is the notion of 'force majeure'. MCDEM needs to take a more pro-active role in monitoring this, and to do so it needs a utility specialist within its capabilities.

The role and accountability of Government Ministries under the Act should be strengthened and made more explicit. The monitoring role of MCDEM everywhere needs to be strengthened and MCDEM made more accountable. **WNZ**

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# New water sector health & safety guidelines

Water New Zealand has recently completed the National Guidelines for Occupational Health and Safety in the NZ Water Industry.

**T**hese guidelines are now available in the Water New Zealand Library. These latest guidelines have been redeveloped following the new Health and Safety at Work Act (HSWA) which came into effect last year. The guidelines provide examples of good risk management processes relating to activities relevant to the water industry. They are intended for use by organisations responsible for water, wastewater and stormwater operations. This latest document has been specifically aimed at:

- Health and safety coordinators/managers
- Operations and maintenance managers
- Senior management teams.

They provide model guidelines that organisations can develop operational specific material from, or update existing procedures and material. They also set a common approach and standards for both organisational and operational risk management.

HSWA recognises that a well-functioning health and safety system relies on participation, leadership, and accountability by government, business and workers.

A guiding principle of HSWA is that workers and others need to be given the highest level of protection from workplace health and safety risks, as is reasonably practicable. It ensures that everyone has a role to play and makes everyone's responsibilities clear.

Businesses have the primary responsibility for the health and safety of their workers and any other workers they influence or direct. They are also responsible for the health and safety of people at risk from the work of their business.

Officers (company directors, partners, board members, chief executives) must demonstrate due diligence to make sure the business understands and is meeting its health and safety responsibilities.

Workers must take reasonable care for their own health and safety and that their actions don't adversely affect the health and safety of others.

Other people who come into the workplace, such as visitors or customers, also have some health and safety duties to ensure that their actions don't adversely affect the health and safety of others.

Go to the Water New Zealand website to download the document. [WNZ](http://www.wnznz.org.nz)

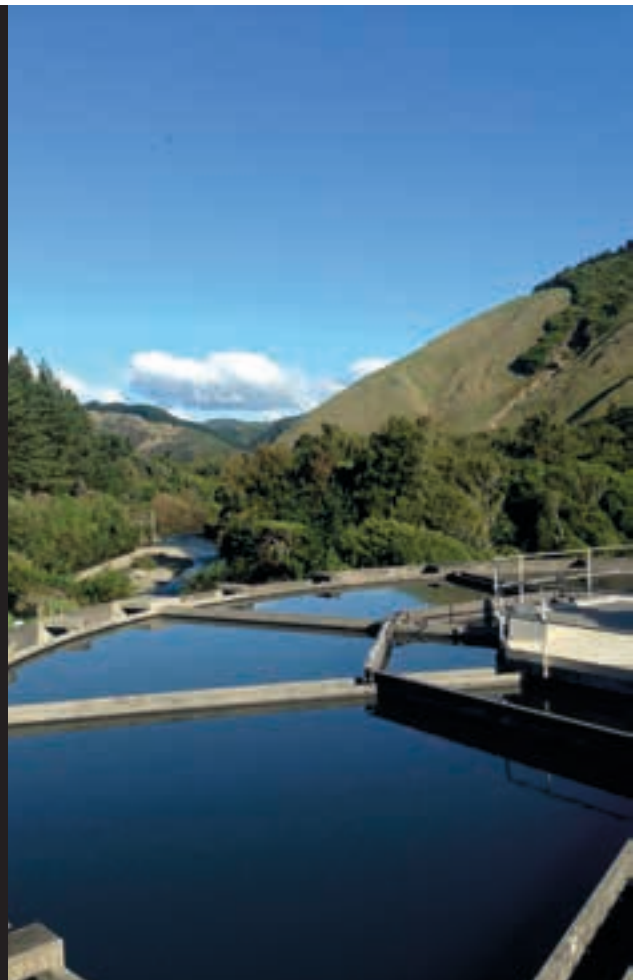
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# The water metering of customers on reticulated supplies good practice guide

**W**ater New Zealand has recently completed the Good Practice Guide to Water Metering of Customers on Reticulated Supplies. This is now available in the Water New Zealand website library.

The Water Metering of Customers on Reticulated Supplies Good Practice Guide aims to prescribe industry good practice for the supply, use, and operation of water meters used for the sale of water by an organisation to its commercial and domestic customers.

Many councils are faced with an increasing demand for water, future population growth, and high costs for implementing new supplies, says Water New Zealand CEO John Pfhalert.

He says this leads to a choice: either invest in new infrastructure, reduce demand, or both.

"Water metering is an effective tool for reducing demand."

It provides accurate information on water use – a critical building block in establishing a water management system in which water is efficiently used.

Universal metering reduces water use by:

- improving customers' awareness of their water use;
- identifying customer water loss, particularly from private laterals; and
- improving understanding of the overall network water balance which can enable water suppliers to reduce water losses in their network.

In particular, water metering can help to reduce peak demand during summer months when water resources are most stretched. Reduced demand can defer the need for network upgrades and/or new supply sources, leading to both capital and operational savings.

This is particularly relevant where the development of new water supplies is considered costly, or applying for and obtaining a resource consent is challenging.

Water metering is also an essential enabler for volumetric-based charging regimes, which provide a fair and equitable approach to water pricing. Volumetric charging can further improve water efficiency by providing consumers with a financial driver to be conscious of wasting water.

Already, consumption on the basis of water meter readings in New Zealand directly results in customer invoicing in the order of hundreds of millions of dollars each year.

It is important that meters are accurate, and the process for accessing information on their use is transparent to consumers.

The Good Practice Guide to Water Metering of Customers on Reticulated Supplies is intended to prescribe good practices for the supply, use, and operation of water meters throughout the country.

Go to the Water New Zealand website to download the document. **WNZ**

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**IDEXX**

# Flygt Concertor to the rescue

**Sultan Qaboos University, located in the Muscat region of Oman,** houses about 6000 students. Both the student and staff population have steadily increased during the past few years and the university's administration is focused on finding efficient and sustainable solutions for all their services.

In September 2015, the operators of a pump station located at one of the student residences agreed to install and trial Xylem's new wastewater pumping system, Flygt Concertor, in an effort to solve serious clogging issues as well as frequent overflows caused by peak flows.

Flygt Concertor has integrated intelligence designed to ensure clean wet wells, clog-free operation and drastically reduce unplanned vacuum cleaning call-outs.

The trial was planned to last for four months, but after the first few weeks the difference in performance and efficiency was deemed 'remarkable'. Flygt Concertor not only kept the pump and sump continuously clean, but also eliminated the common sewage spills during peak flows.

The positive results were clear as early as during the first week of the trial. Before installing Flygt Concertor, operators had to frequently lift the pump up to remove waste solids caught in the impeller. With Xylem's new wastewater pumping system, the pump clogging was completely eliminated.



Furthermore, the cleaning of the sump, which previously required the services of a sewage vacuum truck to manually remove accumulated grease and sediment, dramatically improved.

"We had to call the vacuum truck once a month and have them manually remove sediment and grease," says Ramesh Rathinavel, senior mechanical engineer at Sultan Qaboos University.

"This is now a thing of the past – with Flygt Concertor this hasn't been a problem and we have saved both time and money."

On top of the benefits delivered by Flygt Concertor's pump and sump cleaning functions, the system's compact design allowed it to easily fit into the existing station at the university.

Concertor's system design results in compact control cabinets as traditional components (motor protection, starters, variable frequency drives and climate control equipment, etc) are either not required or are built into the pump. This reduces the size of the control cabinet and at the same time enables more monitoring functionalities.

## Hach solutions

**For over six decades Hach has offered** online instrumentation, portable laboratory equipment, prepared reagents, software and technical support for testing the quality of water, liquids and air.

Hach's RTC (Real Time Control) solutions are complete off-the-shelf systems that adjust treatment processes in real time.

Standardised RTC modules can be combined and configured to deliver a holistic water treatment optimisation solution tailored to plant specific requirements to improve compliance and reduce operating expenses.

The company also claims maintenance efforts and equipment downtime are reduced

due to Prognosis, the predictive diagnostic system which is part of every RTC solution. RTC modules can be combined on various hardware platforms and tailored to specific needs, and you can start optimising a single aspect of a plant, adding modules as you progress with the optimisation of other wastewater treatment processes.

## GHD expands to Tauranga

**With Tauranga recently overtaking Dunedin** as our fifth largest city, GHD, has opened an office there to offer services for water, transport, environment and property and building projects.

The new office is led by Ryan Orr and Nick Gurr, and has eight staff with skills in water engineering, transport, spatial science, and building services.

"Continued population and economic growth will drive demand for new and upgraded infrastructure in the Bay of Plenty," says Ryan.



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# First EcoStruxure installation

Following the recently-completed upgrade of the city's Branhholme water treatment plant, Invercargill residents are enjoying potable water with a reduced risk of contamination.

**T**he Invercargill City Council embarked on the plant's \$11.5 million upgrade earlier last year, primarily to provide a further barrier to the risk of bacterial and protozoal contamination.

The upgrade also addresses residents' concerns about the water's seasonal taste and odour by the use of UV Advanced Oxidation Processes (AOP). Drawing source water from the nearby Oreti River, the Branhholme treatment plant can provide up to 45,000 cubic metres of water a day to the city. The original plant met the requirements of the Drinking Water Standards New Zealand, but the upgrade future proofs the city against increasing water requirements and any deterioration in source water quality.

Components for the upgraded water treatment plant included the replacement of the existing filter media, a new lift pumping station, a UV/AOP system, a Granulated Activated Carbon filter system, upgraded chemical plant dosing systems for lime, coagulant, polyelectrolyte and, when required for taste and odour control, hydrogen peroxide. There was also a 'back to scratch' build of the water treatment plant control systems.

The new plant's control infrastructure is almost exclusively Schneider Electric. It's also one of the company's first EcoStruxure installations in this country. EcoStruxure is an open, interoperable, IoT-enabled system architecture and platform that delivers enhanced value around safety, reliability, efficiency and connectivity.

Overseeing the Branhholme upgrade was Russell Keen, Invercargill City Council's 3 Waters operational manager, who says the transformation has been very successful.

"The most obvious improvements are from the operational crew's perspective. While the old plant did have a SCADA system, the upgraded one is far more user friendly with an easy-to-use HDMI. It provides improved process control with more data and comprehensive overviews of all plant process and equipment."

The new SCADA – part of Schneider Electric's Wonderware stable – is 'object-oriented'. With components such as pumps, fans and valves depicted realistically on the screen (rather than a simple line drawing with symbols), users are able to follow and monitor the treatment process far more easily.

"A major advantage," says Russell, "is the variety and quality of information provided by the SCADA. Operations staff have been enthusiastic and very positive about the change. They now have more detailed information about plant processes – data verifying that treatment systems are optimised and operating within required parameters.

"And the alarm process is far more reliable. We have operators onsite during normal working hours, but the plant is remotely



monitored 24/7. Any anomalies are reported automatically to a call centre and, when necessary, the operations staff are mobilised."

One thing the operations staff particularly like about the new system, he adds, is the support. "If any gremlins creep into the control system or we need help for whatever reason, we call one number. We no longer have to coordinate multiple suppliers."

## Seamless communication

The EcoStruxure technology was installed by Automation for Industry (AFI) – a Wellington-based systems integration company, and one of Schneider Electric's 'Alliance Integration Partners'. AFI director Alastair Cook says installing and commissioning a plant is always easier when the entire control infrastructure family uses the same, open protocols over the Ethernet network.

"Connectivity and communication is seamless – everything talks to everything – there's no need to deal with different protocols or proprietary systems. Components such as variable speed drives and PLCs are discovered and identified immediately – there's much greater transparency.

"And seamless integration usually means faster commissioning, saving money."

Alastair says the Branhholme upgrade is one stage of a larger control system upgrade for the Council treatment plants.

"Ultimately, the technology will be rolled out to other assets such as the wastewater treatment plant. Having all operators using the same SCADA with the same graphic interface offers enormous benefits."

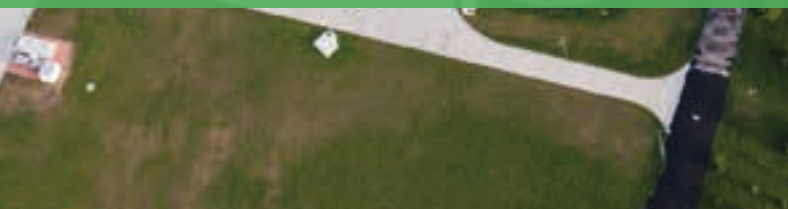
Russell underscores the significance of the new technology: "With the Oreti River we are working with a source water that is in a constant state of flux – the river is continually either rising or falling, getting dirtier or getting cleaner.

"The source water currently has a three-log requirement. Following Branhholme's upgrade we are nevertheless delivering seven-log quality water to the residents of Invercargill." **WNZ**





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# For Earth Bio

## Aussie case study in bio-augmentation

By **Ryan Wong**, engineer City of Tea Tree Gully, Adelaide, and **Shane Mckibbin**, manager For Earth Bio (Australia).

**This project centred on a series of trials** (For Earth Bio) to enhance nitrification and denitrification at the Greenwith Waste Water Treatment Plant (WWTP) in Adelaide and seek approval from South Australia Water in relation to trade waste discharges.

Sponsored by the City of Tea Tree Gully (CTTG) in Adelaide, South Australia the project involved three trial sites: Amanda Dr Redwood Park; Riverside Dr Redwood Park; and Greenwith WWTP. It started in March this year and was performed over a three-month period.

The Greenwith WWTP was commissioned in 2011 and handed over to the local council to operate. The WWTP influent is sourced from two sewage pumps stations owned by South Australia Water. This is commonly referred as 'sewer mining' where the council is taking raw sewage from the sewer pump stations, treating to reuse level and irrigating on council sports fields and reserves instead of using potable water.

The WWTP uses a Sequence Batch Reactor (SBR) process with the following processes: raw influent screening, primary aeration, secondary aeration tank, holding tank, sand filtration, ultra-filtration membrane, UV disinfection and chlorine disinfection. Designed flow 1.2M/day.

### Key issues

The WWTP was experiencing the following treatment issues: moderate risk of septicity issues at the pump stations potentially leading to corrosive material and odours; high risk of poor denitrification resulting in elevated levels of nitrogen in the Class feed water reducing the effectiveness and efficiency of chlorination; and moderate to high risk of high levels of organics in the effluent, leading to high colour and reducing the efficiency of UV disinfection.

### Trial of additive

For Earth Bio is a liquid bacteria product that contains nitrifying and denitrifying bacteria. The product is being successfully used in the states of NSW and Victoria at treatment plants and pond systems to improve treatment results in the following parameters, BOD, ammonia and nitrates.

### Jar testing

Prior to dosing the WWTP with For Earth Bio, four jar tests were performed. Four 600mL composites were created from sewer pump station on December 21 2016 and January 4 2017, and were characterised before and after 24 hours of the addition of 0.25ml For Earth Bio additive during which time the composites were aerated.

After 24 hours the composites showed an mean average reduction in  $\text{NH}_3$  (Ammonia) by 98.5 percent, and total nitrogen by 53 percent.

### Jar test results

Pre addition of For Earth Bio					
	1	2	3	4	Mean Composite Value
$\text{NO}_3$	33.3	34.1	43.6	32.8	35.95
$\text{NH}_3$	1.99	2.13	0.95	1.92	1.7475
Total N	81	67.8	97.3	91.1	84.3
pH	6.36	6.36	6.38	6.33	6.3575

### Post treatment 24 hours after addition of For Earth Bio

	1	2	3	4	Mean Composite Value
$\text{NO}_3$	5.8	24.4	35.1	10.4	23.925
$\Delta\text{NO}_3$	7.5	9.7	8.5	22.4	12.025
% $\Delta\text{NO}_3$	22.5%	28.4%	19.5%	68.3%	Nitrate 34.7%
$\text{NH}_3$	0.018	0.009	0.025	0.039	0.02275
$\Delta\text{NH}_3$	1.972	2.121	0.925	1.881	1.7247w5
% $\Delta\text{NH}_3$	99.1%	99.6%	97.4%	98.0%	Ammonia 98.5%
Total N	43	27	35	54	39.75
$\Delta\text{Total N}$	38	40.8	62.3	37.1	44.55
% $\Delta\text{Total N}$	46.9%	60.2%	64.0%	40.7%	Total N 53.0%
pH	7.23	7.47	7.52	7.51	7.4325
$\Delta\text{pH}$	-0.87	-1.11	-1.14	-1.18	1.075
% $\Delta\text{pH}$	-13.7%	-17.5%	-17.9%	-18.6%	pH -16.9%

### Bio-augmentation trial of WWTP

After the review of the jar testing a three-month trial commenced at the WWTP.

### For Earth Bio dosing at sewer pump stations

A five-litre initial dosage was added to the Primary Tank at the WWTP, also a dilution of 1:20 of For Earth Bio with tap water was slowly dripped into both Amanda and Riverside pump stations, every day from Monday to Friday for three months.

### Monitoring results

Samples were taken at SP3 (inlet to the treatment plant), SP7 (Primary Tank to Secondary Tank) and SP11 (decant to Balance Tank) every day to monitor the quality of the effluent. The parameters being monitored: Ammonia, Total Nitrogen, Total Phosphorous, Nitrite, Nitrate, pH and EC etc.



## Swan Analytical NZ arrives

**Swan Analytical New Zealand has been recently set up** to improve distribution and support its services from Switzerland for generation, municipal, wastewater, recycling, pharmaceutical, food and beverage and other markets

The New Zealand country manager, Muhammad (Mak) Kahn, pictured, will be making his debut at Water New Zealand's conference in Hamilton this month.

## WWTP pre-treatment results at sample points prior to dosing trial

Sp3	NH <sub>3</sub>	Total N	TSS
Max	8.9	83.1	160.0
Min	0.02	22.7	40.0
Average	3.1	52.8	100.6

Sp7	NH <sub>3</sub>	Total N	NO <sub>3</sub>	NO <sub>2</sub>	MLSS
Max	13.2	124.0	234.6	19.0	3210.0
Min	0.8	42.4	3.8	0.2	2100.0
Average	3.2	65.3	74.5	3.3	2727.9

Sp11	NH <sub>3</sub>	Total N	NO <sub>3</sub>	NO <sub>2</sub>	TSS
Max	8.9	125.0	261.2	19.0	20.0
Min	0.02	37.0	0.18	0.2	3.1
Average	2.6	63.6	59.2	3.2	12.3

### WWTP trial results

The bio-augmentation of the plant with For Earth Bio treatment results over the three-month period were very similar to our jar testing with a significant drop of ammonia at SP3, SP7 and SP11, which helped us reduce the usage of chlorine at the tertiary treatment. Both Total Nitrogen and Total Phosphorous have a noticeable decrease as well, pH is more neutral at SP3, and it is less acidic throughout the class B treatment.

SA Water's trade waste staff also performed four water quality testings at the discharge point from the plant back to their sewer network and the results have shown there to be no impact to their sewer network. An approval was then granted to City of Tea Tree Gully for the use of For Earth Bio at the WWTP.

### Conclusion

The water quality results have shown that dosing For Earth Bio into our WWTP has an advantage in pre-treatment water quality, hence, reducing the use of chemicals for pH correction as well as disinfection.

A significant operational advantage of dosing For Earth Bio is that it enables BOD reduction without increasing aeration systems or process. Bio augmentation with For Earth Bio achieves BOD (NH<sub>3</sub>) reductions without an increase in energy for aeration and no additional capital expenditure required. **WNZ**



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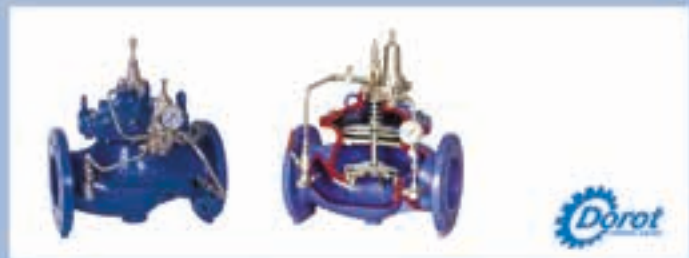
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