

water

MARCH / APRIL 2017 ISSUE 198

Meeting customer needs

Wellington – the resilience question

The Water Debate – Malcolm Alexander

Maximising technology use

METERING

Domestic and Bulk



SENSUS

Electromagnetic Flow Meters



**EUROMAG
INTERNATIONAL**

Automatic Meter Reading System (AMR)



SENSUS

GSM/GPRS Data Loggers



DataCell

FILTRATION

Innovative Filtration Solutions



ARKAL



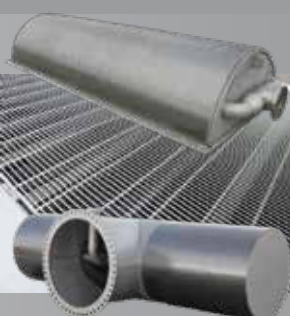
FILTMAT



AMIAD

**amiad
WATER SYSTEMS**

Vee Wire Screening Solutions



Hendrick Screen Company
Cutting Edge Metal Solutions

VALVES

Water Control Solutions



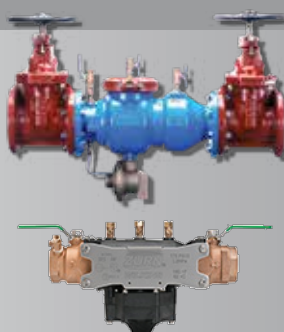
Irrigation

Waterworks

Fire Protection

BERMAD

Backflow Preventers



WILKINS
a ZURN company

High Performance Air Valves



VENT-O-MAT

Deeco Services Ltd | Water Process Solutions

National Service & Distribution | 21 Regent Street PO, Box 33-226, Petone
Tel: 04 568 5293 | Fax: 04 568 5273 | service@deeco.co.nz | www.deeco.co.nz

Wellington | Auckland | Tauranga | Christchurch

President: Dukessa Blackburn-Huettner
Board Members: Dukessa Blackburn-Huettner;
Helen Atkins; Shayne Cunis; Vijesh Chandra;
Kelvin Hill; David Simpson, and Colin Crampton
Chief Executive: John Pfahler
Manager, Corporate Services:
Linda Whatmough
Manager, Sector Engagement:
Vicki McEnaney
Executive Administrator: Amy Aldrich
Technical Manager: Noel Roberts
Technical Coordinator: Lesley Smith
Communications Advisor: Debra Harrington
Water Service Managers' Group:
Lorraine Kendrick, P: +64 7 872 0030

SPECIAL INTEREST GROUPS

Backflow: Graeme Mills, P: +64 7 577 7052
Digital Water: Thomas Joseph, P: +64 9 374 1599
Modelling: Jeff McLean, P: +64 3 363 5455
Small Wastewater & Natural Systems:
Ulrich Glasner, P: +64 3 450 1721
Stormwater: Michael Hannah, P: +64 9 476 5586
Water Efficiency & Conservation Network:
Sally Fraser, P: +64 7 838 6787
Young Water Professionals:
AKL: Matt Ewen, P: +64 9 274 4223
WLG: Fiona Myles, P: +64 4 439 7433
CHC: Richard Gramstrup, P: +64 3 941 5778

WATER JOURNAL

Managing Editor: Alan Titchall
P: +64 9 636 5712, M: +64 27 405 0338
alan@contrafed.co.nz
Contrafed Publishing
Contributors: Mary Searle Bell
& Hugh de Lacey
Advertising Sales: Noeline Strange
P: +64 9 528 8009, M: +64 27 207 6511
n.strange@extra.co.nz
Design: Contrafed Publishing
Suite 2,1, 93 Dominion Rd
PO Box 112357, Penrose, Auckland, 1642
P: +64 9 636 5715
www.contrafed.co.nz
Distribution: Debra Harrington
P: +64 4 495 0895

DISCLAIMER: Water New Zealand reserves the right to accept or reject any editorial or advertising material submitted for publication. The opinions expressed in contributions to Water are not necessarily those of Water New Zealand. The information contained in this publication is given in good faith and has been derived from sources believed to be reliable and accurate. However, neither Water New Zealand, nor any person(s) involved in the preparation of this publication accept any form of liability whatsoever for its content including advertisements, editorials, opinions, advice or information. This extends to any consequences from its use. No part of this publication may be reproduced, stored in any retrieval system, or transmitted in any form or by any means electronic, mechanical, photocopying, recording or ink-jet printing without prior written permission of the publishers.
ISSN 1179-2949 (Print)
ISSN 2382-1906 (Online)

www.waternz.org.nz

water

Issue 198 MARCH / APRIL 2017

INSIDE

- 4 Updating qualifications to ensure workforce capability – President's comment
- 6 News and events
- 8 2017 Stormwater Conference
- 14 Havelock North – We need to talk
- 16 NPR results available for viewing
- 18 Managing real water losses
- 20 Profile – Craig Freeman
- 24 Veteran Profile – Graeme Leggat

FEATURES

- 26 Wellington – The resilience question
- 28 Training onsite under the LTO concept
- 30 Building quake-resilient underground utilities
- 32 Raveen Jaduran – Watercare customer focus
- 36 Malcolm Alexander – A personal view
- 40 Maximising technology use
- 44 Microbial monitoring
- 46 Technology – Data integrity principles
- 48 A customer-first culture challenge

REGULARS

- 52 Technology – The pond resurgence
- 54 Comment – 'Agency capture' and dangerous politics
- 56 A wider view – If our taps run dry
- 58 Oxfam – Appreciating clean water
- 60 Legal – Out with the old, in with the new
- 64 Technology – Reviewing the Pipe Inspection Manual
- 66 Commercial news
- 70 Advertisers' index



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.

Updating qualifications to ensure workforce capability



Dukessa Blackburn-Huettner,
President, Water New Zealand

On my travels around the country during the summer holidays I was pleased to note a heightened focus and awareness around water issues.

The conversations around the barbecues and wine tastings were about rainfall, water availability, changing weather patterns, droughts, and the quality of drinking water.

This, along with the huge growth in many areas of the country, is highlighting the shortage of skilled labour as well as the aging workforce in our sector. Incidents such as in Havelock North remind us of the importance of having a skilled workforce. Water New Zealand recognises that training and workforce capability is a big issue and is addressing this as one of our key initiatives through the Water Utilities Association in 2017.

It is therefore timely to highlight that over the next two years changes are coming to water qualifications and training delivery, and it's time to get specific about what's going to happen.

Over the past five years a review of the water industry qualifications has been undertaken. The process was first launched by the Primary Industry Training Organisation (ITO) with Connexis picking up the reins in 2013, and was due in part to a wider government led review of qualifications in all industry sectors. Following consultation with industry, five updated qualifications have been registered on the NZ Qualifications Framework.

Since 2013 Connexis has been working with industry to review the programmes which make up each of the qualifications and unit standards. Most of the unit standards have now also been finalised and sent to NZQA for evaluation.

One consequence of updating the qualifications is that the current water qualifications will expire. The last date for enrolment in existing qualifications is 30 June 2017, and trainees have until the end of 2018 to complete them. The final off-job courses for these qualifications will run during the first half of 2017.

Connexis has a Water Industry Group (WIG) drawn from across the water sector. The advisory group has representatives from contractors, suppliers, consultants and industry users. Water New Zealand is well represented with both the Water Services Managers Group (WSMG) and the Water Industry Operations Group (WIOG) in attendance.

The WIG has expressed the view that the existing training content is too narrow for evolving industry needs, resulting in competency gaps and increased service risks. The group also believes the current training delivery model is outdated, inflexible and costly – resulting in low uptake and a perceived focus on qualifications above competence. These views seem to have widespread industry support including feedback from recently qualified trainees.

This has led to the development of the Future Training Concept (FTC) by the WIG. The changes signalled by this concept were outlined by Helmut Modlik from Connexis in the September 2016 issue of *Water*.

At its meeting in December 2016 the WIG members advised Connexis that they wish to develop the FTC ideas as the basis for future training delivery to the sector.

In summary, the concept envisages training being delivered with greater emphasis on e-learning rather than attendance at

block courses – although that will still occur to a degree as having trainees attend such courses provides valuable networking and support between peers.

Blended learning might be a better way to describe it. Feedback from the sector has also suggested that trainees should be able to demonstrate their competence in a controlled operational environment, such as a purpose-built treatment plant simulator that allows the trainee operator to make adjustments to equipment without putting consumers at risk.

You can draw a comparison with trainee pilots who use flight simulators to hone their skills.

Another consequence of updating qualifications, in conjunction with an industry desire to move to a new delivery model, is that new material to support the new training delivery model will need to be developed. This task currently falls largely to training providers. It may be that some courses with few course participants will be unattractive to trainers, in which case the government or industry may need to support the development of training course material.

If our industry is to remain relevant we need to ensure that we are current with new technology and methods of learning. When the existing training system was developed there was no such thing as webinars or online training modules. Block courses were *de rigueur* when we designed the existing system. Those days have changed and we must move with the times.

While the role of Water New Zealand has been to coordinate industry input to the training review over the past five years, the emphasis now shifts to employers to assist by ensuring they budget for training staff every year.

The new training regime will be different from what employers are used to. Extending people's capability in how they apply the knowledge learnt in the classroom is essential. Employers can help by being more engaged in training and ensure trainees have adequate time at work to undertake their online assessments. It won't be sufficient to expect them to do it all in their own time.

From these changes there is an expectation industry will gain a more responsive training environment which ultimately will lead to trainees with more relevant and useful qualifications.

Water New Zealand is supportive of the coming changes. It links to work we plan this year on sector workforce capability. This is about identifying future training needs, and improving recruitment and retention of staff, particularly at the operator level.

Attracting younger people to join the sector, improving gender balance, upskilling the workforce to optimise the use of new technology, and anticipating future training needs are all things we as a sector need to do to make our businesses attractive places for people to work.

If anyone would like further information, please do get in touch with us and we can refer you on. Of course we are also very interested in your views, the role you think Water New Zealand should be taking here, how we can help or if you are interested in contributing. [WNZ](#)

SOLVE ODOUR PROBLEMS WITH

GREEN DOME[®] ODOUR FILTERS

PART OF OUR WIDE RANGE OF ODOUR CONTROL SYSTEMS



- ✓ Attractive and low profile
- ✓ The better biofilter alternative
- ✓ Smaller footprint
- ✓ Lower CAPEX
- ✓ Simple & reliable operation
- ✓ Biological and/or Carbon
- ✓ Breather or Ventilated options
- ✓ Wide range of sizes and options
- ✓ Easy installation
- ✓ Ideal for air valves, pump stations, manholes & more

We help you choose the right approach for your odour control challenge



Designers, manufacturers and suppliers of world-class industrial fibreglass (FRP/GRP) products and odour pollution & corrosion control solutions

+64 6 755 0410 enquiries@armatec.co.nz

PWWA chief appointed

The Pacific Water and Wastewater Association's (PWWA) first Chief Executive Officer is Pitoula Lusio SefoLeau of Samoa.

SefoLeau has served the Samoa government for 33 years from 1982 to 2015, including three years in 1997-2000 as a Director's Advisor with the Asian Development Bank. 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.

Her most recent previous two appointments were as the CEO for the Ministry for Revenue and as a Deputy CEO for the Ministry of Finance.

She has served on numerous boards of SOEs and government reform taskforces in Samoa, as well as serving as a member of regional and international steering committees and management boards such as the Oceania Customs Organisation, the Pacific Islands Tax Administrators Association, and the OECD Peer Review Group for Transparency in Tax Information Exchange, among others.

The appointment of a CEO is the first step of the PWWA (established in 1994) in setting up the organisation as a permanent regional body advocating for its members as the 'voice for water' in the Pacific.

This involves capacity development and regional integration towards improved access to water and sanitation for Pacific peoples.

PWWA membership currently includes 28 Pacific Island water and wastewater utilities across 22 countries and component states, international water authorities and associations (including Water New Zealand), private sector equipment and service supply companies, contractors, consultants and individuals.

Aurecon regional director

Carl Devereux has been appointed the new Regional Director – New Zealand at global engineering and infrastructure advisory company, Aurecon.

In this role, Carl will be responsible for the overall operation of the New Zealand business taking over from Bruce Manners who has retired from the company.

Carl has been Aurecon's South Island Manager for the past five years and has been a driving force behind the growth and diversification of Aurecon's Christchurch operation in response to the 2011 earthquakes.



Harker Underground evolves

Harker Underground Construction was set up in 1988 by Graeme Harker as a tunnelling and micro-tunnelling company.

Six years ago Hawkins bought the company, which has been expanded and diversified since then under the Hawkins umbrella.

More recently Mike Harker, the son of Graeme Harker, and Abergeldie Complex Infrastructure have jointly bought the equipment and business of Harker Underground Construction. Abergeldie will own 80 percent and Mike Harker 20 percent of Abergeldie Harker.

"I am delighted that the Harker family will once again own a share of the business my father founded," says Mike Harker.

"My brother Phillip will also continue to be a key member of staff. I have known Mick Boyle and Abergeldie for around seven years and I have no doubt we will work well together and Abergeldie Harker will be very good for our employees and our clients and continue our father's legacy."

Abergeldie founder and executive chairman Mick Boyle says the investment will allow Abergeldie and Abergeldie Harker to share technical expertise, personnel and equipment.

"It will strengthen our tunnelling and shaft capabilities in both New Zealand and Australia."

As well as shaft and tunnel construction, Abergeldie Harker will bring to the New Zealand market some of the niche capabilities that Abergeldie has developed such as shaft sinking by blind boring, pipe relining, excavation by blasting as well as capabilities in the water and rail sectors.

Matt Mules, Harker National Manager, has been appointed General Manager of Abergeldie Harker.

Waipa seeks 'mixed model'

Waipa councillors look less likely to support a proposal to transfer Waipa's water and wastewater assets into a ratepayer-owned company.

Instead they may try to convince Hamilton City Council and Waikato District Council to take what they say is a far more "prudent and risk-averse" approach to managing water and wastewater across the three districts.

In June and July 2016 all three councils agreed to consult their communities on an agreement to form an asset owning council-controlled organisation (CCO). The CCO would be responsible for managing all water operations, on behalf of each council.

Waipa still intends consulting on that proposal. But it now wants the other two councils to also consider an option which wouldn't require each council to transfer its assets into a separate company. A water company would still be formed, funded by the councils and responsible for all water activities. But councils, if they chose to, could retain ownership of their own assets.

Waipa mayor Jim Mylchreest said there are big financial and other advantages to be gained from the three councils joining together to manage water and wastewater more efficiently. But he does not believe that moving straight to an asset-owning CCO as recommended by a range of independent consultants is the right option for Waipa.

"That might be a very good option for Hamilton and Waikato, but my job is to focus on what's right for our district.

"Waipa is not anti-change; we simply want to ensure that any change we make is the right one for us."

Tapping in to water news

Opus global leaders

Opus International Consultants (Opus) has appointed three global Sector Leaders to drive and implement its new water strategy.

Timothy Phelan has been appointed Sector Leader for Water and Wastewater Treatment. As the current Director of Water Treatment Group for Opus Canada, he has over 21 years' experience in water supply, treatment and transmission – specialising in surface water treatment.

Liam Foster has been appointed Sector Leader for Water Resources and Flood Risk Management. He has over 16 years' experience in water environmental consultancies, working with local, national and multinational organisations and is the current Principal Environmental Consultant and National Services Area Lead for Stormwater and Flood Risk Management in Opus' Christchurch office.

Stephen McNally has been appointed Sector Leader for Water for Agriculture. He brings 30 years' experience in the agriculture and horticulture industry across contracting, consultancy, leadership and business management roles, and is currently the National Technical Director for Productive Water, in Opus' Wellington office.

Hamilton water options up for discussion

Hamilton City Council is viewing options for a new way of managing water.

The council has sought further information and advice on an "enhanced shared service model" and a Council Controlled Organisation that is both asset owning and non-asset owning (transitioning to asset owning).

The council also asked its Chief, Richard Briggs, to convene the Waters Governance Group to progress the project in conjunction

with Waipa and Waikato District Councils, and identify options for working together.

A consultation document is to be prepared by June 30, in conjunction with the Waters Governance Group, which will also involve public consultation and community feedback on options for managing water.

Hamilton City Council Mayor Andrew King says seeking more information on options is a pragmatic approach for the city.

"I am happy to consider options to move forward – but move forward we must."

More information about the project at: www.waterstudywaikato.org.nz.



Fast. Sensitive. Accurate.

Automated Microbiology Detection System

The TECTA™ B16 is fully automated and can provide E. coli and Total Coliform **results in 2-18 hours**, depending on the level of contamination. With integrated networking capabilities, the TECTA™ B16 will provide immediate notification and early warning of positive sample results as soon as they occur. Results can be automatically sent to any device, including computers, tablets and smart phones, on detection of bacteria.

New Zealand Ministry of Health (MOH) approves the Tecta B16 for testing E. coli for bacterial compliance in drinking water.

TECTA - PDS
EINDETEC

Find out more at thermofisher.co.nz/tecta

© 2017 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. TECTA™ is a trademark of TECTA-PDS. 1488424254

ThermoFisher
SCIENTIFIC

Stormwater 2017

Innovative, Resilient & Future Ready

The 2017 Stormwater Conference will be held at the Pullman Hotel, Auckland from May 3 – 5. Earlybird registration for the conference is open until March 23, so get in now to secure your reduced rate and book your accommodation at the Pullman promptly to avoid missing out.

The 2017 Conference theme of *Innovative, Resilient and Future Ready* provides the platform to introduce, explore, address and challenge the way the industry responds to the impacts of stormwater on the environment. The conference will explore ways to manage and integrate stormwater, from the concept and design, through to construction and into operation and maintenance.

Throughout Wednesday and Thursday there will be a full

programme of technical papers and informative sessions along with sessions on Friday morning and optional site visits around the Auckland region in the afternoon. The Welcome Function is on the Wednesday after sessions conclude and is included in the full Conference registration.

The Conference Dinner is being held on Thursday evening, at The Maritime Room at the Viaduct Harbour.

With a projected attendance of 300 attendees, the 2017



2016 Stormwater Conference.

Stormwater Conference is targeted at:

- Regional council and TLA staff
- Professionals from related disciplines
- Procurement managers
- Academia
- Infrastructure providers

The conference provides opportunity to:

- Cultivate technical knowledge
- Hear new and cutting-edge stormwater information
- Up skill in various areas of stormwater science and management
- Keep up to date with the latest innovations
- Create business opportunities
- Build your corporate profile
- Network with peers

The theme

This year's theme of Innovative, Resilient and Future Ready provides the platform to introduce, explore, address and challenge the way the industry responds to the impacts of stormwater on the environment.

The conference will explore ways to manage and integrate stormwater, from the concept and design, through to construction and into operation and maintenance.

Innovation needs to be introduced, explored and embraced within the industry and its collaborative partners to push

the boundaries of the urban infrastructure and support industry growth in our city centres.

Resilient stormwater infrastructure is supported by a collaborative approach from design to implementation. This theme has been explored previously and this conference will continue to share examples, acknowledge and celebrate this important component of providing resilient systems.

Future Ready is a progressive way of introducing the challenge of supporting an urban environment that can meet the needs of a growing population and to incorporate the innovation and resilience required by society.

The selection of themes and sub-themes have been designed to attract technical papers, expert panel sessions, open discussion forums and exhibitions to provoke thoughts, challenge stormwater practitioners' thinking and knowledge while expanding their views on holistic stormwater management.

The Stormwater Conference Team looks forward to welcoming you to Auckland in May. **WNZ**

- For more information on all of the above visit the Stormwater Conference website www.stormwaterconference.org.nz or email waternz@avenues.co.nz.

High quality water filtration options



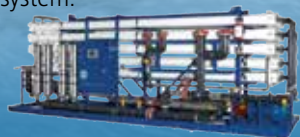
Microfiltration

GE's ZeeWeed ultrafiltration (UF) hollow-fiber membranes are designed with a robust life expectancy, giving you confidence in your water treatment system's operation and helping you comply with your regulatory requirements.



Reverse Osmosis

GE's PRO Series is a range of reverse osmosis (RO) machines and components such as multi-media filters, carbon filters, water softeners, chemical feed systems, tanks, and pumps. When combined, these components deliver a full-scale, configurable water system.



3M High Flow Filtration

The advanced design of the 3M High Flow Filtration System delivers exceptionally high flow rates in a compact housing—up to 500 gpm from a single cartridge.



FILTEC Aqualite Filtration

For effective removal of fine sediment in small water filtration schemes.

- Low running costs



Contact us today for more information on the best solution for your water treatment process!

FILTEC

Water & Wastewater Specialists

09 274 4223

info@filtec.co.nz

filtec.co.nz

Mott MacDonald appointment

Mott MacDonald has appointed John Seed as its new global advisory services sector lead, responsible for the company's advisory services business and developing its global strategy.

John has 30 years' experience managing multidisciplinary government and private sector projects. Most recently he was manager of Mott MacDonald's advisory and management business in Europe, being responsible for the consultancy's work in programme project and commercial management, infrastructure finance and advising international financial institutions.

"Our one-team approach will bring together expertise from across all our regions and ensure best practice and resources are applied to the right projects on a global basis," says John.

Guy Leonard, Mott MacDonald's Group strategic development director, added: "John has been part of Mott MacDonald since he graduated and has helped make our advisory business the leading success it is today.

"The creation of this new role recognises the importance we place on the advisory services sector and I know that John will approach it with his trademark determination and ambition."

Survey to help councils

What do customers really think of the way we, as a sector, deliver water, stormwater and wastewater services?

This is one of the key questions that Water New Zealand will be asking consumers as part of a nationwide survey this year.

"We want to get an overall sense of what people in this country think about the management of their water services," says Water New Zealand Chief Executive John Pfahlert.

"The survey will be aimed at helping councils and water utilities better understand their customers. So we'll be asking councils to get behind the survey and help promote it through their newsletters to customers, rates bills and so on.

The survey will start at the beginning of May and run for six weeks. Findings will be presented at the Water New Zealand Annual Conference in Hamilton in September.

New Customer Group

Water New Zealand is inviting expressions of interest from members keen to be part of a newly-formed Special Interest Group (SIG) focussing on customers.

This new group will bring together members with an interest in customer focus to discuss and share issues and solutions as well as develop and maintain industry standards and policies.

"There's been some really good work done in recent times by many of our members focussed on becoming more customer centric so there is already a lot of valuable learning to be shared in this area," says John Pfahlert.

The customer satisfaction survey is the first project of the new SIG. The new group will be led by a management committee, assisted by Water New Zealand staff.

If you are interested in being part of this group, please contact Vicki McEnaney, Manager, Sector Engagement, vicki.mcenaney@waternz.org.nz.

A bird's eye view

This cracker photo (opposite) was taken by Brendon Dixon, an Auckland drone operator and captures a startling bird's eye image of Watercare's Lower Huia Dam in the Waitakere Ranges.

Brendon Dixon from Epsom was a pro snowboarder in his younger years and now works as a professional camera and drone operator in the film and television industry. He visited Lower Huia dam one afternoon recently to capture the shot with his DJI Inspirepro X5 flying directly overhead, around 25 metres above the spillway. He is pictured lying flat out on the footpath that runs through the middle of the spillway; the controls are nearby-discreetly out of sight.

Brendon made sure he had contacted Watercare to ask permission to film the dam prior to his visit. Filming the whole sequence took about two minutes: "The first time I visited the dam I was doing some commercial real estate work in the area and was riding my electric bicycle around. I came across the dam and knew it would be great to film," he says.

The 50-hectare dam was completed in 1971 and is one of five dams in the Waitakere Ranges that supply water to the people of Auckland. The dam is accessible via a gravel road from the car park and a popular walking track links both Lower and Upper Huia dams.

Forest & Bird spits the dummy

Forest and Bird Protection Society has withdrawn from the Land and Water Forum (LWF) over what it says is "mounting frustration about non-implementation of key LWF recommendations".

In an email published by Kevin Hackwell, group manager campaigns and advocacy, the society says; "Forest & Bird has for quite a while been concerned about how the government has been responding to the recommendations of the Land & Water Forum, and the general lack of progress in responding to the Forum's recommendations and particularly towards protecting the ecological health of our waterways."

He says the Government's response to the Forum's recommendations has been "underwhelming", particularly in respect to the Forum's recommendations on MCI and DIN & DRP that relate to ecological health.

"We have considerable goodwill towards the intent of collaborative governance processes, but note that an essential component is the Government showing good faith in the implementation of the decisions made collaboratively.

"Forest & Bird also has considerable goodwill towards fellow Forum members whom we have worked alongside over the last nine years"

At the same time Hackwell tendered his resignation from his role as trustee and chair of the Land & Water Trust.

"Naturally, I hope that the Government will come to its senses, show good faith towards the collaborative process and do a much better job of responding positively to the Forum's considerable body of work.

"In the event that the issues we have raised are satisfactorily addressed, Forest & Bird will consider re-engaging with the Forum."

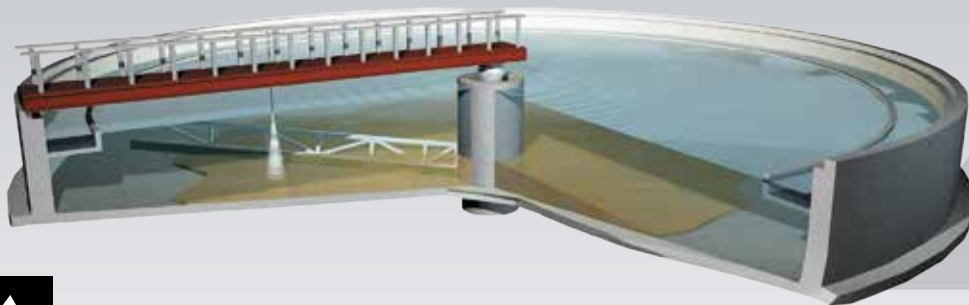


Sludge Blanket Monitoring

NEW from



Continuous monitoring of the sludge/water interface or sludge blanket is central to the efficient operation of clarifiers, thickeners and settlement tanks.



**Applied
Instruments**

Smart sensors can connect wirelessly to the monitoring system.

Telephone: +64 (09) 579 2633
Email: engineer@applied-inst.co.nz

Instrumentation for Process Measurement and Control
www.applied-inst.co.nz



Global engineering and consulting firm MWH, now part of Stantec, has promoted **David Hogg** to the role of General Manager, Water for New Zealand.

The sheep did it

The first stage of the Havelock North Water Inquiry revealed that the Mangateretere pond was the most likely pathway by which water contaminated by sheep faeces entered the Brookvale Road borehead 1.

Members of a science caucus, that included scientists from Tonkin & Taylor and the Hawke's Bay Regional Council, was formed after the hearing held in December last year to research potential pathways of contamination put to them by the inquiry panel.

They agreed that there was a 78 percent probability that the pathway travelled from the pond to the bore situated 90 metres away, and a good probability that it entered the bore through a defect or hole in the bore casing.

Caucus also considered the possibility of the water travelling from neighbouring paddocks to the dry well and then to bore 1, and decided there was only a 20 percent probability of this being the pathway.

Hastings Mayor Lawrence Yule said that without pre-empting the ongoing inquiry he was happy that there was now a highly probable answer as to how the outbreak happened.

"It's helpful to have this answer and I hope it will restore public confidence that there has been no neglect."

He said in the 35 years that bore 1 had been operating the only other instance of water contamination was in 1998.

"Now that we have found the cause we can move on to addressing issues like the chlorine in the water and getting bore 3 running with its UV treatment to ease the water restrictions.

"We have the UV system for bore 3 which can be set up for bore 2 if we need to, but at the moment bore 3 will be enough to provide enough water in the immediate future."

More on the inquiry on page 14.

Hurunui irrigation funding

Crown Irrigation Investments is putting \$3.4 million into the Hurunui Water Project, which will take and store water from the Hurunui and Waitohi rivers and use a pressurised piped distribution system.

The Hurunui Water Project is a \$200 million irrigation scheme capable of irrigating up to 21,000 hectares within an area of around 60,000 hectares on the south side of the Hurunui River in North Canterbury.

"Water storage has the potential to make a huge difference given the drought in this part of the country has been going on for nearly three years," says Primary Industries Minister Nathan Guy.

"Importantly the scheme will have strict nutrient discharge rules and is focusing on irrigating parts of each farm, rather than whole farms. Around 70 percent of irrigated land will be used for sheep and beef production, with the other 30 percent being for arable, dairy and other uses."

The National Government has allocated \$120 million to Crown Irrigation Investments over the past three years, and \$25 million extra towards the Irrigation Acceleration Fund in last year's Budget

"A recent report by NZIER found that irrigation contributes \$2.2 billion to the national economy and this has the potential to increase further," says Nathan Guy.

All decisions by Crown Irrigation Investments are made by an experienced, independent board. Strict conditions have to be met including technical feasibility, consents in place and sound governance.



Precious.



Excelling in the provision of electronic data capture systems, meter reading technologies and accurate metering solutions. Ensuring the sustainability of our most important resource.

Because Every Drop is Precious.



www.adriley.co.nz

ADR
Arthur D. Riley & Co. Ltd.

fieldsmart technology

Auckland: (09) 444 2350
Wellington: (04) 472 7614
Christchurch: (03) 379 2628

Havelock North

We need to talk

Water New Zealand's Technical Manager **Noel Roberts** attended the two and a half weeks of inquiry hearings and reviewed the many submissions presented as evidence at stage one of the inquiry into Havelock North's drinking water.

My aim was to help ensure greater dissemination of the issues in the water industry and help inform Water New Zealand's submission for the second part of the inquiry.

The first stage of the inquiry was nearing completion at the end of last month and it had already become clear that Havelock North's water contamination was most likely caused by sheep faeces getting into the Brookvale Road Bore 1 through the Mangateretere pond about 90 metres away – via the groundwater.

It was identified with dye trace testing that the water from the pond to the bore travelling via this route only takes just over a day.

The issues covered in this first stage were around root cause; responsibility of the various agencies; prior knowledge of risks; failures; facts; responses; and pre planning.

Stage two of the inquiry will be focused on what, if any, changes are required to reduce the likelihood of a similar contamination event occurring in the future. No firm dates have been set for stage two at the time of print.

While the questions around who is to blame are entirely relevant and understandable, particularly in light of the three deaths and approximately 5500 cases of campylobacter, it's what's going to happen over the next couple of months that will be key for the water sector.

So far, the evidence has clearly pointed to system issues in Havelock North causing an outbreak that could have happened in many other parts of the country. That's why putting the spotlight on system failings will be key to ensuring that history does not repeat itself.

Instead of sheeting the blame to any one of the agencies involved, we all need to take a close look at the system of delivering safe drinking water to our communities and how our own roles contribute to success or failure of the system.

During the inquiry it became very clear that a lack of communication, and the often vexed relationships between agencies, had a big impact on the way drinking water was supplied to the Havelock North community as well as how the authorities responded when the crisis unfolded.

One clear outcome that the Havelock North inquiry has

pointed to has been the need for much more coordination and discussion between regional councils, district councils, district health boards, drinking water assessors and water utilities.

The inquiry highlighted shortcomings amongst all agencies and put that alongside systemic issues resulting in the classic 'Swiss Cheese Model' of system failure.

One salient fact about Havelock North was this lack of real information sharing as each authority managed its own part of the system (catchment, infrastructure, public health). How was one agency responsible for supplying drinking water from the Brookvale Road Bore 1 into the town's taps to know if there was a breach in an aquifer 90 metres away? And how, other than in hindsight, was an aquifer breach to be discovered?

Then once it was revealed that there was a possible contamination, how could we ensure that any outbreak was minimised through getting information such as 'boil water' notices to the community in the most timely manner.

Whether it's appropriate to have chlorine added on a mandatory basis along with other treatment options to water supplies was also raised.

Another issue the inquiry highlighted was the need to retain intellectual knowledge in the water sector. How do we ensure that appropriate knowledge is passed on to staff so that they are aware of past events, and how do we mitigate against staff turnover and loss of knowledge?

The big challenge now is to ensure that everyone in the system accepts their share of responsibility, both for their own failures and to ensure this does not occur again. How do we ensure that proper discussion, coordination and true information sharing exists between all the authorities? Does that need to happen through legislation change? If so, how? Or is there a more acceptable and effective option?

It is important not to ignore the question of resourcing and the impact this has on the delivery of water to communities. While the big question of water governance is outside the terms of reference for this inquiry, systemic and resource issues will inevitably be part of the core of the next stage.

This could help offset the big discussion in the sector about what changes are required to the existing system and what is the appropriate level of regulator control. **WNZ**

Water sustainability inspires career choice

Six years spent growing up in Sri Lanka helped Michael Kalpage decide to pursue a career in sustainability and water.

As part of that decision, Michael has spent this summer working as an intern for Water New Zealand.

"Water is perhaps the most important resource and is absolutely essential for life and yet it is mostly taken for granted," he says.

"In Sri Lanka, the sharp contrast in the level of development in different parts of the country showed the impact vital resources such as water have on people's lives.

"I'm very interested in sustainable resource management and innovation. It's important, specifically for my generation, that we have sustainability as an intrinsic value embedded in all of our endeavours. As a student, I'm interested in both the water industry and the bio-fuels industry, as they are both of strategic value and closely tied into sustainability, innovation and management."

Michael is a third year student at Auckland University studying a conjoint degree made up of a BE(Hons), specialising in Chemical and Materials Engineering, and a BSc, double majoring in Psychology and Statistics.

He says adding psychology to what is clearly an ambitious study programme is aimed at helping him balance the technical aspect of



Michael Kalpage.

engineering with the soft people-oriented skills needed in a modern working environment.

Michael says his work experience at Water New Zealand has provided an insightful overview of the water industry and the industrial, social, environmental and policy aspects of water as a resource.

"I've had the pleasure of working on a variety of projects from the National Performance Review to the On-Site Wastewater Management System booklet to the Wastewater Treatment Plant Inventory, to name a few.

"Work experience like this, along with the knowledge and skills gained through my degrees, should hopefully hold me in good stead for the future. It's been a thoroughly informative and enjoyable time."

Making pipe, delivering solutions

Manufacturer of spiral welded steel pipe, protective coatings and linings, fittings and jointing systems.

Why specify Steelpipe for your next pipeline?

- * The only New Zealand manufacturer of large spiral-welded steel pipe
- * Transparent traceability and repeatable quality are key to our process
- * Focused on tailored solutions, we offer much more than just the pipe
- * Steel has many advantages over other pipe materials

If you want to learn more about how we can protect your water pipeline assets contact us on:

Email: enquiries@steelpipe.co.nz

Call: +64 9 622 4580



www.steelpipe.co.nz

NPR results available for viewing

Results of the 2015/16 National Performance Review (NPR) are now available through the Water New Zealand website. By **Lesley Smith**, Water New Zealand Technical Coordinator.

The NPR is Water New Zealand's annual benchmarking exercise of our drinking water, wastewater and stormwater service delivery and provides a comprehensive picture of our 3 waters services. This year benchmark data is supplied for 50 participants, with jurisdictions covering more than 90 percent of the population.

At its core, the NPR aims to provide water service managers with benchmarks to assist them continuously improve their service delivery. It also gives external parties a transparent snapshot of the status of our 3 waters services, underscoring the significance of our sector.

In 2015/16 NPR participants collectively employed 2057 staff, were responsible for the safe delivery of 231,350 Olympic pools worth of drinking water, safe disposal of 183,315 Olympic pools worth of wastewater and maintaining more than 17,000 kilometres of stormwater network to prevent flooding of our homes and businesses. Participants collected \$1.6 billion in revenue to operate and maintain these services, supported by assets with a total worth of \$31 billion.

This year's report not only includes quantitative data, but also case studies that highlight examples of good practices happening behind the scenes. The case studies span the length of New Zealand and the breadth of operational activities, from inflow and infiltration assessments in the Far North, to climate adaptation programmes in Dunedin.

We also look at an innovative biosolids reuse project in New Plymouth, community led whole of catchment river improvements spurred by a wastewater treatment plant in Wairoa and practical realignment of Kapiti's finance and Waikato's engineering procedures to improve financial management and customer focus respectively.

The NPR groups' case studies and quantitative performance indicators are grouped into areas of key importance in the delivery of 3 waters assets; protection of public health and the environment, customer focus, resilience, reliability, economic sustainability and resource efficiency.

Summarised here are some of the key outcomes relating to topics covered in this month's journal on customer care and resilience. For a more comprehensive overview of results refer to the summary snapshot or full report available at: www.waternz.org.nz/NationalPerformanceReview.

Thanks to the participants in our review who contributed

time and expertise gathering and reviewing the reported data. This is no small task and we appreciate your efforts. Also thanks to our industry led advisory group. This group helps us align both the NPR process and performance indicators, helping the association ensure the process remains useful and targeted to industry needs.

Customer focus

Collection of customer focused data is increasing and the percentage of participants providing reliable or highly reliable response time data rose from 59 percent in 2014/15 to 85 percent in 2015/16. The percentage providing customer complaints data associated with different drinking water, wastewater and stormwater faults rose from 72 percent to 76 percent in the same period.

The increase in data collection reflects a growing movement amongst the industry to focus on the needs of the customer. Data collection has no doubt been buoyed by the requirements of the Department of Internal Affairs' Non-Financial Performance Measure Rules, which introduced a mandatory reporting requirement for these indicators in councils' 2015/16 annual reports. The rules highlight that central Government is also interested in making sure customers have information to evaluate their system performance.

The highest proportion of income spent on 3 waters services occurs amongst regions with the lowest incomes

The three regions with the highest proportion of household incomes spent on 3 waters services are amongst the four regions with the lowest average household income in the NPR. In these locations the collective bill for water, wastewater and stormwater services was greater than three percent of the average household income. An additional four participants also had 3 waters charges exceeding three percent, including the participant with the lowest average household income.

This finding reinforces calls from Water New Zealand and agencies such as Local Government New Zealand to reinstate subsidies for water and wastewater schemes, as well as review funding mechanisms for local infrastructure. Ratepayers in our smaller, poorer, communities should not be expected to shoulder the costs of infrastructure attributable to visitors.

Resilience

Flooding standards are generally consistent across the country, but are not supported by consistent guidance

Eighteen of the 36 respondents who provided data on stormwater systems design their primary stormwater networks (typically the piped network) to have an annual exceedance probability of one percent and a further 13 of the 36 design for an exceedance probability of two percent.

For secondary networks (typically overland flow paths) 19 of the 36 who responded designed for exceedance probabilities of 10 percent and 13 for 20 percent.

While it is pleasing to know that wherever you live, your local authority is designing stormwater systems that afford similar levels of flood protection, it is less reassuring that the modelling techniques underlying these designs can vary enormously.

For a number of years Water New Zealand's rivers and stormwater special interest groups have been calling for the development of national rainfall and runoff guidelines.

For nationally consistent guidance we need national coordination. Until central Government supports this initiative, regional inconsistencies in flood management will contribute to unnecessary flooding and duplication of effort.

'Climate change' is generally considered in the management of 3 waters assets, but approaches vary significantly

Thirty-six (of 50 respondents) provided an account of how climate change considerations had been factored into their businesses. Climate change impacts that were addressed included: stormwater design to accommodate the increased intensity rainfall events, rising aquifer salinity from sea level rise, inflow and infiltration impacts from rising ground water and rainfall changes, declines in water yields and asset inundation from rising sea levels and/or increased flooding.

The approaches and changes accounted for differed for each NPR participant. The only standardised guidance referred to was the Climate Change Effects & Impacts in New Zealand – A Guidance Manual for Local Government in NZ published in May 2004.

This suggests there are benefits to be gained from the development of contemporary resources for adapting water assets to climate change.

To contribute to national efforts to provide science to underpin these, Water New Zealand is participating in the representative user group of the Deep South National Science Challenge. The challenge's mission is to enable us to adapt, manage risk, and thrive in a changing climate. [WNZ](#)



Delivering Pumping Solutions® Since 1908



Layne Bowler Vertical Turbine Pumps

- ✦ Flows to 1,500 L/Sec
- ✦ Heads to 300 m
- ✦ Horsepower to 1000 KW
- ✦ Temperatures to 150° C
- ✦ Bowls Dia up to 32 inch

Design Advantages

- ✦ Fabricated discharge head
- ✦ Flanged bowl construction
- ✦ 416SS shafting
- ✦ In-line suction & discharge simplifies installation
- ✦ Alloy construction for corrosive / abrasive services
- ✦ Optional suction in can for flexibility

Applications

- ✓ Water Supply
- ✓ Boiler Feed
- ✓ Irrigation
- ✓ Condensate
- ✓ Geothermal
- ✓ Chemical Transfer
- ✓ Product Unloading, Refinery Blending
- ✓ Injection Secondary Recovery

Auckland : (09) 525 8282, Christchurch : (03) 365 0279, Hamilton : (07) 847 5280, Wellington : (04) 570 1500, Dunedin : (03) 456 2562

Managing Real water losses



The recent National Performance Review (NPR) by Water New Zealand shows that managing water loss continues to be a significant issue for a number of water suppliers. By **Richard Taylor**, from Thomas Consultants.

The NPR covered 49 water suppliers providing water to 90 percent of the population. Across these 49 water suppliers, median water loss was 241.5 litres of water per service connection, every day. Collectively this amounted to over 100,000 ML of water lost in 2015/16, or enough water to fill over 40,000 Olympic size swimming pools.

Water loss is not always economically inefficient. In areas where water is plentiful, tolerating some level of water loss will make sense.

However there are many who have room for improvement. Twenty percent of authorities participating in the NPR have yet to undertake an assessment of their water loss efficiency. Of those who have determined their infrastructure leakage index (an internationally

recognised water loss benchmark allowing comparison between different systems) six of the 26 have high or very high leakage rates. For those water suppliers wanting to calculate, report and manage real water losses Water New Zealand's technical resources library (www.waternz.org.nz) includes two very useful documents. The main features of these two documents are summarised below.

Benchmarking of Water Losses in New Zealand Manual (and Benchloss Software) was initially developed in 2002 as a Water New Zealand project by the Water Services Managers Group and updated in 2008.

The manual and software are used to calculate and report on real water losses from water supply networks using the International Water Association methodology and recommended performance indicators.

IWA WATER BALANCE DIAGRAM

| Own Sources | | Water Exported | | | Billed Water Exported to other Systems | Revenue Water |
|----------------|--------------------------------------|----------------|------------------------|---------------------------------|--|-------------------|
| | | | | Bill Authorised Consumption | Billed Metered Consumption by Registered Customers | |
| Water Imported | System Input (allow for bulk meters) | Water Supplied | Authorised Consumption | | Billed Unmetered Consumption by Registered Customers | |
| | | | | Unbilled Authorised Consumption | Metered | |
| | | | Water Losses | Apparent Losses | Unmetered | Non-Revenue Water |
| | | | | Real Losses | Unauthorised Consumption | |
| | | | | | Customer Metering Under-registration | |
| | | | | | <ul style="list-style-type: none"> Leakage on Mains Leakage and Overflows at Service Reservoirs Leakage on Service Connections up to the street/property boundary | |

The objectives of the software and the manual are to:

- Introduce standard terminology for components of the annual water balance calculation;
- encourage water suppliers to calculate components of Non-Revenue Water, Apparent Losses and Real Losses using the standard annual water balance; and
- promote Performance Indicators suitable for national and international benchmarking of performance in managing water losses from public water supply transmission and distribution systems.

The recommended performance indicators for real water losses from a water supply network are:

- Litres/connection/day for urban areas – defined as having a connection density greater than 20 connections/kilometre water main;
- m³/km main/day for rural areas;
- Infrastructure Leakage Index (or ILI). This is a non-dimensional ratio between the volume of ‘Current Annual Real Losses’ (or CARL) divided by a calculated volume of ‘Unavoidable Annual Real Losses’ (or UARL) for the system. The latter uses a quantitative formula based on number of service connections, length of water mains, and average system pressure.

In 2013 the Department of Internal Affairs (DIA) introduced non-financial performance measures. Performance Measure 2 (maintenance of the water supply network) is calculated as real losses, expressed as a percentage of total annual system input. The use of percentages for reporting real water losses is not recommended by the IWA as it is considered misleading.



This is because it relates to the level of real losses to consumption, which can vary depending on water use by customers (including councils).

For example, if water consumption is relatively low due to successful water efficiency and conservation measures, the percentage of real losses may appear high when in fact this is not the case. Despite submissions to the DIA at the time highlighting the above, the measure was adopted as it considered percentages to be more readily understood by the general public compared with technical measures.

The NZ Water Loss Guidelines, published in 2010, are aimed at providing all water suppliers with the means to first assess their water losses (ie, a recap of the water balance and performance indicators), then develop an effective water loss strategy for any distribution system, large or small. They provide a basis for planning the ‘next steps’ in managing water losses, starting from any level.

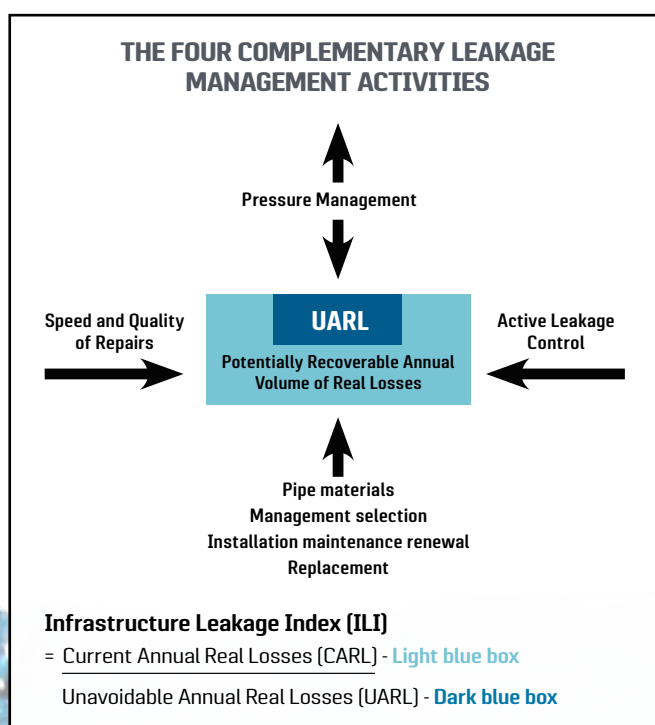
The recommended approach to water loss management, as outlined in Section 7 of the Guidelines is as follows:

- First, estimate the level of losses in a network using the calculation methods available (water balance and/or minimum night flow measurements).
- Second, having established the level of water losses occurring, it is recommended that leakage targets be set for the system based on guidelines given in the document, and that budgets for installing monitoring equipment and active leakage control are prepared for approval.
- Third, that the remaining actions outlined in Section 7 of the Guidelines need to be implemented at an appropriate scale in order for set targets to be achieved within an agreed time frame to reduce and then to maintain water losses at an acceptable level. A description of what is considered to be a basic and an advanced level of implementation of the various actions is included in Table 7.1 in the Guidelines. It is noted that this requires ongoing commitment and dedication, and not only of water supply operational staff. It also requires adequate budgets for key ongoing activities.

In summary, there is a need for many Councils to address water loss management. The Benchmarking Manual and software provide the basis for defining, calculating and reporting real water losses.

The Guidelines are intended to be a toolbox for those wanting to make progress. Several additional resources are also available via the Water New Zealand website.

Increasingly water suppliers are faced with inadequate treated water supplies, and leakage assessment and reduction must be considered as the first step in providing for future demand. [WNZ](#)



Chlorine Champion

It's not often cited as the saviour of the world, but to Craig Freeman chlorine is a greater gift to humanity than sliced bread. **Hugh de Lacy** explains.

Chlorine, that greenish poisonous gas that slaughtered thousands in World War One and in more than a few regional conflicts since, has saved more lives than any other industrial/medical breakthrough, Craig Freeman of Filtec Technology – better known as Filtec – is eager to point out.

Found in nature only in compound form, most notably with sodium to form common salt, chlorine's oxidising properties allow it to combine directly with most chemical elements, including the hydrogen and oxygen that make up water.

Chlorine combines readily with water to produce a disinfectant effect that has made it the global mainstay in the treatment of water supplies to make them safe and potable.

Freeman, one of the founders and a shareholder of Auckland-based Filtec, likes to point out that when chlorine was temporarily removed from some South American water supplies in 1991 because of its undeniable toxicity as a free element, 12,000 people died from waterborne diseases as a result.

"Chlorine is credited with saving more lives than any other chemical, medicine or industrial process," Freeman says, and it's the key element in the Filtec water and wastewater treatment processes that the company designs and installs in water supplies around the country.

It's the simple but reliable key to safe water supplies worldwide, he adds.

Freeman started out in the water business with MacEwans Machinery at Kaiwharawara, Wellington, completing a fitting and turning apprenticeship with that company in 1980.

McEwans had previously been owned by Fletcher Building which sold it to New Zealand Steel and Tube which in turn bought out JJ Niven's nationwide water treatment business in 1983.

When Steel and Tube subsequently set about selling off all its subsidiaries not directly related to its core steel business, the water treatment branch was bought by Graeme Thacker and one of his aunts, with

Freeman a shareholder.

They named the new company Filtration Technology.

Thacker and Freeman later bought out the aunt, and Thacker served as founder and senior advisor until retiring in 2013.

About a year later the company began trading as Filtec.

In the meantime Matt Ewen, a Filtec project engineer who had been with the company since 2004, and shown drive and business competency beyond his years, had bought into the business.

Later he and a colleague, David Rouse, bought Thacker's share between them, and 18 months later Ewen bought out Rouse, leaving himself and Craig Freeman as joint owners, with Matt Ewen the majority shareholder.

In the face of the mounting public concern over the state of the country's vast natural water supplies, and with Ewen driving the expansion, Filtec has been in a sharp growth curve for the past half-decade.

During 2014-2015 it built itself new premises on Carbine Road in Mount Wellington, Auckland, including a stainless steel fabrication shop, a separate mild steel fabrication shop and a further separate PVC manufacturing and assembly plant.

Staff numbers have risen to around 50 and turnover to about \$20 million a year, and the company has a full and growing list of projects – 10 to 20 on the go at any one time – here and around the Pacific.

Filtec has designed, built and supplied filtering systems to the Philippines, Australia, Fiji, Tonga and Papua New Guinea, while it has eight service sites, each with its own manager, around the country, and full-time offices in Wellington and Dunedin as well as the Auckland headquarters.

There is also a part-time office in Melbourne.

The managers include fully qualified engineers from a regular United Nations of homelands, reinforced by Kiwis often recently returned from the ritual Overseas Experience.



"Chlorine is credited with saving more lives than any other chemical, medicine or industrial process," Freeman says, and it's the key element in the Filtec water and wastewater treatment processes that the company designs and installs in water supplies around the country."

Craig Freeman

Craig says that, besides the miracle effects of combining chlorine with water, the biggest driver of the business is health and safety, with a fulltime H&S specialist on the staff, and site audits being a key element of Filtec services.

The core business of the company is building water and wastewater treatment plants, with activities broadly divided into equipment supply, design-and-build, and project management.

Among Filtec's major clients is the cooperative dairy giant Fonterra, for which it has completed a number of projects including the \$4 million Lichfield treatment plant in the Waikato.

It's currently starting on another Fonterra project, this one in Victoria where it recently completed an installation for another company.

At the other end of the scale Filtec has built portable systems in containers for the likes of the Tokomaru community in the Manawatu, which had been battling with unsafe supplies for years.

Filtec supplied the successful Tokomaru system for around \$150,000.

Freeman rates people as the company's biggest asset. "We've consciously tried to bring young people through to be trained by our older and most experienced engineers."

This is partly motivated by the recognition of our country as a small market in which survival is dependent on a reputation for service.

"Make mistakes in our little market, and word gets around really quickly."

The same awareness of the client's needs governs the outreach to the Pacific and Australia.

Within the wider industry, Filtec is actively involved with both Water New Zealand and the Water Industries Operations Association of Australia (WIOG), on which staff member Greg Gordon has served as a committee member.

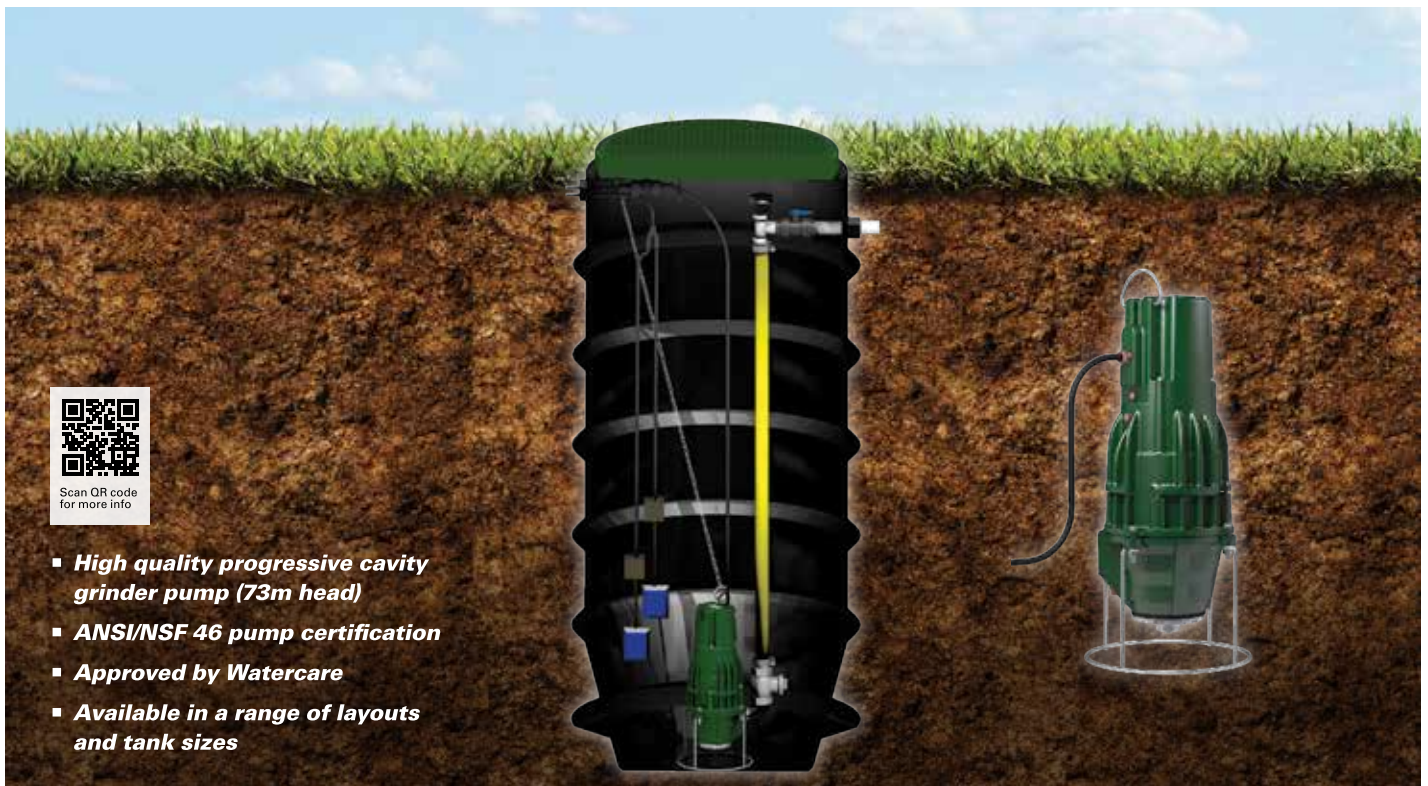
The company's founder, Graeme Thacker, was a staunch supporter of Water New Zealand, and is one of only four people to have been awarded its service medal for volunteer work.


The company continues its close association with the association, with Ewen chairing its young water professionals group, and Freeman involved with the Ministry of Health in developing national drinking water standards.

It's this latter association that has heightened Freeman's appreciation of the nasty green gas that makes otherwise contaminated water safe to drink, and he shakes his head at the continued ignorance and fear that it brings out in sceptics.

"The challenge for the industry is to educate the public on the value of safe clean water delivered to the tap," Freeman says.

"Only then will our industry be fairly recognised and rewarded." **WNZ**





Scan QR code for more info

- **High quality progressive cavity grinder pump (73m head)**
- **ANSI/NSF 46 pump certification**
- **Approved by Watercare**
- **Available in a range of layouts and tank sizes**

AQUATE PRESSURE SEWER SYSTEM
BRANCHES NATIONWIDE

0800 93 7473
hynds.co.nz

HYNDS



TAPS OFF

HELP US WAVE GOODBYE TO WATER POVERTY BY GOING A DAY WITHOUT TURNING ON YOUR TAPS.

22 MARCH is Taps Off Day where we're asking all New Zealanders to see if we can go an entire day without turning on our taps – at home or at work. We're lucky to have access to clean safe water, many of our neighbours in the Pacific aren't so lucky. So help those who don't have a tap by turning yours off for 24 hours.

To get prepared, just fill up buckets, bottles and containers the day before and then leap online to make a pledge: www.tapsoff.org.nz



OXFAM
New Zealand

Community minded career

Graeme Leggat can boast of a stellar career in the water industry, complemented by years of work for his local community. **By Mary Searle Bell.**

Born in Invercargill in 1935, and raised in Nelson, Graeme's interest in maths and the sciences led him to study civil engineering. His degree was funded through a bursary from the Ministry of Works, which then tied him to the organisation for six years following graduation.

His first job at the Ministry was in its housing division, where he worked on the development of a housing estate in Porirua. He then worked in its Power Design office on the design and construction of the Hayward Scheme converter station.

His bond to the MOW complete, he joined Beca Carter Hollings and Ferner, but shortly thereafter decided he would like to travel and work in the United States. Obtaining the necessary visa to do so took 18 months. During that time he worked as an engineer for the Wellington City Council. In 1968 his visa came through, so he and his wife, Rosalie, headed to Boston with their two small children.

He spent two years in Boston with Metcalf & Eddy Consulting Engineers as a project manager working on solid waste projects. This was followed by a further two years with the firm's branch in Palo Alto, California, where he was project manager for a water treatment plant for Panama City, which was "quite a contrast", he says.

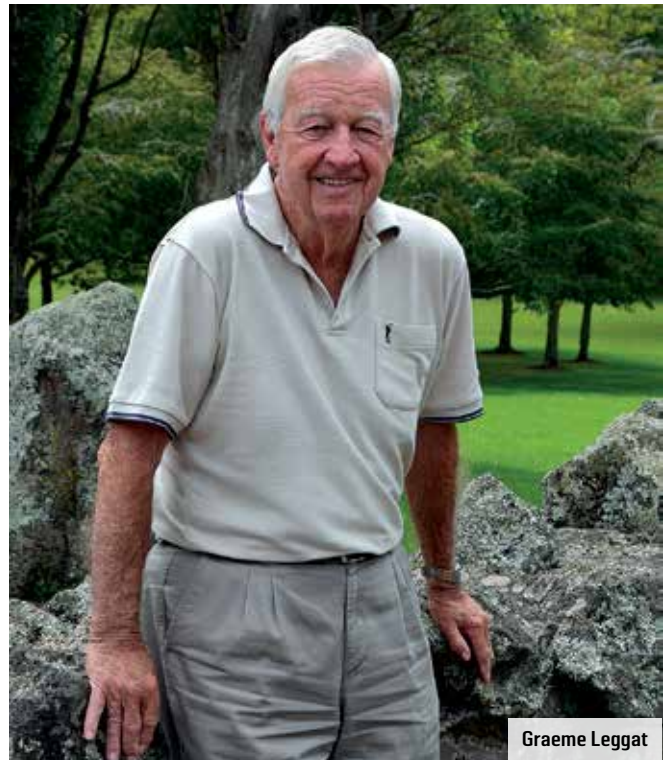
At Christmas in 1971, the family, now complete with three children, decided to return to New Zealand. Before he left the US, Graeme wrote to Steven Fitzmaurice & Partners in Auckland and secured a position as an associate. After six years, he was made a partner.

Steven Fitzmaurice & Partners was one of the pioneering firms when it came to water and sewage, and Graeme worked on projects throughout the country. His first was a pipeline in Te Kuiti.

"After the US, this brought me down to size quite quickly," he recalls.

Other memorable projects include the Mt Maunganui Outfall, which cracked on installation.

"We had to work out how to seal many hundreds of joints in the pipe underwater, some 1000 metres out to sea," he told *Water New Zealand*. "We were lucky to have such a lateral thinking chemist on our team, Frank Lowe, who developed a method of pumping in a mixture of chemicals that acted



Graeme Leggat

together to seal the pipe. It took some time, but it gradually sealed itself."

In 1989, the company merged with, what is now, Beca, and Graeme found himself working on a water supply project for Kabul, Afghanistan.

"It was after the war with the Russians, before the local factions started fighting each other again," he says. "It was relatively peaceful – the mujahedeen fired about 10 rockets a day randomly into the city."

"I was there for about five weeks in 1991, working for the UN. We completed the design but just as money was to be assigned for the project they started fighting again."

"If they ever stop, they have a water supply ready to be built."

Graeme stayed with Beca until his retirement in 1995. However, he continued to work as a consultant for the firm

for a further three years until he finally put his professional career aside.

He had joined the Howick-Pakuranga Cricket Club in Auckland on his return from the US and has remained a passionate member. He served for many years, first, establishing the junior club, then on the senior committee. When the club wanted an indoor wicket, Graeme designed and supervised its building, the same too when new clubrooms were needed following a fire.

For his efforts, he was awarded life membership of the club, and has served as its patron since 2009.

Graeme also served on the Whitford Residents & Ratepayers Association for several years, primarily battling Manukau City Council to ensure proper operation and conditions for the Whitford Landfill. Once he retired from professional life, he was elected to the Clevedon Community Board, serving six years – three of them as chair. He was also chair of the Whitford Community Trust, among others, for many years.

In 2001, Graeme was appointed as a resource consents hearings commissioner for Manukau City Council and continued in that role (and for the Auckland Council) until 2011.

In 2002, when the Manukau council wanted to build a community and sports centre at Maraetai, Graeme was appointed chair of the Te Puru Trust to steer the completion

of the \$4.5 million project, which opened in 2005. He continued to serve on the trust until 2010.

His commitment to serving extended to his professional career too – he is both a fellow of IPENZ and a life member of Water New Zealand.

He joined, what was then, the Water Supply and Disposal Association on his return from the US in the 1970s.

“Someone asked John Fitzmaurice to be on the committee but he declined as he didn’t have the time, so I put my hand up,” says Graeme.

That was 1978, and Graeme went on to serve on the committee for 10 years, spending five or six years as treasurer.

“My wife was reading her diary the other day, the entry said, ‘Graeme and I doing the accounts for the Association. Finished at 11pm.’ It was midnight the next night,” he says with a chuckle.

For his service to the water industry, he has been honoured by the American Water Pollution Control Federation and is a recipient of the Arthur Sidney Bedell Award.

However, his most notable accolade came in 2012, when he received a Queen’s Service Medal for services to the community.

“I was pleasantly surprised,” he said at the time. “I was pleased and flattered the things I had done had been recognised.” **WNZ**

INZDEP

LEVEL 6

TAKE
YOUR CAREER
TO THE NEXT LEVEL

NEW ZEALAND DIPLOMA IN ENGINEERING PRACTICE

RECOGNITION OF PRACTICAL, WORK-BASED SKILLS
FOR WATER PROFESSIONALS

FOR MORE INFORMATION

0800 486 626

askus@connexis.org.nz

www.connexis.org.nz

CONNEXIS

qualify for success



WELLINGTON

The resilience question

Kaikoura's big shake has injected more urgency into a programme to ensure Wellington becomes more water resilient in the event of a major quake.

By **Debra Harrington**, Water New Zealand Communications Advisor.

The November shockwaves that shook the Wellington region's buildings – closing and condemning many in the central city – also rattled the capital's minds and helped focus the region on what could happen in the event of the big one striking.

Mark Kinvig, Group Manager, Network Strategy and Planning at Wellington Water, says there's now a renewed focus on what the region needs to do to increase infrastructure resilience.

In a worst-case scenario some parts of the Wellington region could be without water for up to 100 days but over the next six months, Wellington Water, the Regional and City Councils will focus on how to encourage everyone in the region to store at least seven days of water. Wellington Water is also planning how to deal with wastewater in the event of a major disruption of Wellington's wastewater infrastructure.

"We have been working closely with our client councils for the past 18 months on water supply and wastewater resilience planning," says Kinvig.

"Then, after the November 2016 earthquake hit we are now working with local and central government to ensure that we understand what the priorities are in the short, medium and long term."

As well as ensuring that all Wellington residents have their own water stored to last at least seven days, a major part of Wellington Water's planning is addressing what will be needed after that first week following a major quake.

"It's also about what's going to happen during the time after the immediate aftermath but before broken infrastructure such as drinking water and wastewater networks are able to be restored. We have to understand what the alternative network options are and ensure we have planned for those other options."

The immediate programme, Kinvig says, effectively comes down to three distinct objectives.

"First, all residents need to be self-reliant for water for seven days because it's likely most of them will be without water in the network for a significantly longer period than that.

"Second, is how residents manage their sanitation needs after the wastewater pipes are seriously damaged and the city's wastewater system is no longer operating properly.

"Third, there's the operational response planning. In other words, making sure we understand what we need to do now to ensure that we are able to respond to the needs of the community after the initial seven days in terms of water supply and sanitation."

As part of the long term resilience planning for water supply, Wellington Water has also identified the significant projects that will be considered in councils' long term plans for the 2018/28 long term plan.

A major summit in December run by Wellington's new Mayor, Justin Lester made it clear that resilience has become a priority for the council. He pointed out that the earthquakes have reminded us that "we need to be moving faster".

Lester says there is a list of resilience upgrades urgently needed right across the city. These include strategic transport links such as the multimillion-dollar Transmission Gully roading link between Wellington and the Kapiti Coast.

Wellington's unique location at the bottom of the North Island surrounded by hills and sea and crossing a number of major fault lines means that the city's three main water supply treatment plants at Te Marua, Wainuiomata and Waterloo are remote from Wellington City and the western and southern suburbs. Key pipelines either cross major fault lines or run very close to them. Both Porirua and Wellington city residents are particularly vulnerable as all the water supply comes from pipes that have to cross the region's fault lines over a significant distance.

"Overall, we've got 400,000 people supplied via 2500 kilometres of pipe with the majority being a significant distance away from a water source," says Kinvig.



Long term projects underway to secure water supply for residents include a new 35 million-litre buried concrete reservoir above Prince of Wales Park in Mt Cook. This will provide an emergency water supply for major users and significantly increase water storage for the central business district in Wellington City. When finished, it will be buried under the ground and the surrounding area landscaped.

There is also a plan to build a cross harbour pipeline running between Lower Hutt and Wellington City. It could supply up to 33 million litres per day, about half the water normally supplied to Wellington City, as well as provide a supplementary or alternative supply to some parts of Wellington during normal operation or during maintenance of existing pipelines.

But there's a need to ensure Wellingtonians are prepared and able to be self-reliant, particularly in the short term.

Following the November quakes, there was a huge run on emergency 200 litre water tanks supplied by the councils – people had clearly woken up to the need for water storage.

Research has shown that up to 80 percent of Wellington residents claim to have stored emergency water.

“But we don't know that they've got enough for seven days. The message has to be that a couple of water bottles in the pantry won't go nearly far enough,” says Kinvig.

“We will be encouraging residents to store at least 20 litres per person per day.”

That's going to mean a major public engagement campaign in 2017.

One of the challenges facing the campaign is that storing a week's supply of water is far easier for some households than it is for others.

“What about apartment dwellers? How do they store water?”

Not only that, Kinvig points out that there could be up to 100,000 displaced people across the region in the event of a major quake, once, water pipes are broken and roads and rail links in and out of the city are damaged.

“This is 100,000 people who could literally be unable to get home or go back to their workplaces. What happens to them?”

The resilience work is finalising those answers but is focused on a multi-pronged approach between the immediate aftermath and the councils' ongoing 30 to 50 year pipe renewal



Konini Reservoir – Wainuiomata.

programmes, which include replacing at-risk pipes with new flexible earthquake-resilient pipes.

“You can't just focus on one part of the plan otherwise the whole system falls over after seven days or you wait 30 to 50 years before you're sufficiently resilient.

“Councils have done a lot of work in the past and are investing in resilience every year – renewing pipes, making reservoirs and pump stations stronger and installing emergency tanks.

“But we can't afford to wait 30 to 50 years to be sufficiently resilient – we need to encourage people to look after their own needs for the first week and have an operational plan in place to support the community beyond the first week.”

The short to medium term solutions will likely include suburban storage – this could take the form of giant water bladders that can be placed in car parks and sports grounds across the city. Some of these giant bladders can store up to one million litres of water. There is also discussion around containerised desalination plants, overland flexible piping and mobile water tankers.

Kinvig says, in the end, this is about risk reduction over the long term and closing the gaps through response programmes that are well integrated across the region. **WNZ**

Training on site under the LTO concept

Don McLeod, Chief Executive of Matamata Piako District Council, discusses internal plant systems and training reviews under the concept of 'Licence to Operate'

Over the past 10 years we have invested heavily in upgrading and automating our water treatment plants to the degree that we now have plants that are capable of complying with the requirements of the Drinking Water Standards NZ (DWSNZ).

We also have a passionate and committed team who run our water treatment plants and yet despite this we have still had occasional incidents of non-compliance. This was unacceptable for us as an organisation and as a result we initiated a number of internal system and organisational risk reviews in early 2016.

One of the reviews covered site specific operator training and competency assessment. This identified a number of issues that potentially contributed to non-compliance events:

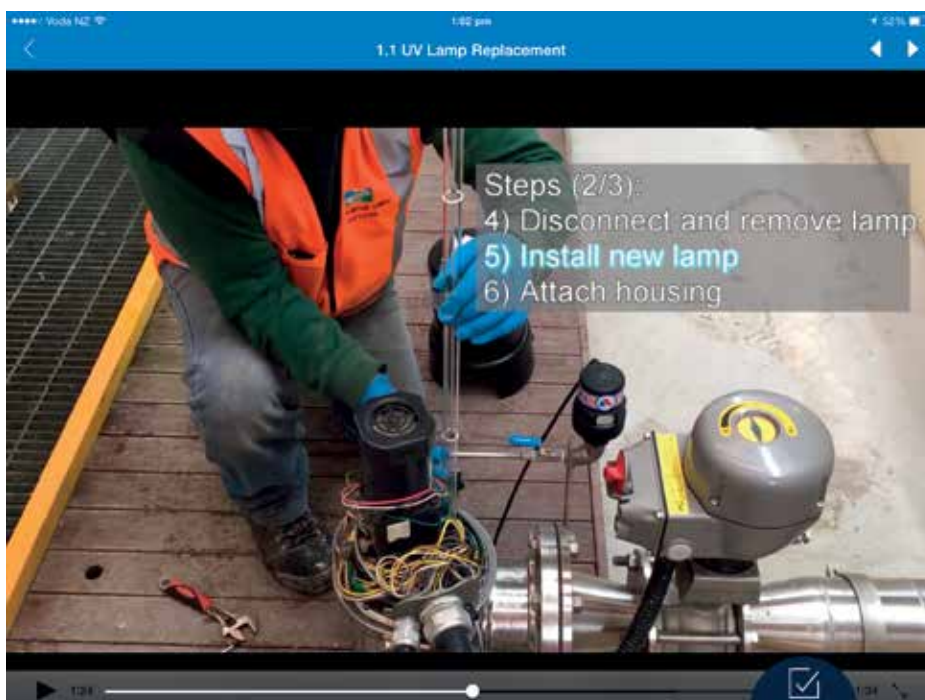
- Poor records of formal and informal operator training for specific plants;
- Incomplete, missing or out of date operating manuals;
- No clear plan to train and on-board new staff;
- No records of staff competency with respect to operating specific plants;
- Inconsistent practice between operators;
- Lack of skills resilience in the event of resignation or illness.

It was clear to us that we needed to create a new operator training and assessment process which would address these issues. We want to be able to demonstrate that our operators have the knowledge and skills required to operate and maintain our water treatment plants. We also knew from

experience that producing wordy operating and training manuals was not necessarily the most effective way to transfer knowledge to our operations teams.

A contract consultant, Shaun Hodson, introduced me to the concept of Licence to Operate (LTO). This was a scheme used in the UK that was based on providing site specific training and assessment for operations staff. This seemed to be exactly what we needed but we faced the challenge of making it relevant to this country and indeed of developing training material, assessment procedures and a modern delivery system.

Jason Colton and his team from H2ope were engaged in July 2016 to scope out and develop an LTO scheme





for our Matamata WTP as a proof of concept. The needs and wants of both the operations and management teams were identified in a series of workshops facilitated by Jason and these were used to develop the LTO framework.

One of the key requirements was to develop a system that the operators had easy access to via smartphones, tablets and PCs and thus a web-based system was selected. The training material is largely video based with a focus on short clips of 'how to do this task' and 'how to respond to this event'. Operations and plant controls (SCADA) are covered and where possible the operators themselves are the ones 'starring' in the videos.

The LTO scheme has four levels and a site specific health and safety prequalification course. The first LTO level qualifies a staff member to assist with plant operation under supervision. The second level qualifies a staff member to operate the plant for short periods without supervision (eg, callout cover).

The third level is a plant expert, someone who understands all operations and key maintenance activities and is able to optimise the process; finally the fourth level is someone who is qualified to assess the performance of others on the plant. To qualify for each level a staff member has to complete all the training material, pass some online tests and demonstrate competencies to an assessor.

My management team can track all the training metrics and as an organisation we now have a complete auditable training record for our operations staff and this will include a record of annual refresher training.

One of the key benefits I saw in this style of training is that it trains all our operators to the same level and supplants the old style of on-boarding new operators whereby they were buddied up with an old hand and "shown the ropes".

In my opinion this style of training is no longer acceptable. I strongly believe that training is a skill and that our new system will both accelerate and normalise the on-boarding process for new staff. Furthermore I think it will make the process more enjoyable which can only be a good thing.

I have been particularly pleased with the way in which our operators have become invested with the scheme and with their enthusiasm in helping to develop the material. They were also heavily involved in testing the Matamata WTP proof of concept along with my management team.

The net result is that we have a state-of-the-art training and competency assessment system which the whole organisation has contributed to. We have since given h2ope the green light to roll-out the system to all our larger water treatment plants and are now considering the same for our wastewater plants.

My management team are currently planning how the LTO scheme will be implemented across our operations teams.

This is a significant challenge for our organisation since we are making such fundamental changes to ingrained behaviours. In fact the challenge is greater still since we would like to share the system with adjoining councils. To that end we sought to involve our neighbours right from the

concept stage as ultimately we all have a lot to gain from cross boundary and cross team collaboration.

If these councils choose to follow our lead then we will all have a system that will better allow our teams to share services and therefore increase the resilience of all our organisations.

Finally, I believe that this has been an essential step for us as an organisation to be able to achieve the standard of service which we want to consistently provide for our communities. The events at Havelock North have given us a stark reminder of how very important that is. **WNZ**



C&S BRAND
AUSTRALIAN FILTER COAL &
C&S BRAND GRANULAR & POWDERED
ACTIVATED CARBONS INCLUDING
OUR INNOVATIVE COAL/WOOD
BLENDED P. A.C.
 Phone or fax for sound technical
 advice from experienced personnel

JAMES CUMMING & SONS PTY LTD
 319 Parramatta Road, AUBURN,
 NSW 2144, AUSTRALIA
 Phone (612) 9748 2309. Fax (612) 9648 4887



Building quake-resilient underground utilities

By Water New Zealand Chief Executive **John Pfahlert** and Opus Water Sector Leader – Asset Management, **Philip McFarlane**.

The Canterbury and more recent Kaikoura earthquakes have shown just how important it is to provide resilient utilities across the country.

The quakes in Canterbury caused extensive damage to 300 kilometres of sewer pipes and 124 kilometres of water mains. The cost to rebuild all horizontal infrastructure was estimated, in mid-2013, at just over \$3.3 billion. This included roads, three waters and the Land Drainage Recovery Programme (LDRP). The LDRP alone was estimated to cover over \$1 billion in a multi-decade programme.

A new report says that investing in improving infrastructure resilience not only demonstrates a legacy of leadership, but also provides economic growth and job creation along with more liveable communities.

The report sets out to understand why some utilities were significantly damaged in the Canterbury quakes while others remained unscathed.

Underground Utilities – Seismic Assessment and Design Guidelines, produced by Opus International in association with GNS Science and funded by the Ministry of Business Innovation and Employment, points out that the cost to benefit ratio of resilient infrastructure has been estimated by the United Nations to be up to 1:10.

In New Zealand, electricity company Orion spent an estimated \$6 million on seismic strengthening which saved \$30 to \$50 million in direct asset replacement costs following the Canterbury earthquakes. The balance would have been even more pronounced if societal benefits had also been taken into account.

The guidelines aim to help improve the ability of underground utility networks to function and operate following a major earthquake. Specifically, they set out to enable practitioners to:

- Assess the vulnerability of existing underground utilities to seismic events.
- Identify and prioritise measures to improve the resilience of existing networks.
- Design and install new utilities that have an acceptable level of resilience to earthquakes.

Local Government Act requirement

Since 2002 local authorities have been required to prepare and adopt a strategy that identifies the significant infrastructure issues facing them as well as the options and implications for managing those issues.

The aim of the legislation is for all local councils to



create 30-year strategies around water supply, sewage treatment and disposal of sewage, stormwater drainage and flood protection and controls.

Key lessons from Canterbury

Some of the findings from the Canterbury quakes and incorporated into the guidelines include:

- The earthquake motion and the way the ground responds has far more influence on damage than shaking and other forces resulting directly from earthquakes.
- Axial forces along pipes cause the majority of damage. Most of the damage occurs at pipe joints. Bending and other transverse loading tend to only to cause damage in brittle pipes.
- All utility materials sustained damage in the earthquakes but modern flexible pipe material generally suffered a lot less damage than older, more brittle pipe materials.
- Larger pipelines typically sustain less damage than smaller pipelines. Service pipe connections sustain the most damage. Even modern PE service pipes sustained significant damage in the earthquakes. This was attributed to failure at mechanical couplings where inserts had not been used.
- Gravity pipes located in areas where liquefaction or lateral spread occurred experienced significant differential ground deformation, causing their grade to be reduced and dips to occur. This affected all pipe materials.
- The performance of the ground influences the ability of the system to remain in service. Experience in Christchurch was that if the ground liquefied then the wastewater system blocked regardless of the amount of damage sustained. This is because of sand and silt entering through gully traps and manholes even where pipelines were undamaged.
- The time it takes to restore service is affected by both the amount of damage incurred and by the ground conditions. Ground conditions affect ground stability and liquefaction during aftershocks which hinders access for repair and inspection.
- The quantum of damage sustained to non-critical pipes often controlled the time it took to restore service. For example the lifting of the boil water notice on the potable water system was largely governed by the time it took to repair the multitude of small leaks that occurred on service connections rather than the condition of the larger pipelines that the services were connected to.
- Alternative means of providing service, such as the provision of portable toilets can be used but they take time to install and the public can only tolerate them for so long.
- Restoration of service involves several phases. It may take many years to fully restore service to the pre-earthquake condition. Priorities and needs change as restoration progresses through these phases.

Improving resilience of existing systems

The report says improving the resilience of existing systems can be achieved by reducing exposure to hazards, increasing the speed and effectiveness of response, increasing the flexibility of the system to adapt and improving the robustness of utilities.

It says that through a combination of response planning, renewals prioritisation and capital expenditure works, the resilience of existing systems can be improved significantly. In many cases this does not involve significant capital expenditure.

Providing new seismically resilient utilities

In order to provide an acceptable level of resilience, the report says utility companies and local authorities should focus on:

- Locating utilities to avoid areas of poor ground performance, to avoid consequential damage to other utilities and features and to improve the ease of repair.
- Providing redundancy in the system.
- Providing robust utilities.

The guidelines specify increasing levels of design sophistication based on the importance level of the utility. For instance, most utilities will not require any further specific design but utilities in the two most important categories will require the equivalent static design method and finite element modelling. [WNZ](#)

- Further information on this report will be available on the Water New Zealand website and in our fortnightly newsletter *Pipeline*.





**Eurofins is the global leader
in environmental testing**

| | |
|--------------------------------|---------------------|
| > Drinking Water | > Contaminated Land |
| > Water and Wastewater | > Soil and Foliage |
| > Streams, Rivers and Seawater | > Trade Waste |

**The Eurofins network of New Zealand and global
laboratories can also assist customers with:**

| |
|--|
| > Food Safety – Full chemistry and microbiological testing |
| > Regulatory & Third Party Food Safety Compliance Auditing |

Totally Independent – Truly Global
waterNZ@eurofins.com | www.eurofins.co.nz

Freephone: 0800 EUROFINS | 0800 576 5016
AUCKLAND | HAMILTON | WELLINGTON | CHRISTCHURCH

A focus on Customer care

Raveen Jaduran, chief executive of Watercare in Auckland, shared his observations on customer value at the 2016 Water New Zealand conference. This is a précis of his presentation. By **Alan Titchall**.

In terms of customer trust at Watercare we have four strategic priorities that we are working on that are driven by a vision – ‘to be trusted by communities for exceptional performance every day’.

It could be anyone’s vision, because it doesn’t talk about water. It doesn’t talk about Auckland. It doesn’t talk about price.

The most important theme for us, out of these four strategic priorities, is our ‘engagement’ with our customers. Monopolies need to be customer centric.

One of my directors put a question to me when I told him that we are going to be extremely ‘customer centric’. He said: “Why would we do that? Because our customers have no choice.”

My answer – that’s exactly why we are going to do it, because trust is being lost.

A recent survey done in New Zealand, that some of you may be aware of, asked the question: What is the one service you could do without for the whole day?

If you’ve got kids, you would say the answer would be wifi and the internet and you are right. But in my view, very few our customers could last a day without water. Yet, we are providing such a great water service they don’t know what it means to be without water for a whole day. We need to get our communities and our customers to understand the service we provide.

How much do you think our customers pay for one litre of tap water in Auckland?

I have asked this question of our customers and some say, “uh, a dollar”, some more. No one says that it’s less than one cent. Which it is.





Raveen Jaduran.

If you drink two litres from the tap every day in Auckland for 365 days, it will cost \$1. The point is – our customers don't know the price of what we supply, let alone the value of it.

Water in this country is effectively free. What we charge is for collecting it, treating it, storing it, and transporting it. We have never created transparency for customers as to why they pay for that water service. Yet most council services to most ratepayers are the best value services they receive. If you analyse all the services that ratepayers receive from councils and you tried to get that from the private sector, they would have to pay far more than what they're paying now. And I'm not saying private sector is not efficient, I'm just saying certain things have remained in council mandate for a purpose.

The average household in Auckland spends more on phones and mobile phones and wifi than they do on water and wastewater put together. Which of the two is more important?

So why would we be talking about reducing our prices? Because that's what happens everyone asks – what are you going to do to reduce your price?

Why are we talking about reducing prices? We should be talking about increasing services. If your customers know what you are doing, they will be willing to pay for it.

Identifying our customers?

A year ago we would have said we have two types of customers – mums and dads and industry – who pay us directly.

Now we say our customers are anyone who receives water from us, which includes tenants (over 45 percent of those resident in Auckland) who pay us indirectly.

If someone rings us with a problem with water pressure or a sewer overflow, we don't ask them "are you the bill payer?"

If you ring telecommunication companies the first thing they ask is "are you the person on the invoice"? If you're not, then they don't talk to you. Well we don't do that.

So, all water 'consumers' are our customers. Developers are also our customers as are surveyors, engineers and lawyers. Lawyers deal with Watercare when a property is being sold and they need a final meter reading. We have to treat that lawyer as if they are speaking for both the existing property customer and the new property customer.

So, we've changed the definition of who our customers are and then said – how do we interact with them? What are their paying points?

We've come from an environment where we tell people, rather than we ask people. And that is because we knew better, and we did.

But the world is changing, they Google, they find things about water and they get concerned and they don't trust. We need to engage them and educate them. We can't change them all, and we won't. But at least we are working towards that.

Staff relations

To have exceptional customer service, you need to have exceptional staff. And so we had to change the way we treat our staff as well.

Yet, out of all the utilities sectors, which pays least remuneration to its staff – water, and if you want to make money, you join the electricity or telecommunications sectors.



Yet which utility provides the best service? I would like to say it's water. And that is because the people who are attracted to the water industry tend to stay in the sector. Why? Because we know what our purpose is and we believe in it.

However, we used to believe that our staff were lucky to have a job with us, just as customers were lucky to get water from us. Consultants are lucky that we give them the jobs, contractors are lucky that we give them the jobs.

The reality is – 'we' are lucky that staff want to work for us, we are lucky consultants want to work for us, we are lucky contractors want to work for us.

There's a huge cultural change required with how we engage with each other. I'm not just talking about Watercare, I'm talking about the whole industry.

We need to collaborate more. We don't have to do the traditional Kiwi thing that we will reinvent everything from zero base. We don't have to stick to the concept that we are different [water providers].

There's much more in common than there is a difference, and we should grasp the bits that are common – we are a very small country and as a small country we can get more out of the investments – in time and money. We must stop trying to do everything ourselves in isolation.

A decade ago, a very large IT service provider won a contract at Manukau and then was given an award for winning this contract. I was speaking to the guy who turned up to get the award and he said, "New Zealand is a very lucrative market for IT businesses".

I asked why. He said: "Well if we supplied a system in the US, you know that one system would serve millions of people. Whereas, in New Zealand we would supply that same system to a small community serving just 50,000 people."

So, why can't we just have one system in this country? Why can't we just have one registration system for dogs? So, if the council customer moved from Wellington to Auckland the dog is still registered and has only moved location. Yet every council has got its own dog registration system.

Customer response

I'm proud to say that the number of complaints we receive has halved in recent years, and we respond within 10 days to all complaints, which is extremely difficult. When I say respond, I mean resolve. That's our target. It used to take us 11 or 12 days on average.

The reason complaints have halved is because we try to make sure customers don't need to call us twice. Our first-time resolution has gone up to 88 percent.

The other thing we did was to get rid of our call centre and we now have staff who answer the phones. Surveys with customers told us they want to speak to someone who is knowledgeable about the subject of their query.

They do not want someone who is doing a Q&A from the computer. They want to have a conversation.

So, we have got rid of our call centre and we have just put people back into the teams where they work with and understand and are specialists in those areas.

Contracting clients

We are spending a lot of money on our capital projects – \$400-\$500 million a year – over the next 10 years.

We surveyed our consultants and contractors and the number one thing that came back was, it is costing a lot of money bidding for work.

So, what we're doing is engaging with our suppliers and saying "how can we reduce the cost of bidding? How can we reduce the cost to you?"

In the past we have been an arrogant client, and that's not unique to Watercare. All large organisations at some point will say they are an arrogant client, because you get to a point where you believe you are the master and others are subservient.

Industry leadership.

You, as water professionals, as water leaders – it is your job to be the advocate for your customers for the sake of quality service.

If you are in a council it is your job to say "if someone gets sick drinking tap water, that's the worst thing that can happen on my watch".

If people got sick drinking water in Auckland, I will lose my job. If I don't lose my job, I will resign. I would not deserve to be leading a water company, the whole purpose of which is to make sure people get safe drinking water, if customers get sick!

Your job is to be the advocate for the customer because they are not the informed ones, you are.

My own councillors at Auckland, until the Havelock North incident, had never asked me what assurance they could have that we will never have an incident in Auckland.

Immediately after that incident that was their first question: "Can you give me assurances that it will not happen here?"

And I could. Hand on heart I gave them the assurance that will not happen. If I couldn't give them the assurance, why am I employed?

There's a responsibility and then if you're a member of an organisation or professional body, you have an ethical and a moral duty to stand up and say this is what needs to be done.

If it is about funding, then the squeaky wheel gets the money. And you have to create the squeaky wheel. You have to create the priority. That's our role. **WNZ**

Instrumentation for water quality

Field / Laboratory



Process



Bell
Technology

+64 9 525 1875 | info@belltechnology.co.nz | belltechnology.co.nz

pH • BRIX • Conductivity • Moisture • DO • NIR • Temperature • RH • Viscosity • Colour • Turbidity • Sensors

The water debate

A personal view

At the 2016 Water New Zealand conference Malcolm Alexander talked personally about 'scary issues' facing the water sector in this country. By **Alan Titchall**.



Malcolm Alexander.

Before launching into his presentation Malcolm Alexander made it clear that he was talking personally and not as the chief of the Local Government association.

However, he did add that some of the ideas he was to talk about were to be presented to the association's National Council at the end of last year as part of its future strategy.

"I will do my best to give you my take on the position, but whether to say that is also the view of the National Council – that remains to be seen," he said.

The future issues this country faces in the water sector are significant and to some – quite scary, he said, defining these into politics, funding, quality, and service, but also cautioning that there was no crisis and "no need to panic".

"Provided we all have a common understanding about what those issues are, how they might be addressed, I firmly believe they can really be solved."

One of the key questions to be answered concerns whether our 3 waters – fresh water, the management of wastewater and stormwater – are 'fit for purpose'.

"That makes it, not simply an engineering, an economics, or an environment question, but at its heart, also a political question. This is because communities and their elective representatives, whether they be local or central, are going to make the decisions that matter and which will frame the regime going forward."

"I subscribe to the view, and I think just about everyone does, that no one owns the water. It's about who gets to use it. But, if anyone does own the water, then it's the Crown on behalf of the people of New Zealand."

That process is political and why the water debate is difficult, he added.

And politically, water responsibility looks "untidy".

"For example, water quality sits with the Ministry for the Environment, while the national infrastructure sits with Treasury. The issues of risk and resilience sit with the Ministry of Civil Defence and Emergency Management and with Treasury and with the Department of Internal Affairs. Network mandatory competition policy sits with MBIE. And our sector deals with infrastructure and the regional councils deal with quality and allocation.

"And intertwining all those processes and institutions are processes such as the Land and Water Forum, which has been going for several years. It has been considering water quality issues with little, at least to my mind, discussion, of how quality rules connect to infrastructure, investment and affordability. The forum's leadership position is very complicated and fragmented. Things could be better. A policy debate of the magnitude of water needs to be far more ramped up than it is at present."

The debate over water policy is focused on two key elements, he said: What water quality standards ought to be in place; who should have access to water, and on what basis?

"A lot of work has been done on national board policy.

Indeed, over the next two years or so, across New Zealand, as part of the implementation of the National Policy Statement on freshwater quality, communities will determine the quality standards that will apply in their catchments.

“That process is ongoing and LGNZ regional centres are working hard and closely with central Government on the road going forward. This is necessary work. But it is one thing to set a standard and it is another thing to implement it.

“In my view, meeting those standards, and whatever they prove to be, must involve consideration of the delivery of better infrastructure, particularly wastewater infrastructure. That will not be cheap. It will not be easy.

“Already we are seeing resistance to costly projects in areas of rural New Zealand. That resistance is understandable. The projects are expensive and the population base to pay for them is small.

“This goes to another debate with a LGNZ initiative happening – is the present funding model for local governments fit for purpose?

“That is a debate for another day, and I won’t say more about that other than to say what we do know – because this

... we haven’t needed to do that because catchment allocation had head room – there was plenty of water.

“That head room is disappearing and whether an approach that relies solely on administrative decision making can endure is questionable in my view.

“It is my personal view and ultimately the fairest and most sufficient manner to allocate water between competing uses and fully allocated catchments will probably be through the provision of some form of a pricing.” Malcolm hastened to add that this is about ‘allocation’ and not water ‘ownership’, which are different things.

“I subscribe to the view, and I think just about everyone does, that no one owns the water. It’s about who gets to use it. But, if anyone does own the water, then it’s the Crown on behalf of the people of New Zealand.”

Like any network business, 3 waters network owners are not going to invest in more infrastructure without assurance that the water will be there to use.

“That is why the coming debate is not so much around agriculture, but urban growth. Auckland, Hamilton, Tauranga ... these three cities are experiencing phenomenal

“A co-regulatory model which has independent and governance, married with the presence of assets owners at the board table, or where the regulators stay close to what is happening on the ground – that’s how the gas industry works and it is working well.”

is locked in for a generation – is that further demographic change in rural, provincial, and metropolitan New Zealand is likely to exacerbate the affordability concerns.

“Consequently, for reasons such as those, it is not possible, in my view, to separate the water infrastructure and water quality debates. It is time for us to coherently consider these matters together.”

A further complication is access and allocation, he said.

“In the past New Zealand has been blessed with clean water to meet a growing demand. That age is drawing to a close. Increased demands from industry, from agriculture and growing urban communities are now increasingly stressing the system.

“Incumbents are defending their existing rights of use, others seek access. In some cases the expansion of urban demand and agricultural lands brings forward that debate and that trend is going to continue in my view.

“But again, from a global view, there seems to me that ultimately human need will trump other means, or to be direct – people vote, cows do not.

“New Zealand operates the first priority system for water consents under the RMA. As those consents come up for renewal, there are probably going to be challenges to whether the existing rights holder should continue to have advantage of that incumbency.

“There are four different ways of dealing with that. You can make some sort of administrative decision, or you can use an economic instrument to do that. New Zealand has traditionally not used economic instruments in the water space

growth. They are extending their networks. That water has to come from somewhere in what is essentially an allocated catchment.”

Lack of integration

On the subject of moving forward Malcolm told conference delegates that he intended to advise the LGNZ National Council that LGNZ needs to collaborate with all arms of central government interests and stakeholders.

“And in a manner that meets the immediate needs and demands of different New Zealanders. But what we should not do is continue to accept the present silent approach to policy development. It will not work, it will end in tears.

“So the whole water debate and infrastructure quality allocation needs to be joined up and integrated in one place. Decisions and actions in another need to be understood and costed and a plan made going forward about how we are going to meet those costs.”

Three waters infrastructure and cost of regulatory framework

“We have done a lot of work in this space and we have reached a clear view with our members on what we consider the best route forward.”

In summary, he said, it goes like this:

1. Water infrastructure is owned by communities. Communities and their elected representatives must make decisions concerning that infrastructure – provided they are accountable for those outcomes.

2. The focus should be on operational excellence and ensuring that the right procedures are in place and that there is sufficient capital to renew and extend networks to meet the required standards.
3. The introduction of private capital to any network is for the present owners to determine, not central Government. The country needs to focus on operational excellence not wasteful ideological debates about competing ownership models.
4. It is appropriate that a lean regulatory framework to govern operational excellence of networks be formalised to ensure that those networks continue to deliver for their community. In this regard we believe the co-regulation model now operating in the gas industry is appropriate.

“As someone who has had experience in most of the network industries in the regulatory frameworks, I am personally satisfied that the co-regulatory model would provide an appropriate level of assurance to local and central Government.”

An appropriate regulatory regime needs to focus on five elements, he added.

1. First, institutions need to ensure that there is effective management and investment in assets.
2. That the regime is effectively covering costs.
3. That the regime promotes efficient usage so therefore

water meters from a demand management point of view are a smart thing to do.

4. Learning and growing from experience.

5. Understanding customers' needs and expectation.

A regime that does not deliver those five methods will not endure, he said.

“A co-regulatory model which has independent and governance, married with the presence of assets owners at the board table, or where the regulators stay close to what is happening on the ground – that's how the gas industry works and it is working well.”

Some view the CCO model before Parliament as a solution looking for a problem, said Malcolm.

“That in my view is a little harsh, as I personally think the CCO model has merit. But the reaction in our sector shows how politics matter and that Bill is now delayed.

“Forcing change on owners of property without first developing their buy-in to those proposals is never going to work. New Zealanders just do not like it.

“It is always best to lead a horse to water, rather than shoot and drag it. So, what we promote is to allow communities to work through together in their different ways, operating how best suits them, and on what their district can afford – which over time will meet those five objectives. So we continue to discuss that idea with central Government and it is a work in progress.” **WNZ**

Micron Industrial Fibreglass Filters



Manufactured from the highest grade of non corrosive materials and employing the latest in fibreglass winding technology.

- UV and corrosion resistant
- Hydraulically balanced laterals
- Deep filter bed configurations available for mixed media applications
- Pressure rated at 250kPa (36psi), 400kPa (58psi), 600kPa (87psi) and up to 800kPa (116psi)
- Optional sight glasses and lateral man holes
- Optional vinyl ester tanks for high temperature and improved chemical resistance
- Suitable for commercial and industrial water treatment applications

WATERCO
Water, the liquid of life

7 Industry Road, Penrose,
Auckland, New Zealand
Ph: +64 (9) 525 7570

www.waterco.com

Maximising technology use



Alan Titchall talks with **Richard Coulter** (pictured), national sector manager, water/industry business at Schneider Electric about technology's role in water quality.

As a water & wastewater segment manager involved in water technology, Richard Coulter has a birds-eye view of our country's water infrastructure.

"Amongst the industry challenges we're facing, the one that's on the top of mind is the obvious reduction in population in certain areas, while it is increasing in others.

"In many areas we have an aging water asset with no expansion of income to support rebuilds or new infrastructure, yet in other areas they face huge new capital infrastructure investment to meet growth projections ahead."

So how is new technology going to help that problem?

"Technology is only one part of the solution; how are we going to best share this new technology across our water industry is to me, the question.



“This principle is not new and has been expressed as an expectation by central Government, where local authorities are to ‘actively seek’ to collaborate and cooperate to improve effectiveness and efficiency.

This in turn encourages councils to look for ways of collaborating and working with other bodies to better achieve the outcomes that their communities want and need.

“This sharing of best practices among councils and water authorities must also be matched with the appropriate funding model and capital programme to invest in modernisation and new technology.

“The cost of reinventing the wheel is just not an affordable or efficient model for this country. Establishing across 68 councils some form of standardisation that can be shared, simply makes good sense.”

What's the situation now?

“In short, we as an industry could be doing more. There is a certain amount of collaboration, but it's reasonably informal in certain areas. In others, such as national standards for meta data in water, it's been formalised with a project currently being worked on by LINZ, MBIE and local councils with seed funding by Treasury for the development of shared data standards.

“In terms of assets and their locations, this will then need to be applied not only to the asset management systems with a geo spatial context, but also to the customer management, hydraulic modeling, SCADA and control systems, as well as all historicised data, so as to get the costs down and to achieve the real tangible advantages of deploying a standards framework.”

How do we compare with what is going on in the rest of the world?

“In some ways we're in a better position, in others we have some way to go.

“Shires and local councils around the globe are now starting to realise the need for the ‘specialisation’ that is already deployed in our cities.

“Unfortunately, in New Zealand we don't have the investment levels necessary or the high level expertise in the geographic locations to achieve that. To share this urban expertise and standards at local council would require a different model, and be driven at a higher level.

“From a technology point of view, there are other options that can be explored, such as the software as a service model (SaaS), a very cost-effective model for the management of data and information systems.

“The cost of having IT service technology on premises, with the necessary IT support people, is a high burden on small councils.

“Whereas farming that to a cloud service provider results in substantial savings with what they call the SaaS model.

“We as an industry need to encourage and embrace these types of options.”

Specifically, what technology options will achieve this?

“First and foremost you have to have information; you can't manage what you don't measure. Accessing this information through SMART field device data, then using existing infrastructure with the likes of the telcos to get this information back has never been easier, or the cost to entry lower!

“Instead of a council having to invest in their own infrastructure which becomes in some cases, once deployed, ‘a stranded asset’, they can deploy this using existing data acquisition infrastructure and bring that information back for a very low cost.

“Currently collected field data – wastewater, freshwater, stormwater, weather services data, GIS and hydraulic modeling – sits in vertical silos to some extent. It can now be integrated so that you have a more holistic and customer centric system overview with analytics providing real innovation and insight.

“Where Schneider Electric has been putting a lot of investment and time is in the analytics layer so you can gain insight for better informed decisions. By effectively integrating big data with technology solutions, the water industry can optimise all aspects of its systems. Not only does the use of data help



organisations understand their customers but it can also help optimise efficiencies, improve longevity of assets and predict future trends.”

Is there an example in New Zealand where this has been implemented?

“It’s a very new technology, and we’re currently deploying it in the agriculture sector.

“This sector doesn’t have the same constraints as local authorities and can be more agile in adopting new technology very quickly.

“We have over 300 installations on farms across the country running on this type of system, which involves things like effluent proof of placement tracking, and water monitoring and compliance.

“Effectively, this technology places the power of what was an industrial SCADA system in the palm of someone’s phone with virtually very little capital outlay, thanks to the power of the cloud with a SaaS subscription model.

“Because of the nature of local government it will take some time before it deploys this technology.”

How is the company involved in the industry’s drive for efficiency?

“In the area of efficiency, one of the innovations we’re bringing to the market at a low entry cost is the ability to measure an energy pump used for water distribution or wastewater networks.

“This is pumping energy consumed by the volume – say how many kilowatts per cubic metre per metre of head – towards a national benchmarking.

“Then you can look at your benchmark against your neighbour’s benchmark in an easy to understand user format using a traffic light style perspective; red, amber or green.

“With a transparent system ratepayers understand what is required to efficiently delivery water to their door.

“If you’re in a council where the pumping stations are percentage-wise more in the red, then there could be an argument that it’s better for central Government to provide assistance programmes to get them more efficient. Because all it’s doing is putting more drain on your rates dollar to go into an inefficient system as opposed to capital works to make it more efficient long-term.

So it all kind of points towards a national standard?

“Yes and benchmarking. At the moment you’ve got no benchmarking to say ‘how is my delivery of water and wastewater done from an efficiency perspective. Is it good, bad, ugly?’ But soon we will know.

“We’re fortunate that now the cost point for data driven decision making has come down, thanks to new data acquisition technology, and reduction cost of the products as global volumes have increased volumes.

“You couldn’t afford to put an energy meter on every pump in the past because it cost thousands of dollars and people would question the value of that.

“Well, now we supply variable speed drives that have energy metering in them as standard.

“Local regulations say that you need to measure extraction rates, so now you have to install a flow meter. With this, it now means you’ve got two very useful variables, energy and flow, by adding a pressure gauge, you know at what head you’re delivering, and suddenly you’ve now got the metrics to have analytics that tell you, from a benchmark, how efficiently you’re delivering water.”

“Globally around 80 percent of all energy consumed in the water and wastewater segment is through pumping.

“So people are always asking, ‘how can I pump more efficiently?’ I only want to pump to meet my demand and no more? How do I know when my pump is becoming inefficient, and it’s time to spend some money and find out why, then remediate or make the required improvements to the system?”

Is such pump data increasingly achieved through wireless technology?

“Yes, this will be the next big industry step change, by leveraging off the multinationals’ R&D technology spend, local organisations get the benefit without having to realise upfront capital investment.

“For example, not having to spend on communication infrastructure because they can leverage on a telco such as Vodafone is a classic example, they’ve invested hundreds of millions with the forthcoming narrow band IoT and broadband roll-out nationally, and what that now means is that smart devices like IoT connected pumping systems can connect to their SCADA systems.

“So all that data can be sent for a few dollars a month from any device, anywhere. “Whereas you couldn’t do that five years ago, the technology just wasn’t there, nor was the price point.

“Now for a few hundred dollars you can get this device and for a few dollars a month you’re measuring those critical assets.

“So there’s some pretty exciting stuff out there and if councils are wanting to embrace that there’s certainly some substantial savings that can be made.

“As a nation, we have a huge opportunity to invest in the future of our water through people, processes and technology.

“With the challenge of a growing population and aging water infrastructure, it’s more important now, than it ever has been that we work together to ensure adequate access to fresh water for the economic growth of our industries and the well-being of our citizens.” **WNZ**

SCADAPack Smart RTUs... the information you need no matter where your assets are.

All In One Compact Package

SCADAPack 500E Smart RTUs or remote PACs combine the monitoring and communications capabilities of remote terminal units (RTU) with the processing power of programmable controllers (PLC/PAC). The design delivers superior functionality in one of the most compact RTU form factors on the market.

The SCADAPack 500E can perform multiple roles simultaneously. Through a simple configuration-based approach, you can conduct basic to complex telemetry processes using the same field unit. In turn, this reduces total cost of ownership to address future changes, while also improving process security and reliability at the core of the RTU.

Flexible Design Connectivity

SCADAPack 500E Smart RTUs offer an array of flexible connectivity and programming features that reduce design and implementation time:

- wide range of connectivity options: easily retrofit into legacy systems to replace the Serck Controls eNet and SCADAPack ES RTUs
- data concentrator for any DNP3, Modbus or DF1 devices with up to 29 SCADA masters, and up to 100 remote DNP3 devices in peer-to-peer mode
- open protocols: interface to third-party SCADA infrastructure
- operating temperature: -40°C to 70°C (optional IECEx certified models for use in hazardous locations).

For more information call 0800 652 999 or
email sales@nz.schneider-electric.com

schneider-electric.co.nz



Life Is On

Schneider
Electric

The future of microbial monitoring

The technology for monitoring water quality is fast changing as new technology is developed and employed. By **Alan Titchall**.

The monitoring of microbial quality of raw water, drinking water and recreational waters has long been deemed essential. But, despite monitoring technology advances, waterborne pathogens still pose a threat to public health and most of the disease-causing organisms originate from contaminated drinking water.

The majority of pathogens that travel through drinking water, or recreational waters, and cause disease in humans are faecal in origin. And the faeces that are most known to carry potentially pathogenic substances come from human beings, other mammals and birds. While different bacteria, viruses and parasites that can pose a health risk have long been identified, testing for all of them is still very time and cost consuming.

In consensus, the water industry has been testing for a few groups of bacteria that work as indicators of faecal pollution, which should be sufficient to 'raise the alarm'.

Coliforms, faecal coliforms and E.coli are all entero-bacteria that primarily colonise the colon and are found present in all faecal samples.

Additionally these organisms are relatively easy to test for and standard methods depend on sample filtering and subsequent growth on culture media. They also rely on a laboratory technician to examine the samples after a 24-hour incubation period, which makes the whole testing regime take between 24-48 hours to provide an answer.

The automated options

All water authorities require water utilities to maintain a certain frequency of testing, and while the testing of bacterial levels at the water treatment plant is already common, it is equally important to test the quality of the water on the distribution network, particularly where there is aging infrastructure and the possibility of leaking pipelines.

There is also the challenge that faecal pollution events can hit randomly, so not all incidents are recorded by the fixed testing scheme before the pathogens enter the distribution network. And any increase of testing frequency requires more manual labour with traditional systems. For drinking water safety, the time delay by manual sampling and analysis combined with the testing frequency can be crucial.

An alternative to this, and as a supplement to the testing already required by water authorities, is a fully automated online instrument monitoring system.

This involves a type of monitoring system that can be placed



at the water source to automatically take samples and analyse them in much less time than traditional methods.

“Basically there are two main approaches for automated bacteria detection that are commercially available at this stage,” says Eike Breitbarth from REZO + Water Energy.

“These are fully recognised industrial systems, of which Colifast [from Norway] is the longest established company with installations for municipal water supplies since 2003.

The Colifast instruments incubate a water sample in a media and measure growth of specific target/indicator bacteria (eg, *E. coli*), he says.

“This is fully automated, with an alarm raised in the case of contamination after two hours and full results in clean water after 15 hours. The process produces results in CFM [Colony Forming Units] which is the standard unit for microbial water monitoring.”

This technology is used widely in Europe to monitor raw water intake, says Eike, and is verified by the US EPA as well as the EU.

“Further, Vienna Water Monitoring [from Austria] developed its ColiMinder system a few years ago. It is important to understand that the Colifast and ColiMinder instruments work on very different principles.”

Instead of bacterial growth, the VWM ColiMinder System measures target bacteria specific enzyme activity.

“This is also fully automated and yields results in 15 minutes. The unit is MFU [Modified Fishman Unit], which can be correlated to CFU taking some environmental factors into account. The power here is in the ‘speed’ of the process and the fact it measures the actual ‘live activity’, which makes this a great method for fast screening and process control.

“Both types of system offer various communication options for integration into networks/SCADA systems and can also be used in remote locations – powered by solar, for example. The manufacturers offer a range of media and protocols for a wide range of applications in industry and environmental monitoring.

“The ColiMinder system is also available as a ‘driving lab’ for well screening etc or can be customised to demand, eg, for rugged field use or multiple intake points in the water industry.”

Using tryptophan

The other option is to measure tryptophan, says Breitbarth, which is an amino acid. “It is not a specific marker for gut bacteria, but if present in water it indicates high biological activity that correlates well with bacterial contamination.

“We can measure tryptophan very well already with optical sensors such as the MatrixFlu by TriOS (Germany), but the calibration in the sense of a ‘translation’ of the tryptophan concentration to actual bacteria numbers requires further research,” says Eike.

“There are companies that market these sensors for bacteria detection already, but this is still at the early stage and we are involved with method development here in New Zealand.

“This sensor measurement only takes seconds, does not

require any consumables, and can already indicate a contamination when high tryptophan levels are detected.

“With their very low maintenance and relatively low cost, optical sensors could form a network that watches water sources and distribution networks, with robust/established methods such as the Colifast ALARM measuring at critical intake of distribution points.”

Molecular mobile testing

Finally, bacteria can be identified and quantified using molecular methods. Biomeme (USA) is offering a mobile phone controlled miniature thermocycler (Biomeme two3) for real-time PCR or isothermal analysis, the gold standards in molecular diagnostic technology.

“This is a very smart device that allows field testing using the company’s targeted primers to indicate bacteria and specific pathogens, such as *Campylobacter*, which was responsible for the Havelock-North contamination,” says Eike.

Results can be achieved in one hour.

“Produced in cooperation with Smith-Root [a US-based world leader in fisheries conservation technology] a semi-automated sampling backpack that greatly simplifies its use in the field is also available.”

While there are no fully automated industrial systems on the market yet, once available – online bacterial monitoring can be even more diagnostic in the future, says Eike. **WNZ**

Automated detection of fecal indicator bacteria



- Drinking water safety
 - Water quality
 - Process control
- via optical and microbial methods



rezo.co.nz
contact@rezo.co.nz
03 4545823 021-02545977

Data integrity principles



By **Dr Peter Johnson**, CEO, WaterOutlook.

As CS Lewis once said: “Integrity is doing the right thing even when no-one is looking.” When it comes to data integrity, the right thing is ensuring there is overall completeness, accuracy, consistency bringing transparency and auditability.

Gone are the days where simply writing recorded values for the operation of plant into a diary or spreadsheet for reporting is accepted as best practice; where SCADA historian and reporting systems are the final repository for data; where labs are the final data holder; and where operations and maintenance contractors get to hold and ration data to their client organisations.

The world has moved on to one of electronic storage of all operational data. Every aspect of our lives is moving to electronic systems that, in part, record data and make it transparently available to a plethora of other systems/software/people.

Data comes into organisations and is used for many purposes. It may be generated within

that organisation or outside it. It’s used for reporting, compliance, added to other data to form complete information sets, modelling, budgeting, and strategy, and many other purposes.

So, with billions of data points flying around and through the internet of things at any given moment, how can an organisation ensure that its data has integrity?

Two core principles:

1. Cut down the chain of custody of data. By reducing the number of people handling a piece of data as it enters any central data system, the chances of error or manipulation of that data are reduced. The objective should be whoever or whatever generates the data inputs it and whoever or whatever needs the data takes it out.

2. Use the concept of the ‘Single Source of the Truth’ in connected systems. The core principle here is to ensure that the source data remains the same, and any use of that data can be traced through a transparent audit system to the raw data feeds.

Today there is a clear trend for more data to lie outside, and beyond the control of, an organisation. In a local government organisation, this 'outside' data comes from electricity companies, laboratories, contractors, weather organisations, etc. It is often supplied by specialist consultants or suppliers. Therefore, the amount of data a Council has that is native to their systems is more limited.

Not all data is created equal. The concept of operational data versus compliance data is firmly entrenched in contemporary best practice. Operational grade data is used for day-to-day operations. Compliance is a measurement against some imposed benchmark.

Typically, to become compliance data, operational data needs to undergo a series of events from collection, cleaning/calculation to reporting.

This means that most, if not all, compliance data is derived or calculated values as opposed to simply measured data. To maintain data integrity in compliance data, there needs to be an audit trail that can track the raw data set, and the way the calculations were performed to get to the derived data output. This must be done in a way that auditors such as drinking water assessors and Regional Council compliance officers can easily understand and measure.

There is a growing international trend in the emergence of independence in the data systems. From the auditor's perspective, there must be confidence that the data holder

has no vested interest in the data. If the data holder is also an advisor, the audit process needs to consider conflict of interest.

High integrity data systems do not have an advisory component. For example, Xero is not your accountant and Orion Health is not your doctor. As soon as an advisory component is introduced into data management, alerting, and reporting it again ventures into the realm of conflict of interest.

Central to integrity is ownership and awareness of data and accountability for it. This is particularly important in local government where public health is concerned. Everyone needs to be confident that accurate data will be there when needed.

Data integrity is vitally important to any organisation. Trusting that data is independently retrieved and transported, that it is accurate and auditable means local government has a plethora of up-to-date information at its fingertips. Data can be continuously sent and received between a Council and its regulators, consultants, contractors, power companies and others all in near real time.

Having a single, independent data repository for trusted data that can come from many sources, can then be easily used as a portal for change, whether it's a changeover of contractors, for shared services or preparing for amalgamation. **WNZ**



www.wateroutlook.com



Bringing integrity to your data

Market-leading Digital Meshing Technology:

- Reducing IT overheads
- Expanding client capability through a single, many-to-one/one-to-many interface that connects and automates data exchange
- Fully independent with no conflict of interest.
- Providing a single source of truth between consumers, industries, and regulators
- Unique highly technical and capable tools for audit procedures on regulations for public health, environment, carbon accounting, service delivery and more

Any data, any time, anywhere.

- Finalist NZ Hi-Tech Awards 2015 – Best Public Service Technology Solution
- Finalist New Zealand Innovators Awards 2015 – Innovation in Sustainability & CleanTech
- Finalist NZ Hi-Tech Awards 2016 – Best Public Service Technology Solution and Innovative Hi-Tech Service
- Finalist New Zealander of the Year 2016 – CEO Peter Johnson

A customer-first culture challenge



This is a précis of a paper presented at the Water New Zealand 2016 conference by **Tim Harty** from the Waikato District Council.

Waikato District Council set itself a challenge to have the “most engaged community by 2020”. To achieve this the council set out on a journey to transform itself and firmly embed a ‘customer centric’ philosophy in everything it does.

As with any organisation that has large sections of its staff operating in a highly technical space, succeeding in the customer arena will not be without its challenges. A key part of this challenge was to create a shared vision and set of behaviours to support the transformation and to engage staff with the vision.

In the engineering, parks and facilities area of council, the 2020 Challenge represented a significant change in the way business was traditionally undertaken. Fundamental changes to the way staff engaged internally were required. Access to up to date technical information for frontline staff along with easy ways for customers to call in, or log calls was also critical. Opportunities to partner with key suppliers across these activities were also critical as contractors are seen as a natural extension of Council by the customer.

The Waikato District Council (WDC) covers a large administration area of more than 400,000 hectares. It essentially stretches between Hamilton City and the Auckland region. The district is characterised by several towns, small villages and a large rural area. The district is home to approximately 60,000 people (Census March 2013) which is not high compared to other similarly-sized districts.

WDC employs 300 staff split between several services centres throughout the district. The executive team consists of a chief executive and three general managers, each one being responsible for the overall management of each of the functional groups and for the delivery of the services to the community. The services that are delivered are done so in accordance with the levels of services outlined within the adopted Long Term Plan.

As with a majority of local authorities throughout the country, WDC delivers a large number of services to its communities that only it can provide. These services can be regulatory or

technical in nature and are predominantly governed by strict legislation, rules and processes. This technical and legislative environment, along with a captive market (ie, its customers can not choose other service providers), can result in a loss of customer focus and an attitude of ‘council knows best’.

In 2013 WDC recognised it was experiencing a loss of customer connection and set out on a process of reconnecting the business with the community it serves. The key goal of this process was to put the customer back into the heart of the business.

This transformational process started with organisational restructure at general management level, followed by a realignment of the business to meet the vision of a customer centric approach.

As with most transformational processes, there was a need to start with a strong vision. In WDC’s case, the vision came about through developing a corporate plan, called Our Plan.

The aim of Our Plan is to tie together all the organisation’s strategic documents and processes. It seeks to provide a simple and digestible plan for staff to understand: Where they fit within the organisation; how their roles impact and influence the council’s direction; and their role in providing an exceptional customer experience.

In the ongoing drive to implement Our Plan, the setting of a vision and set of behaviours for staff was seen as critical and to support the 2020 Challenge a set of behaviours was developed by the Executive Team.

The next step in the process was engaging staff by communicating the vision and setting expectations. These expectations were set by developing a strategic pathway that included measurable actions and goals that were designed with the intention that all teams could relate to, and engage with, the role they played in contributing to the organisation’s success. The most important engagement arena was with all people managers. This was done by empowering them to lead by example and being accountable for investing in conversations with their teams.



Developing a framework that enabled the delivery of the 2020 Challenge was an essential next step in the process. To do this a series of workshops was held with the teams' drivers developed.

Each driver had a series of projects with measures and targets that helped the organisation make and track progress towards the 2020 Challenge. The implementation was overseen by a newly formed Strategic Review Team, which provided guidance to the project managers and reported progress to the Executive Team. Staff were kept informed of progress on these key projects and processes by the positioning of large Our Plan scorecards across the organisation, and regular updates at team meetings.

WDC's Service Delivery Group is responsible for many of the services that the community receives, ranging from provision of three waters services, parks and facilities, roading and infrastructure project delivery. The group consists of four units comprising approximately 80 staff. Many of the services have been historically delivered internally, such as design and project management. Whilst other services, such as road maintenance services, were delivered via standard term contracts and external contractors.

Historically, connection with the customer was via the Customer Request Management (CRM) system and, in many cases, managed through contracted service providers and/or their field staff.

The Council's front line call centre staff generally dealt with queries and complaints from the public, and thereby generally filtered issues from the technical staff. This process shielded those staff from a lot of direct contact with the customer and resulted in poor understanding of issues and the importance of a rapid resolution. Direct customer contact for technical staff, was generally reserved for only when matters became unsolvable and needed direct intervention. Because of the lack of experience of these technical staff in dealing with customers, matters were often not handled very well and public feedback included statements such as the technical team were arrogant and, at times, unyielding.

The long-established CRM system and processes presented a number of challenges for the group, the council and most importantly, the customer. Whilst the system itself was generally fit for purpose, the way that it was set up and utilised, combined with the number of categories that a customer enquiry could be logged in it, made the system clunky and generally perform poorly. The teams both managing the system and the call centre (front line) found it hard to deal with and the underpinning processes unclear. The database used by the frontline staff to answer customer queries (the Knowledge Tree) was not always updated by the technical teams and did not contain the latest and necessary information. This was primarily due to a disconnect and lack of understanding from technical staff as to how important it was to have a well-supported and well informed frontline team. Such up-to-date information could have resulted in a much easier life for customers and staff alike.

A significant amount of the Council's physical works is delivered by external contractors. In WDC's case Roading and Open Spaces (Operations and Maintenance) have been delivered via traditional NZS 3910 type contracts. Due to the size of Council's road network, road maintenance works were delivered via two contracts, one covering the west and one covering the east of the district. Each geographic area accordingly had different contractors and contract managers, which could at times, result in a different level of service being delivered to different customers. In the case of Open Spaces, again two different contracts and contractors covered the district with similar issues of disparity of services.

Contractors in the field are a natural extension of Council as customers often have no way to differentiate between them and "the Council". Traditional methods of letting contracts can promote inflexibility, as often the focus of the contract is about controlling costs and quality of physical works, rather than customer service. This can result in contract staff carrying a poor message of the Council out to customers. The "we are only doing what Council wants" or "don't ask me, I'm doing what I am told" messages do not help the image of Council and



Pokono.



Taupiri.

can severely impact on the perception of the organisation to customers. For WDC this was occurring regularly.

Culture change

WDC had to ask itself ‘How to change the culture of an organisation?’ This is a difficult question and challenging for any organisation.

A critical piece of work that needed to be done early in the journey was understand the current culture of the organisation and develop a view on where the culture needed to be changed, to meet the 2020 Challenge. This work is currently ongoing at an organisational level and about to move into a second, more significant phase. However, initially to support the challenge, a number of smaller changes were completed to allow staff to start the transformation journey required.

Many of those changes focused on communicating the 2020 Challenge across the organisation. The 2020 Challenge framework was displayed on large “scoreboards” across the offices with targets developed and progress updated monthly. Managers and team leaders were actively encouraged to take teams to these boards and discuss the challenge and the progress being made. Quarterly updates at all of Council’s ‘Chamber Chats’ focused on progress and were delivered by the Executive Team.

In the first year of the framework, many of the tasks focused on setting up a sound platform to move forward from. Developing and signing off a Community Engagement Plan and developing a Zero Harm Strategic Plan were among many of the tasks. The importance of discussing these; how they connected in with the business; and how they were critical to delivery of the 2020 Challenge was a task assigned to the Council’s managers. To facilitate this to occur, a Leadership Forum was put in place. This forum allowed the Council’s third tier managers to openly discuss matters and support each other to change the culture and deliver the 2020 Challenge.

Customer service

To provide a more seamless and improved customer experience, a major review of the way the Council managed the interface with customers was embarked upon. The key goal in this approach was to enable a higher number of customer requests to be resolved at first point of contact, simplify the customer experience and provide an improved electronic customer interface to log calls via Council’s internet site.

Pivotal to the success of the review was rationalising the large number of service request categories within the CRM system and reducing the complexity for both the customer and

frontline staff. In many cases dozens of request categories were reduced, and now the system has been streamlined to contain only eight separate work areas with 14 overall job categories.

This reduction in categories and simplified system improved the customer experience and allows for much clearer messages to be delivered by frontline staff. The knowledge tree used by frontline staff is also easier for the unit to update and keep current.

Contract relationships

Over the past two years, both the district wide Rooding and Open Spaces operations and maintenance (O&M) contracts have come up for renewal. Both these major contract renewal processes allowed Council to consider how it engages these services from the market to provide best value but also ensure that the outcomes required aligned with the 2020 Challenge.

The first contract to be retendered after the initiation of the 2020 Challenge was Rooding O&M. With a large rooding network, a contract sum in excess of \$30 million a year and ownership of a rooding maintenance company, this process is significant for Council.

Staff undertook a full analysis of delivery models and recommended to Council that it enters into an alliance agreement. The alliance provided the flexibility that Council was after in this area, but more importantly took a ‘one team’ approach to providing a service. Following a tender process, Council entered into an alliance partnership with Downer NZ and collectively the Waikato District Alliance was born.

This Alliance allows a single point of contact for all customers and has improved the interface between the customer and Council. The Alliance’s ability to focus directly on the works and outcomes required, and not letting technical contract specifications get in the way, has seen a marked improvement in managing service requests. After the first year of operation, the Alliance has added significant value to our business and this is supported by a suite of Key Result Areas (KRAs) and associated Key Performance Indicators (KPIs) measured to demonstrate this.

The second contract to be retendered was the Open Spaces contract. Again, following significant analysis on value propositions, Council determined that a single district wide Open Spaces Maintenance Contract was preferred. The new contract had a built-in requirement from Council for utilising local service providers. While the contract was proposed to be a more traditional NZS 3917 based approach, contractor selection was undertaken via a competitive dialogue process, which allowed staff to have open discussions with prospective

tenderers. These discussions focused on partnerships, communications and ensured alignment with Council's values.

In August 2016, City Care started work on the district wide Open Spaces contract, supported by a number of local subcontractors and suppliers.

Community engagement

WDC covers a large geographic area and has a number of formal community boards, community committees and many informal local community groups. Finding the appropriate and best way to engage with these different groups so they have sufficient information to ensure they are connected to the organisation, can be a challenge. Finding a balance between information sharing and engagement and freeing staff up to deliver services is critical. Getting this balance wrong can result in missing delivery targets and failing to meet the expectations of the public and the terms of contracts.

The Council recently developed and implemented an Engagement Policy. This policy forms the basis of the way staff engage with the community and outlines the three essential criteria for engaging with communities, as being:

- It is a continuing and iterative process;
- It is carried out in such a way that there is a genuine exchange of views, (including consideration of all options);
- It needs to provide feedback to those consulted on regarding the process for the final choice.

A significant amount of effort and energy is currently being placed in this area. Staff attend market and open days to allow opportunities for passive engagement with communities on any works that are occurring in an area or are used to provide general information and updates. Under the Engagement Policy, if the nature of the service or works meets a certain criterion, a more formal process of engagement is undertaken.

Staff are also utilising these methods to engage with communities on projects and other matters. Most recently Council undertook a significant change to the way in which the delivery of solid waste and recycling services was undertaken. This change affected many customers and saw multiple messages and engagement processes being undertaken within the community. A number of lessons were learnt through this process and are being integrated into the business following a project review.

Another example of engagement is within the Rooding Alliance. There is a KPI that focuses on community engagement and promotes the running of at least three local community workshops annually on roading related issues. To date, four of these workshops have been run and been extremely successful with large numbers of attendees and positive comments following the meetings. The newly engaged Open Spaces contractor is also gearing up to engage with the community and community boards. Again, this provides a good connection with local community members and local issues.

It is fair to say that many of these community engagement processes are still in their infancy, but there have been a number of learnings to date.

The results to date

Staff acknowledge that the journey towards achieving the 2020 Challenge is long and will not be without challenges. The changes in the technical and customer services areas that have occurred to date are just a start of the process and are focused at changing some deeply engrained behaviours. Much more work is needed.

As noted within the body of this paper, significant improvements have been made in the Customer Service Request system and resulting responses. The Waikato District Alliance has lifted the bar significantly with regards to response rates, now sitting at over 90 percent compliance with requirements. This previously sat at around 70 percent. This reflects the success of the Alliance process for this council. The partnership with City Care is expected to follow suit.

Other results show that the community is starting to respond to Council's new approach. Customer satisfaction survey results are showing a general improvement in many areas with some improving markedly (satisfaction with public toilets, as an example, is up from 48 percent to 73 percent this year following retendering of services).

Internally, the connection between technical staff and frontline (customer-facing) is improving. Work on the knowledge tree has significantly improved the ability for customer calls to be answered at the frontline and has also resulted in some good cross team connections being formed. **WNZ**

Conclusions

Connecting with the customer and engaging with them whilst delivering essential and non-competitive services can be difficult. WDC acknowledged that it could do better and developed a vision to do so. An organisational vision is essential and, in this Council's case, has required the development of a full set of key organisational processes to support its delivery. Many of these process changes require a culture that supports new ways of delivering services, along with ongoing engagement with those receiving those services.

This sort of change is not something that can be done quickly. Critical to making this level of change is support and ability to be innovative in the way that external service providers are engaged

and work with Council and the community. As these providers are seen externally as a natural extension of council, partnerships with them can ensure cultural alignment so the customer will receive a better service and experience.

Any change of this scale will take time. Measuring and celebrating successes along the way is critical to ensuring the momentum of change continues.

Year one has been successful, but this does not mean that the focus and drive can be lessened or eased off. WDC will continue to measure progress against the 2020 Challenge each year and as the journey progresses, will continue to challenge itself to do better.

The pond resurgence



Waste stabilisation ponds – are they valued – are they understood?
Nick Walmsley explains.

Waste stabilisation ponds (WSPs), or oxidation ponds to some of you, are still one of the most commonly used methods for treating domestic sewage here and overseas. We take them for granted and often don't consider how much value they give our communities.

The Ministry of Health's COSINZ data base reported that, at the year 2000, there were some 176 community wastewater treatment systems incorporating WSPs and this hasn't changed much since. This is over half the total number of community treatment plants. These communities WSP systems range in number between one to eight ponds and service populations from under 100 to over 100,000.

For small to medium sized communities (say up 30,000 population equivalents) ponds are often the sole form of wastewater treatment. For larger communities, there is often a multiple pond system, increasingly with enhancements, to produce a tertiary standard of final effluent quality.

WSPs are also used extensively for waste treatment of dairy farms and piggery effluents as well as agricultural processing wastewater in the likes

of meatworks. They have been used with confidence for hundreds of years, yet often the communities that rely on them have inadequate knowledge of how they should be managed and just take them for granted.

For some communities the direct discharge of pond effluents to waterways is becoming less acceptable, for both cultural and water quality impact reasons and often for 'perceived' rather than well understood reasons.

Yet ponds are experiencing resurgence, both here and overseas, due to a mixture of improved understanding of pond biology, maintaining pond health, the development of advanced pond systems, and greater experience and knowledge of retrofit technologies.

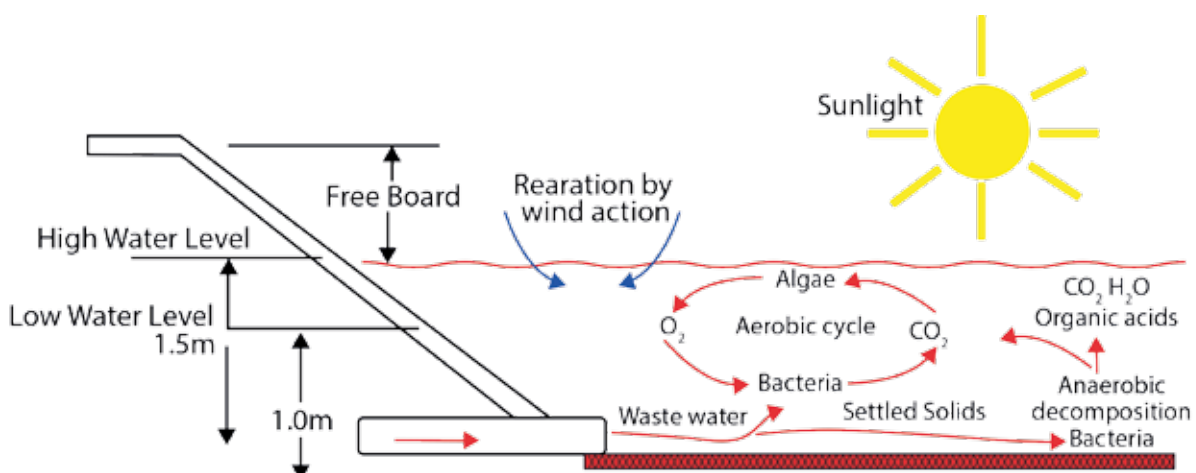
These improvements are able to maintain better quality across the seasons as well as to achieve treatment qualities comparable to mechanised, high rate treatment plants such as activated sludge. Where land is available, ponds also offer significant capital and operating cost advantages when compared with alternative wastewater treatment technologies.

Modern ponds, with enhancements, have an important role to play in wastewater treatment in this country. Ponds are robust, require low energy, are able to cope with hydraulic and organic loading peaks, and can provide buffer storage for downstream processes such as land treatment systems.

Greenhouse gas emissions, especially methane, are an important aspect of the 'environmental footprint' of a wastewater treatment process.

The 2014 National Greenhouse Gas Inventory, using the Intergovernmental Panel on Climate Change (IPCC) 2006 methodology, notes that there is considerable uncertainty in the amount of greenhouse gas emitted from wastewater treatment.

However, the conversion factors proposed by the IPCC indicate that WSPs, which are primarily aerobic or facultative, are likely to emit less greenhouse gases from the whole treatment plant than more mechanical





High Rate Algal Pond.

e.g. activated sludge, systems unless there is substantial energy recovery.

In spite of their apparent simplicity, WSPs require skilled operation and regular attention. A good understanding of how they work and attention to maintenance requirements will make sure the ponds operate reliably.

WSPs are shallow earthen basins in which wastewater is treated biologically. Ponds are able to reduce the level of many contaminants in sewage including biochemical oxygen demand (BOD), suspended solids (SS), ammonia, and a number of microbial faecal indicators (pathogens). Wastewater solids settle to the pond bottom where they partially digest anaerobically and accumulate as sludge.

WSPs use algae and wind action to introduce oxygen to the pond surface waters. The wind and inlet flow momentum will also create currents within the pond which help to mix the wastewater over the full pond area. The quality of outflow (effluent), from a WSP, is very dependent on the action of these currents, and avoidance of short circuiting.

Grazing by microscopic animals, settlement, and sunlight exposure all work to help reduce the levels of faecal indicator and pathogenic microbes in the WSP. This is illustrated in the figure below.

Basic processes at work in a WSP

Dissolved nutrients in the sewage, such as nitrogen and phosphorus, are assimilated along with carbon dioxide, by green algae which are microscopic plants suspended and living in the water.

Like land plants, algae produce oxygen by photosynthesis, during the day. Pond oxygen levels, and some other characteristics, like pH, will therefore change throughout the day and from day to night. The oxygen sustains the aerobic bacteria which feed on and break down the incoming organic waste.

Most algae are good, providing the majority of the aeration of conventional oxidation ponds, as well as nutrient removal. Problem blue-green algae in secondary ponds can be reduced by making sure there is a surface outflow for the effluent, providing mixing to the pond surface and dividing the final pond into cells of no more than two days hydraulic retention.

Knowledge is now available on the key technical issue supporting performance; mixing, hydraulics, the necessary operational skills and that sludge management is always required plus a range of upgrade technologies to modify existing ponds to give cost effective upgrades. However publically available guidance on this can be hard to find.

One of the major advantages of WSPs is they require relatively little operation and maintenance in comparison to more intensive wastewater treatment processes. However, regular and skilled O&M is required to:

- Maintain the health of the pond biology.
- Monitor the efficiency of the WSP process.
- Undertake general housekeeping around the site.
- Maintain the structural integrity of the ponds.
- Collect samples for resource consent compliance.

While WSPs do offer the real advantages of low complexity and operating cost their performance is highly seasonal and we have limited control over the natural biology. Given this disadvantage, there is a natural range of unpredictable performance. WSPs are unlikely to reliably achieve full, year-round nitrification, even after modification. Lack of algal control and overloading are commonly causes for odours.

A few key issues to consider are:

Raw influent screening upstream of a pond system can have several benefits:

- Reduce maintenance requirements through the removal of inorganic matter, which would otherwise float on the pond surface, settle on the embankments or obstruct overflow weirs.
- Protect equipment installed in the pond such as aerators and mixers from jamming and growth media and rock filters from clogging.
- Improve the pond's sludge long-term quality and for potential re-use.

Septage and commercial/industrial discharges can have a significant impact on the health, the treatment capacity and the long-term operation and maintenance needs of a pond system.

A septage discharge not only represents a very high instantaneous load (e.g. $6 \text{ m}^3 = 600\text{PE}$) for a pond, but it adds a high percentage of digested, heavy sludge as well as inert solids, such as sand and grit and often also lighter material which can float to the pond surface. Its impact is often underrated but can represent an equivalent load of an additional small village. As such it can make the difference between having to upgrade a pond system to a high-rate plant versus being able to operate a pond over many more years to come.

Anaerobic ponds can significantly improve the treatment capacity of an existing pond system through their capacity of retaining solids, grease and oil and in reducing BOD_5 load. Pretreatment using anaerobic ponds is an excellent opportunity to combat additional organic load to conventional oxidation ponds and reduce the volume of sludge for disposal, and could provide a local energy source (compared with adding aeration).

In modern pond designs the need to use the whole pond volume more efficiently and to create consistent flow conditions has been recognized. The pond inlet design has consequently radically changed. Old plants can easily be modified to improve treatment at the pond's front end through a change of the inlet.

Apart from the use of WSPs as treatment process units, the structures themselves represent a valuable asset as a potential reactor basis for alternative treatment processes. The experience of the Christchurch 2010/11 earthquakes in which practically none of the ponds in the city and the wider region were damaged has shown that treatment ponds can be very resilient structures.

Given the value and versatility of this technology Water New Zealand is updating the WSP Good Practice Guide to enable all utilities to get the most from this asset type. The update will be available later this year. **WNZ**

‘Agency capture’ and dangerous politics

Dr Mike Joy is a senior lecturer in Environmental Science/Ecology at Massey University. This opinion piece was first published in the Dominion Post.



Dr Mike Joy.

As a freshwater ecologist and passionate environmentalist you would think I'd have a natural affinity for a government department named the Ministry for the Environment.

And while I do work for them, much of what the ministry does just makes me angry.

Over the last few decades the Ministry for the Environment (MfE) has been captured by politics; concentrating on making the policies of the government of the day look good. This phenomenon is happening at central and local government and is known as 'agency capture'.

Exemplifying how it manifests in the environmental arena, there is now a standard formulation initiated by Ministry for the Environment and used by most regional councils for making freshwater states and trends look better than what they really are.

Usually, the first trick is to make it look like there is considerably more water available than anyone could ever need or possibly pollute. This is done by presenting the total annual rainfall, and then revealing the comparatively small amount of that taken for irrigation and industry. The implication being that all the water not used is 'wasted'.

In reality there is no such thing as 'wasted water'. The natural full flows are what shape our river valleys, the morphology of the rivers and streams, and everything about them, including the life in them. The rivers and lakes have evolved together with their biology over millennia with full natural flows. Every drop taken has an effect and the other unmentioned impact is that the water that is taken makes its way back into waterways in a much poorer state.

The next 'trick' involves shifting the goalposts and claiming after applying less strict limits that there is no problem. You simply set the limits for pollutants to match the most degraded waterways, and then you can write state-of-the-environment reports showing how most of the sites have acceptable levels of pollution.

A great example of this goalpost shifting, ironically under the banner 'a fresh start for freshwater', is MfE's radical weakening of the limits for nitrogen in water (which in many parts of this country is the most significant freshwater pollutant).

The long-accepted and scientifically robust Australasian (Anzecc, 2000) standard to protect freshwater ecosystems from algal blooms is less than half a milligram – 0.44 mg/l – of nitrate-nitrogen per litre of water.

Under the new MfE regime, the allowable level has been set at 6.9 mg/l, or 15 times the Anzecc guidelines. The associated 'water quality bands' for nitrate are farcical. Sites with nitrate levels more than double the previous (Anzecc) limit score an 'A', while sites with more than four times the old limit score a 'B' and those with up to 15 times the limit score a 'C'.

A very similar process to this nitrogen example occurred with human health protection in freshwaters. The data shows that more than half of all monitored sites fail Health Ministry guideline levels. To get rid of this embarrassing statistic MfE shifted the minimum standard from 'contact recreation' to 'wadeable'. This sleight of hand combined with the nitrogen trick meant MfE could then write in its 'Environment Aotearoa 2015' report that most sites meet the standards for human health and nitrogen levels.

The third trick in the formula is to fiddle with trend statistics to make it appear that there is no change in water quality, implying that things are not getting worse.

To do this you select a short time period from a long data set, thereby reducing the number of data points analysed, so the possibility of any change being picked up is drastically reduced. For example, MfE use only the last 10 years of records from a 25 year data set sampled annually. By doing this it makes it virtually statistically impossible to get a statistically significant change.

This misrepresentation of reality has a name: agnotology. This term was coined by Stanford University's Robert Proctor, who studied the

antics of the tobacco industry. The definition of agnotology is: Culturally induced ignorance or doubt, particularly the publication of inaccurate or misleading scientific data to spread confusion and deceit, usually to sell a product or win favour.

It's not just our environment ministry indulging in agnotology; the Ministry for Primary Industries (MPI) is up to the same tricks when it comes to fisheries. To see the contradictions for yourself compare both Forest & Bird's 'best fish guide' and the recent fish dumping reports from independent Auckland University researchers, with the MPI reports and webpages.

Recently a team of young New Zealanders (Choose Clean Water) presented to the Local Government and Environment Select Committee a 14,000 strong petition to have 'swimability' as the bottom line for rivers, rather than 'wadeability'. Instead of being supported by MfE, the agnotological formula of spin and denial described above was trotted out by MfE staff to the committee.

I have come to expect agnotology from industry, but it makes me angry when it comes from 'public servants'.

I'm especially angry when a dedicated group of young people are undermined by the ministry tasked to support them. It is especially galling when you consider that the toxic legacy of freshwater pollution spun and denied by the ministry will most impact these young people.

Covering up and spinning the reality of environmental degradation fails us all. Am I asking too much to expect honesty from government departments? **WNZ**



IT'S LIKE HAVING A 360° VIEW OF YOUR SAMPLE.



The next standard in the evolution of turbidity.

Only the new TU 5 Series Lab & Process Turbidimeters with 360°x90° Detection™ deliver unprecedented confidence that a change in your reading is a change in your water. See for yourself at hachtu5.com



If our taps run dry – just imagine



A glimpse of the future by **Mike Axton** (left) and **Brian Horton** from Aurecon and the company's new blog called Just Imagine.

In the developed world, expectation is nothing less than a right. We open the tap, and we expect clean drinking water to flow. We switch on the lights, and bulbs must illuminate. We swim in waterways that must be safe and free from bacteria.

It's often said that we don't realise what we have until it's gone. This is perhaps how some of the 1.7 million residents of South Australia felt the evening of 29 September 2016, when severe storms toppled power transmission towers and left their state in darkness. The infrastructure that ensured the steady provision and flow of electricity went largely unnoticed and unappreciated, until it was no longer doing its job.

The resource supply systems undergirding our cities are currently pressed from numerous sides.

Many cities are facing the real possibility of a perfect storm that will push their infrastructure close to breaking point unless a radical shift in thinking is embraced. The confluence

of our insatiable appetite for urbanisation coupled with an unpredictable climate, all superimposed on infrastructure that is decades old, is demanding new thinking.

Ongoing demands for upkeep and expansion have an eye-watering price tag. Water infrastructure is a multibillion-dollar asset that, if we were currently to overhaul and redo, would likely drain an entire city budget. Sydney alone will spend \$2.2 billion on water infrastructure in the next four years.

As the tidal wave of urbanisation increases in the coming 20 years, how can governments and water authorities manage the compounding pressures on limited resources, coupled with the adverse effects of adverse climate change? The public purse and taxpayer pool will have to somehow satisfy the living standards and expectations to which communities have become accustomed.

About 40 percent of the world's population currently lives in water-stressed areas. With three billion more people added to the planet by 2050, water scarcity will soon become a matter of life or death. We face lower and lower tides on our water supplies.

The world of water in a decade's time will see people expect exactly the same level of service (if not better), yet the problem will have grown in complexity. More pipelines are only a part solution. It's a paradigm shift that's called for: the utility authorities will need to change people's behaviour through better digital interaction with water.

If we fail to address the social mind-sets driving city planning up until now, our problems will only get worse. But if we can use the digital world to sidestep this static analogue problem, we can turn crisis into opportunity.

Digital technology allows us to step back and 'smart up' around the current cycle of water consumption and wastage. We can begin to see the grim reality of limited supply as the 'dark room' of innovation, whereby bold new ideas can be born to secure societal welfare in future uncertain times.

Moving from point A to point B

Up until now, we have lived in an analogue-based society. Our infrastructure is essentially 'dumb', marked by physical variables that function independently of one another. But as digitalisation and mobile technology continue to evolve at pace, the systems and spaces we inhabit will begin to catch up.

The flow of water through a city's network of steel and copper waterways will someday be analysed and controlled by smart grids. Our analogue world will become digitised; we will cross over. But where does this leave our clients today, when we stand on the precipice of change and don't see a bridge in sight?

Our job is to build that bridge through digital transformation. Our current 'unintelligent' analogue systems must be progressively transformed if we are going to change user behaviours through their enhanced interaction with the precious resource they are consuming.

Real-time predictive analytics can draw the best out of our limited water supply by offering simple, intuitive, and meaningful insight into unique infrastructure. This, in

turn, can be transferred into optimal and cost-effective management strategies that keep the water cycles healthy.

Getting one step ahead

Installing predictive maintenance applications can feel at times like a Herculean task. But statistics alone present a convincing argument that motivates a speedy change of gears into digital integration.

While the demand for freshwater is increasing by 64 billion cubic metres annually, the US alone loses 2.1 trillion gallons of treated water every year due to pipe breaks, leakages and mismanagement. This economic loss amounts to trillions, with a downward chain reaction on food prices, health and sanitation.

Connecting these assets into a real-time monitoring network will reduce the time it takes to discover and solve problems that historically appear only when they literally surface. That same data can be applied as red alerts to motivate preventative maintenance and mitigated risk into the future.

"The flow of water through a city's network of steel and copper waterways will someday be analysed and controlled by smart grids. Our analogue world will become digitised; we will cross over. But where does this leave our clients today, when we stand on the precipice of change and don't see a bridge in sight?"

Smart meters, high-tech leak detection devices and water data software are starting to offer sophisticated and granular information on how to maximise profit, impact and environmental sustainability within water management and distribution systems. The municipalities who are taking heed are gaining traction in the future-ready race.

Contextualising the issue

The 'magnifying glass' or micro approach to problem solving is no longer viable within the context of our interconnected digital world. If we don't contextualise the water crisis under the bigger themes of climate change and urbanisation, we could solve a water problem, while unintentionally creating an economic one.

Our water problems will not ultimately be solved by throwing water solutions at them. Water cannot be seen as an isolated utility, but an integrated variable in the quest to solve societies' major problems. If we are to ensure this precious commodity's sufficient supply into the future, we have to adopt new ways of thinking around our capability and responsibility to steward the resource. Smart cities are the only solutions with shoulders broad enough to buffer the oncoming high tide of overpopulation. **WNZ**



Can you survive 24 hours without turning on the tap? Taps Off Day is being organised by leading anti-poverty group Oxfam, and is taking place on March 22.

Kiwis around the country are being challenged to go a whole day without turning on their taps – at home and at work – in a new project hoping to provide easy access to clean water for our Pacific neighbours.

Taps Off Day is being organised by leading anti-poverty group Oxfam, and is taking place on March 22, in support of families and communities in places such as Vanuatu and Papua New Guinea who do not have access to safe water.

The project was launched at the beginning of this month with the release of a short film starring award-winning satirist and writer Te Radar. The film can be seen at www.tapsoff.org.nz.

While going 24 hours without being able to turn on the taps might seem like a wild idea to most Kiwis, it is a daily reality for many people in the Pacific.

Oxfam is hoping thousands of Kiwis will take part in Taps Off Day. Those taking the plunge can't turn any taps on from midnight, but can fill up bottles, buckets and other containers with water the day before. And, yes, flushing is allowed.

Money pledged towards the event will go to Oxfam's water, sanitation and hygiene projects in Papua New Guinea and Vanuatu. Papua New Guinea currently has one of the lowest rates of access to clean, safe water in the world.

"We're fortunate here in New Zealand to have easy access to water that is clean and safe to drink," says Charlene Fitisemanu from Oxfam.

"Most of us don't even think about what it'd be like not to have an endless supply of this life-giving liquid at our fingertips.

"However, many of our neighbours in the Pacific aren't so

lucky, and have to walk for hours to the nearest water source – often a river that's used for everything from drinking and washing, to bathing and using the toilet.

"We can all help improve this by taking part in Taps Off Day on 22 March, to help those who don't have a tap by not turning ours on for a whole day. The money raised will do real good in helping alleviate water poverty for people in the Pacific."

To take part, register at tapsoff.org.nz, pledge a minimum of \$10 and turn off your taps for 24 hours from midnight on 22 March.

"In Papua New Guinea, women and girls spend hours every day collecting water from rivers that's often not even safe to drink," comments Kiwi celebrity Te Radar, the face behind the campaign.

Supporting Taps off on World Water Day

Water New Zealand is supporting the Taps Off Day and encourages all members to participate in this national campaign.

We all know the importance of water so let's support the initiative and see if we can make a real day of it! We want the 4.5 Million people of our country to be thinking about water, not just the water industry!

The promotion of this event has also been kindly sponsored by GHD, MHW Stantec, Cuesko, Lautrec, Asmuss Plastics, and Ecoflow.

“By taking part in Taps Off Day, you can help them access clean water, so that they and their families can lead safer, healthier lives.”

Auckland Civil Defence Director John Dragicevich says Taps Off Day is not only a way to recognise the hardship of our Pacific neighbours, but it is also a wake-up call for us locally. Auckland Civil Defence is supporting this campaign as a reminder that we are not immune to natural disasters affecting our water supply.

“We know that the average New Zealander uses about 200 litres of water every single day,” he says.

“Taps Off Day is a great way to raise awareness of the issues we would face if our local water supply was ever to be compromised. It is a reminder to check our emergency supplies and to think about how prepared we are.”

Oxfam’s work in Papua New Guinea and Vanuatu includes water, sanitation and hygiene (WASH) projects that focus on improving the health of rural communities, through access to safe water supplies, sanitation facilities and improved hygiene practices.

Taps Off Day marks World Water Day held annually on March 22 as a means of focusing attention on the importance of freshwater and advocating for the sustainable management of freshwater resources.

• For more information visit oxfam.org.nz and acenz.org.nz **WNZ**



Lorakau Village, Vanuatu.

If you're taking part in Taps Off Day, then please:

Only use water you've collected in buckets and water vessels to drink, cook and bathe. But you can flush!

- Remember that Taps Off Day starts at 12.01am, so it's best to get ready the evening before. The challenge finishes at 12pm that night.
- If you're doing exercise, or anything else, that requires heavy exertion remember to prepare sufficient supplies.
- Stop the challenge if you're feeling light-headed and you're running out of supplies.
- Share your efforts on social media using the hashtag #tapsoffday.

HOW HEALTHY ARE YOUR PIPES?

We advise utilities and councils
WHEN & HOW to renew ageing
pipelines to optimise service,
cost and sustainability.

Our services include:

- Investigations and condition assessments
- Risk management and criticality assessments
- Renewal strategies
- Trenchless design and delivery management
- Procurement and project management

Contact us

- ✉ info@projectmax.co.nz
- 🏠 projectmax.co.nz



ProjectMax
Optimising Pipeline Renewals

Out with the old, in with the new.



By **Helen Atkins**, partner,
Vicki Morrison-Shaw,
senior associate –
Atkins Holm Majurey

In this article we provide an overview of developments in relation to a number of legislative instruments, including: the Resource Legislation Amendment Bill, the National Policy Statement on Urban Development Capacity 2016, and the Fire and Emergency New Zealand Bill.

We also provide a brief overview of a couple of cases that have caught our eye over the past couple of months.

Resource Legislation Amendment Bill

The proposals in this Bill have proved rather controversial with the Government finding it difficult to obtain enough support for the Bill to pass it in its present form. Indeed, the Government sought an extension for the Select Committee report back date for the Bill until November 7, 2016 last year but was unable to obtain support for the extension.

To overcome this issue, the Government had the Select Committee report the Bill back pro-forma (essentially as it was when it was first referred to the Select Committee) and then rather than allowing it to have its second reading, the Government put forward a notice of motion referring it back to the Select Committee with a new report back date of 10 May 2017. While a number of other political parties opposed the move, the approach was ultimately confirmed by the Speaker of the House as one which had been used on a number of occasions previously and was therefore open to the Government in this case.¹

National Policy Statement On Urban Development Capacity

Last year the Government consulted on a proposal to establish a National Policy Statement (NPS) for Urban Development Capacity. The proposed NPS was directed at ensuring there was sufficient development capacity to accommodate urban growth. Submitters (including Water New Zealand) identified a number of issues with the proposed NPS and sought a number of changes.

The National Policy Statement on Urban Development Capacity 2016 which came into effect on 1 December 2016 (NPS UDC) included a number of changes which were made in response to submissions but did not fully address all of the issues raised by submitters. In relation to the key issues raised by Water New Zealand, it is notable that:

- Contrary to the relief sought by Water New Zealand the NPS UDC does not:
 - provide guidance as to the form additional urban development capacity should take – intensification, expansion or both;
 - recognise nor address issues such as construction resourcing, attitudes to growth, and the fragmented consenting system which may impact both capacity and/or the subsequent take up of that capacity;
 - resolve or address the potential for conflict with other national policy statements and other legislative instruments.
- infrastructure has been split into two types:

- “development infrastructure”, which is defined as comprising the 3 waters and land transport infrastructure controlled by local authorities; and

- “other infrastructure”, which is defined as including open space, social and community infrastructure, telecommunications, energy, open space and land transport/ other infrastructure not controlled by local authorities.

- In terms of funding of infrastructure, the NPS UDC imposes a requirement on local authorities to ensure there is sufficient funding by including funding for such works in their long term plans.
- a new policy has been included to require decision makers to have regard to the efficient use of urban land – however there is no express requirement to consider the quality of the development outcomes on that land.
- while there is a policy encouraging collaboration and co-operation between local authorities who share jurisdiction over an urban area there is no requirement for a broader (eg, region-wide approach).
- the housing and land assessments remain with local authorities – (Water New Zealand had sought that these responsibilities be transferred to the Ministry for the Environment for smaller local authorities).
- the NPS UDC has been brought into effect ahead of the remainder of the proposed Resource Management Act reforms.

With the NPS UDC now being operative, the focus for central Government has now shifted to providing implementation and guidance to local authorities as to how to undertake their responsibilities under and best give effect to the NPS UDC. In this regard, the Ministry for the Environment and the Ministry of Business Innovation and Employment have been working together to develop an implementation programme. This programme comprises the following work streams:

- Monitoring market indicators;
- housing and business development capacity assessments;
- responsive planning;
- consenting processes;
- future development strategies;
- monitoring and evaluation (ie, monitoring the implementation of the NPS UDC and evaluation of the effectiveness of the NPS UDC); and
- communications and engagement.

Further information on the progress of the various work streams and make-up of the various advisory groups is expected to be available in the next month or two. It is understood that the Ministries are aiming to have guidance statements available for each of the different work streams between May and September this year.²

Fire And Emergency New Zealand Bill

The Fire and Emergency New Zealand Bill was introduced last year to give effect to a single unified fire services organisation for New Zealand. Submissions closed in August

¹ New Zealand Parliament, Resource Legislation Amendment Bill – Recommittal, Hansard Debate 10 November 2016. Available here: https://www.parliament.nz/en/pb/bills-and-laws/bills-proposed-laws/document/00DBHOH_BILL67856_1/tab/hansard.

² For further information on the current state of play refer to the Ministry for the Environment's website: <http://www.mfe.govt.nz/more/towns-and-cities/national-policy-statement-urban-development-capacity>.

and the Select Committee released its report on 22 December 2016 recommending that the Bill be passed but with some amendments.

Water New Zealand made a submission on the Bill which sought:

- more proactive consultation between Fire and Emergency New Zealand (FENZ) and local water organisations;
- better co-ordination between organisations operating in the emergency sphere;
- the appointment of a regional relationship manager; and
- changes to specific clauses including:
 - clause 20 – to require the appointment of representatives from the local council or local water organisation to the local committee;
 - clause 41 – to clarify the relationship between FENZ and local councils in terms of use of water and ability to change water pressure in emergency situations;
 - clause 45 – to require the consent of the local water authority to use water for emergency and training purposes;
 - clause 63 – to clarify that the code of practice would replace current codes, to ensure water organisations were in the list of consultees, and to require consideration of local water limitations; and
 - clause 64 – to require prior notification to local councils when FENZ is undertaking water supply checks and to give consideration to traffic issues while such checks are taking place.

Most of the changes made by the Select Committee were to provisions not directly relevant to the water sector or Water New Zealand's submission. One positive change is the recommendation to include a new clause (13A) which sets out the purpose and functions of local advisory committees. These functions include local engagement, advice and planning. In carrying out these functions FENZ is required to consider the interests of FENZ volunteers and industry brigades as well as relevant current operational service agreements and any memoranda of understanding.

There is no specific requirement for consultation or greater coordination and no requirement for prior consent of the councils. This appears to be on the basis that the Committee considers that FENZ will consult and notify as a matter of course:

"We queried the powers provided to FENZ in clause 41(a) of the Bill, to cause water to be shut off from, or turned into, any pipe to obtain greater pressure, and enable firefighters to access water mains. Our primary concern about these powers was the negative consequences that may arise from altering or shutting off water supply, for example, the impact this may have on a dialysis patient. We were informed that fire personnel would contact the relevant water organisation to take appropriate action when necessary. Firefighters do not access water mains or pipes themselves. Water organisations can identify if there are any vulnerable customers in the area. Additionally, we were assured that dialysis patients are trained in what to do if their water supply is suddenly shut off during an emergency. We are confident that the appropriate steps would be taken when exercising these powers."³

A full copy of the Committee's report on the Bill is available

on the Parliament website.⁴ The next step is for the Bill to be read a second time.

Case Law Update

There have not been that many cases since our last case law round-up late last year. We have therefore gone back a little earlier to provide an overview of a couple of cases that came out in the last half of last year. The first of these places another obstacle in the path for the establishment of the Ruataniwha water storage scheme proposal; and the second is a case regarding the appropriateness (or otherwise) of proposed restoration activities at Lake Horowhenua.

Royal Forest and Bird Protection Society of New Zealand Incorporated v Minister of Conservation [2016] NZCA 411.

One of the key issues that the Hawkes Bay Regional Council's water storage proposal faced was that part of the land to be flooded was part of a conservation park, which is subject to a statutory prohibition against disposal or exchange. To overcome this issue, a proposal was made to exchange certain land for that area and to revoke the conservation park purpose of the area. The Director General agreed and revoked the conservation park purpose and replaced it with a stewardship designation. It was the revocation decision which was subject to challenge by Royal Forest and Bird. There were also cross appeals regarding the marginal strip.

The appeal was dismissed in the High Court as the Court held that the Director General had acted lawfully by satisfying himself that the decision was properly based on conservation purposes interpreted broadly.

However, the Court of Appeal disagreed with the High Court. After setting out its views on the Conservation Act 1987 provisions, the Court of Appeal found that the process that the Director General followed led to an unlawful decision:⁵

"The Director-General did not inquire into whether the 22 hectares should be preserved because of its intrinsic values or protected in its current state to safeguard the option of future generations where the scientific evidence established its ecological significance. Nor did he inquire whether preservation or protection of the area in its current state was not practicable. Nor did he inquire why the 22 hectares should lose conservation park status when its inherent characteristics remained unchanged and otherwise deserving of protection and preservation. This factor assumes particular relevance where destruction of the 22 hectares – land previously deserving of special protection – was the inevitable consequence of his decision. The decision would free much of the land to be submerged and cease to be land; there could not be a more fundamental corruption of its intrinsic value.

The Court considered that the revocation decision had been made for the sole purpose of expediting the proposed exchange, and had the effect of "circumventing a statutory prohibition that had been the subject of careful legislative consideration

³ *Fire and Emergency New Zealand Bill*, As reported from the Government Administration Committee, Commentary at page 14.

⁴ https://www.parliament.nz/en/pb/sc/reports/document/51DBSCH_SCR72243_1/fire-and-emergency-new-zealand-bill-148-2

⁵ At paragraph [75].

before its enactment”.⁶ Accordingly, the Court ultimately found that the revocation decision was unlawful and should be set aside and that the Director General should reconsider the application in accordance with the terms of the judgment.

Hokio Trusts v Manawatu-Wanganui Regional Council [2016] NZEnvC 185

This was an unusual case in that all parties were in agreement that restoration activities should be undertaken – the issues arose from the proposed restoration methods selected and the perceived effects of those methods on ecological matters and tangata whenua values.

Weed harvesting and the reduction of sediment by the installation of a sediment trap were the two short-term restoration methods proposed. In terms of ecological matters the Court found that:

- the most likely outcome of weed harvesting was a significant reduction or elimination of the toxic blooms and a significant reduction in the release of unionised ammonia which was toxic to the fish;
- any adverse effects of weed harvesting were no more than minor and could be appropriately managed via conditions;
- the Council had proposed a cautious adaptive management approach which adequately addressed the tests set out in the

⁶ At paragraph [74].

decision of the Supreme Court in *Sustain our Sounds*;⁷

- the sediment trap would have no discernible adverse environmental effects and would make a significant contribution to the short-term management of sediment and nutrient in-flow to Lake Horowhenua.

In terms of effects on local Maori, the Court accepted that Lake Horowhenua had historically been the ‘food basket’ of Muapoko and that the degraded state of the Lake diminished the strong cultural values associated with it.

The Court also accepted that there were a number of groups within Muapoko that had cultural ties to the lake and that there were differing views between these groups on how restoration should be achieved.

While some groups supported the proposals – others (including the Hokio Trust) opposed. In the end the Court found that the Hokio Trust had failed to establish that the restoration activities would have adverse effects on tangata whenua values. The Court considered that the restoration measures would also assist in restoring the mauri of the Lake and that the ongoing involvement of the Lake Trust (which was comprised of iwi members) would foster the relationship of iwi with the Lake. The appeal was dismissed and the consent was granted with a few amendments to the conditions. [WNZ](#)

⁷ *Sustain Our Sounds Inc v New Zealand King Salmon Company Ltd* [2014] NZSC 40, [2014] 1 NZLR 673.

85% OF LIFT STATIONS ARE NOT PREPARED

ARE YOU UNPREPARED...

...for wipes and rags overwhelming your pumps?

It is not the pump's fault – they are only designed for “normal sewage”.

Muffin Monster® Grinders with Wipes Ready™ Technology will take care of the difficult and unexpected debris. They are designed to shred wipes, rags and other solids that often clog pumps.

Let Muffin Monsters® grind so pumps can do what they do best – pump.

JWC Environmental
Total Resource Quality

Contact Us Today For More Details
toll free: 800.331.2277 phone: 949.833.3888
email: jwce@jwce.com web: www.jwce.com

MacEwans
Pumping Systems Ltd

Reviewing the Pipe Inspection Manual

By **John Pfahlert**, Chief Executive of Water New Zealand and **Steve Apeldoorn**, Director at ProjectMax



The New Zealand Pipe Inspection Manual (NZPIM) was created in 1989 to provide the water services industry with a standard approach for the inspection of non-pressure drainage pipes, the classification of the defects and features observed, and the determination of an overall condition code.

It was largely based on the UK Water Research Centre (WRc) Manual of Sewer Condition Classification published in 1980.

The overall approach adopted in that manual has remained largely intact over the years, while being progressively improved to accommodate new technologies and fine-tuning of the processes and outcomes. There are now a number of documents in use around the world, including UK, Europe, USA, Australia and New Zealand that share these roots.

In 2016 an overall framework was assembled to provide a range of relevant and useful reference documents, standard approaches and specifications for the New Zealand water services industry. This is driven through a multi-year collaboration of the University of Canterbury's Quake Centre, Water New Zealand and IPWEA.

An update of the NZPIM was identified as a priority project given its relevance and its perceived relative ease of implementation. ProjectMax was responsible for the 3rd Edition update of the NZPIM in 2006 and was engaged to define the depth and breadth of the update to ensure that any changes aligned with industry needs and preferences.

The NZPIM is the only document of its type in use in this country and is supported by council asset owners, CCTV contractors and industry suppliers. Any changes therefore require careful consideration to ensure the NZPIM remains the defacto standard for CCTV inspection and condition assessment.

The Scoping Review progressed through a series of well-defined steps.

Literature Review – A survey of relevant documentation and approaches from around the world, particularly

countries that New Zealand has working relationships with such as Australia and the UK.

Industry Survey – The literature review informed the generation of a survey circulated across the pipe inspection industry. This generated 54 responses, mainly from Local Government, which on the whole conveyed a consistent view of the changes sought.

Engagement of a Steering Group – 18 people from the CCTV industry and councils were engaged to provide guidance and comment. There was broad consensus on the issues and no objections to the Scoping Review recommendations of any consequence.

Formulation of Recommendations – The Scoping Review contains recommendations arising from the above and, once approved, is intended to inform the next phase which is actually generating the NZPIM update

Comprehensive changes are recommended to the 2006 NZPIM that will improve the ability of the industry to scope the works required, undertake inspections to a consistently high quality standard and then interpret the outcomes in accordance with best asset management practices. The content will also recognise new technologies now available and the way data is managed.

Specific mention is warranted for Pressure Pipelines, Pipe Condition Grading and Pipe Defect Classification. The recommendations for these go beyond the relatively obvious opportunities for updating, expanding and improving the content of the current NZPIM.

Pressure Pipelines

The current NZPIM deals only with CCTV and its application to gravity drainage pipes, typically for stormwater and wastewater. No equivalent single document exists for the inspection and condition assessment of pressure pipes typically used for water supply and wastewater rising (pump) mains. The survey revealed a clear desire for a pressure pipe manual. While the overall principles are similar for both

gravity and pressure pipes the technologies and approaches involved are quite different. It is therefore recommended that this proceed as a separate project.

Pipe condition grading

One of the most important outcomes of a pipe inspection is the overall assessment of its condition as it gradually deteriorates from 'As new' to 'At end of useful working life'.

This decline is typically characterised by scores of 1–5 respectively. This is the basis of the proposed meta-data standards and the IPWEA International Infrastructure Management Manual (IIMM). It also provides the ability to compare pipe condition with other water services entities across the nation and the world.

The pipe condition grading process in the current NZPIM does not yield outcomes that align with the proposed meta-data standards or the IIMM and a number of changes are recommended that will generate a better alignment.

Pipe defect classification

The NZPIM shares roots with other prevalent asset inspection guidelines around the world and uses similar descriptions for similar defects and features. However, 'similar' is not sufficient to benchmark, at a defect level, against countries using a slightly different classification system.

The only way to ensure compatibility at a defect level is to adopt the classification system used by the jurisdiction that we wish to compare ourselves with. While this is possible it comes with a number of issues. Inspection operators and engineers would need to be retrained, comparison with past inspections would be difficult and the industry may fracture into 'old' and 'new' classification groups. We would also potentially lose control over the future evolution of the system.

If the recommendations on Pipe Condition Grading are accepted, and overall pipe condition is expressed using meta-data standards that are equivalent to other jurisdictions, this will still allow informed and valuable engagement with other worldwide entities. It is widely believed that this is the level of engagement that is most likely to occur and would be the most valuable.

In recognition of these points, the recommendation is that New Zealand should continue with an enhanced and expanded version of the current NZPIM pipe defect classifications.

The proposed scoping of the review of the NZPIM will undergo significant consultation with the industry in 2017.

It is intended to call for expressions of interest to update the 2006 NZPIM later this year. **WNZ**

HAWKINS ARE WATER EXPERTS

We are project delivery specialists; developing, constructing and maintaining safe and sustainable underground infrastructure for the three waters, energy and transport sectors. Let's move ahead, together.

hawkins.co.nz



Delivering clog-free pumping

Solving wastewater challenges in North East Victoria, Australia with the world's first wastewater pumping system featuring integrated intelligence. By Adrian Rijnbeek, sales engineer, Xylem, and President, Water Industry Operators Association of Australia.

North East Water provides water and wastewater services to 41 localities across North East Victoria, Australia, serving an estimated 122,000 people in an area of approximately 20,000 square kilometres. The region extends from Corryong in the east, along the Murray River to Yarrawonga, then south to Benalla and the alpine towns of Bright, Mount Beauty and Dartmouth.

The municipal sewer pump station at Jordyn Terrace in Wangaratta receives very challenging wastewater containing a large quantity of sanitary items, and other fibrous waste objects, that cause 'ragging' of the pumps. This resulted in pumps having to be lifted and unblocked twice or three times every week.

In July 2016, North East Water became the first water business in Australia to install Xylem's Flygt Concertor system with the aim of resolving this issue and delivering clog-free pumping to Jordyn Terrace wastewater pump station.

Since the installation in July 2016, station managers have reported no blockages or clogging issues at the station, as well as a cleaner station with less visible material in the sump.

The challenge

Jordyn Terrace in Wangaratta, North East Victoria, is located within a busy residential area as well as being situated close to a retirement village. The pumping station receives very challenging wastewater including personal sanitary products and towelling that caused the pumps to clog a number of times each week. This frequent clogging required operations and maintenance staff to travel to the site to remove the blockage up to three times a week.

"As a result, operation and maintenance staff had to leave their daily work schedules to travel to the pump station, unclog the pump and get the station up and running again," says Grant Waite, manager assets and operations for North East Water.

"In addition to man-power, a maintenance crane truck was needed to perform the pump lifts which meant it had to be taken away from other projects, which added further expense to the repair job."

New integrated clog-free technology

In July 2016, North East Water agreed to have Flygt Concertor installed at the Jordyn Terrace pump station in order to resolve the chronic clogging experienced at the station.

The team had high hopes in this new system, as it combines Flygt's well-known self-cleaning hydraulics, Adaptive-N, as well as intelligent



Xylem's Flygt Concertor at Jordyn Terrace Pumping Station.

functionalities like pump cleaning. This function activates when a clogging instance is detected and starts operating the impeller at different speeds and directions to remove the debris. Its efficiency has been proven in many applications all over the world and, together with other functions that ensure trouble-free pumping, offers a new level of reliability.

After installing the Flygt Concertor system, clogging issues at the Jordyn Terrace wastewater treatment plant were completely eliminated. "We have found Xylem's Flygt equipment to be of excellent quality so we were happy to trial the new wastewater pumping system," says Waite. "The trial pump we received is still running in our station and so far we haven't had one single case of clogging."

Peace of mind in the long run

Concertor's short term results in Jordyn Terrace were certainly a relief for the station's operators but their main concern was to find a sustainable solution that can bring peace of mind in the long run.

This is where the system's flexibility played an important role. One of its main hardware elements, the pump impeller, is offered in three different materials, to adapt to different conditions: Hard-Iron, Duplex Stainless Steel and Stainless Steel.

A high chrome alloy, Flygt Hard-Iron is five times more wear resistant than duplex stainless steel. In accelerated wear tests, Hard-Iron kept working efficiently and showed minimal wear after pumping water with a very high concentration of extremely abrasive particles. This durability and reliability saves customers time and money.

"The Hard-Iron impeller will ensure that the current pump performance is maintained for extended periods," says Waite. "In an application like this, with wastewater that contains a high level of non-biological solids, it is the best option."

Compact design and more functionality

Flygt Concertor is proof that new technologies with sophisticated integrated intelligence for wastewater pumping do not require more components or complexities, rather Concertor is user friendly and simple to install, commission and operate.

"Since Flygt Concertor has been installed we haven't experienced any clogging issues at the station which is a dramatic improvement to how the station's old pumps had been running," says Waite.

"The new wastewater pumping system has also had a positive impact on the local community – less visits to the station by large maintenance trucks and personnel. Station managers have also reported that the sump is cleaner as a result."

Flygt Concertor will be available from early 2017. For more information, visit Flygt.com/one-ultimate-system **WNZ**

NEW

CONCERTOR™ PUMPING SYSTEM WITH INTEGRATED INTELLIGENCE

WORLD'S FIRST WASTEWATER PUMPING SYSTEM WITH INTEGRATED INTELLIGENCE

This revolutionary system delivers optimal performance while reducing your total cost of ownership. It also offers unparalleled flexibility and simplicity on a whole new level. You might even say it thinks for itself. We invite you to enter a new era in wastewater pumping with Flygt Concertor.

See Flygt Concertor for yourself at the Water Industry Operations Group New Zealand Conference in Queenstown, 3rd - 5th May 2017.

One powerful solution. Unlimited possibilities.



- Repair, test & maintain backflow prevention devices
- On site surveying for Backflow prevention, cross connection control
- Specific design and manufacture of boundary control units to suit your individual needs

Jon Lewis
 Mob: 0274 974 271
 E-mail: jon@backflowprevention.co.nz
www.backflowprevention.co.nz

CIWEM HAS A NETWORK OPERATING IN NEW ZEALAND.



**It is the only Royal Chartered
professional body dedicated to
water and the environment sector.**

**If you'd like to explore how to become a
chartered professional in NZ go to:
www.ciwem.org**

The Chartered Institution of Water
and Environmental Management

**Contact Dan Stevens: dan.stevens@beca.com
 or Peter Brooks: peter.brooks@greenscenenz.com**

WATER LEAK DETECTING EQUIPMENT

We supply water leak detectors, leak correlators,
pipe & cable locators and associated equipment
to councils and contractors.

We also offer a water leak detecting service.

DETECTION SOLUTIONS

P.O. BOX 38-061, HOWICK, AUCKLAND
 Ph: 0-9-576 8000. Fax: 0-9-576 4641

Bio-Augmentation Specialists

Proven Results in Sewage Treatment Process

- Improved Nitrification /De-nitrification
- Less Sludge Production
- Less Odours
- Energy Reduction in Aeration



Email: shanem@forearth.com.au
 Website: www.forearth.com.au

Health ministry approved microbiology testing

While most potable water is treated to disinfect and kill or inactivate *Escherichia coli* (*E. coli*), it still needs to be regularly tested for bacterial contamination. Systems using surface water are required to take extra steps to protect against bacterial contamination because surface water sources are more vulnerable to such contamination.

When the health of many is at stake, time is precious and you need answers fast! Thermo Fisher Scientific says its automated, self-contained TECTA B16 microbiology testing system comes to the rescue when a fast and accurate water testing solution is needed.

Common *E. coli* and Total Coliform testing services can have a turnaround time of up to three days. The TECTA B16 can incubate and interpret test results in just two to 18 hours, depending on the level of contamination. Interpretation of pre-incubated samples only takes 60 seconds! *E. coli* can be detected and treated before it spreads and causes public disease outbreaks.

Up to 16 simultaneous tests for *E. coli*, Total Coliform and Faecal Coliform can be conducted by a single TECTA B16 Analyser with an MPN count for level of contamination on positive results. Remote alarm upon detection of bacteria is available via immediate email or SMS notifications.

The TECTA B16 methodology is based on a patented Polymer Partition technology that measures fluorescent enzyme indicators of the target organism. It is not compromised by coloured water samples or high turbidity. Continuous, automatic test monitoring with automated reading/reporting and early alerting eliminates delays and human error, protecting lives and environments, allowing key decision makers to provide timely warnings to the community.

This advanced water testing system can be used onsite, eliminating the costs and delays associated with transporting samples to external laboratories.

The pre-prepared media cartridges provide significant time savings, greatly reducing laboratory costs. The test cartridges are pre-filled with all required media, eliminating the need for additional reagent preparation, sample handling, dilution or mixing. The TECTA B16 automated detection system, coupled with email/SMS reporting, also eliminates the need for manual, out-of-hours results interpretation, reducing staff and operational costs – an important consideration for time-and-cost conscious utilities.

Our Ministry of Health evaluated the TECTA B16 as an alternative method for testing *E. coli* for bacterial compliance in drinking water, comparing it to approved traditional methods. Approval testing was conducted at the laboratory of Watercare Services, an approved laboratory for the detection of *E. coli* by the Colilert-18 method. Test results confirmed that the TECTA EC/TC Method satisfies all criteria for the ministry, adding to the TECTA method's list of existing global approvals, including being the only automated test for *E. coli* approved by the US EPA.

In response to this approval, Doug Wilton, President & CEO of TECTA-PDS, says: "New Zealand is just one of many countries around the world that have accepted the TECTA B16 method for bacteriological compliance testing, and we are convinced it will add a multitude of benefits for them moving forward."

• Further information on TECTA-PDS and the TECTA B16 system or to request a demo, please email envirozn@thermofisher.com or call 0800 933 966. **WNZ**

Filterra biofiltration gets Auckland Council approval

National specialist stormwater management company Stormwater360 has introduced a unique, innovative solution to the challenges of implementing water sensitive urban design in our increasingly busy urban areas.

The Filterra system from Stormwater360 is an engineered biofiltration device with components that make it similar to bioretention in pollutant removal and application, but it has been optimised for high flow treatment in a prefabricated system.

Occupying a footprint a fraction of the size of traditional rain gardens, the Filterra system is the solution when space is at a premium.

Recently granted Auckland Council approval for a stormwater treatment device for use on private sites, this innovative system is said to be the ideal stormwater treatment for highly developed sites such as landscaped areas, parking lots, and streetscapes.

An adaptable system – it can be used alone or in combination with perforated pipes or chambers to optimise runoff reduction.

Filterra has been certified for TSS, dissolved heavy metals, and oil and grease removal from international agencies including the Washington Department of Ecology. The product has been independently verified to achieve performance equivalent or better than conventional bioretention systems.

Stormwater360 managing director Mike Hannah says; "I see technologies like Filterra as the next step in bioretention aka rain gardens. If you look at the wastewater industry, septic tanks are rarely designed anymore.

MEASURED POLLUTANT REMOVAL PERFORMANCE

| Pollutant | Median Removal Efficiency | Median Effluent Concentration (mg/L) | Third Party Reference Studies |
|------------------------------|---------------------------|--------------------------------------|---|
| Total Suspended Solids | 86% | 3.3 | UVA 2006, Herrera 2009, Herrera 2014, NC State 2015 |
| Total Phosphorus (TAPE) | 70% | 0.05 | Herrera 2014, NC State 2015 |
| Total Nitrogen | 34% | 0.54 | NC State 2015 |
| Total Copper | 55% | 0.004 | UVA 2006, Herrera 2009 |
| Dissolved Copper | 43% | 0.003 | Herrera 2009 |
| Total Zinc | 56% | 0.04 | UVA 2006, Herrera 2009, NC State 2015 |
| Dissolved Zinc | 54% | 0.1 | Herrera 2009 |
| Total Petroleum Hydrocarbons | 87% | 0.71 | Herrera 2009 |

Information above is based on results from third party field studies following industry recognised protocols such as TAPE and TARP. Relevant studies are noted for each pollutant, and corresponding data was aggregated to provide realistic and repeatable performance expectations.

"It is far easier to purchase a packaged on-site wastewater system which is proven to be a lot more effective, cheaper and easier to maintain. I see on-site bioretention going the same way."

The Filterra system provides all the benefits of traditional bioretention, but with a reduced footprint and is well suited for the urban environment where land is an issue. There are also grated top and open options for seamless blending into the environment.

Stormwater360 says it has made it easy to design and size a Filterra Biofiltration device via simple 'design your own' tools on its website. "The design tool is very useful in the initial planning stages, saving valuable time and resource," it adds.

Filterra is available now from Stormwater360 or Humes Pipelines.

For more information phone: 0800 786 769 2837;

email: sales@stormwater360.co.nz, or visit www.stormwater360.co.nz **WNZ**

The Next Generation in Rain Gardens

Filterra® from Stormwater360 is a packaged high flow biofiltration solution that works as effectively as a traditional bioretention system, but with a much smaller footprint, lower operational costs, and is easier to implement and construct.

- Auckland Council Approved
- Efficient as a traditional bioretention system but in a footprint a fraction of its size
- **Enhanced Phosphorus Removal**
- **Enhanced Dissolved Metal Removal**
- Lower maintenance cost than traditional bioretention (rain gardens)
- Over 10,000 Installed Worldwide



Stormwater360
BETWEEN SKY AND SEA



Now available at Humes Sales Centres

0800 STORMWATER (0800 786769)

www.stormwater360.co.nz

| | |
|---|---|
| <p>AGRU New Zealand Ltd</p>  <p>Specialisation in PP, PE, fittings & piping systems Phone: 09 299 36 40 Mobile: 021 329 432 r.gruen@xtra.co.nz</p> | <p>Huerner Welding Technology Ltd</p>  <p>Specialisation in Butt Welding, Electro-fusion equipment + tools 12 Croskery Rd, Auckland 2110 www.huerner.co.nz</p> |
|---|---|



- Waste Treatment Ponds
- Marinas • Dams
- Lagoons • Lakes

◆ DESLUDGING

◆ DESILTING

◆ EXCAVATING

 **07 868 1129**

 **admin@hydracare.co.nz**

Aeration, Mixing, SBRs, Dewatering

- Aeration Blowers
- Aeration Diffusers
- High Efficiency Mixers
- Sludge Conditioning

- SBR Process Systems
- Thickening Systems
- Dewatering Systems
- Consultancy



JONASSEN INDUSTRIAL PROJECTS LIMITED
 Process, Design & Environmental Engineers

P: 09 479 3952

E: info@jipl.co.nz

www.jipl.co.nz

THE MIGHTY GRIPPER COMPANY LIMITED

Specialist suppliers of water grab sampling equipment for environmental monitoring

Patricia Bolton
Manager



P O Box 541, Whangarei
New Zealand

E-mail: patriciab@orcon.net.nz

Telephone:
New Zealand 09 556 1400

Website:
www.mightygripper.co.nz

| | |
|------------------------------------|-----|
| Acuflo..... | IBC |
| Applied Instruments Group Ltd..... | 11 |
| Armaterc Environmental Ltd..... | 5 |
| Arthur D Riley..... | 13 |
| Bell Technology..... | 35 |
| Brown Brothers..... | 17 |
| Connexis..... | 25 |
| Deeco Services..... | IFC |
| Eurofins..... | 31 |
| Filtec..... | 9 |
| Hach Pacific Pty Ltd..... | 55 |
| Hawkins..... | 65 |
| Hynds Pipes..... | 22 |
| James Cumming & Sons Pty Ltd..... | 29 |
| MacEwans Pumping Systems Ltd..... | 63 |
| Project Max..... | 59 |
| REZO Water+Energy..... | 45 |
| Schneider..... | 43 |
| Steelpipe..... | 15 |
| Stormwater 360..... | 69 |
| Thermo Fisher Scientific..... | 7 |
| Water Supply Products..... | OBC |
| Waterco (NZ) Ltd..... | 39 |
| Wateroutlook Ltd..... | 47 |
| Xylem..... | 67 |

CLASSIFIEDS

| | |
|---------------------------------------|----|
| Backflow Prevention Ltd..... | 68 |
| CIWEM..... | 68 |
| Detection Solutions..... | 68 |
| For Earth Pty Ltd..... | 68 |
| Huerner Welding Technology Ltd..... | 70 |
| Hydra-Care..... | 70 |
| Jonassen Industrial Projects Ltd..... | 70 |
| The Mighty Gripper Company Ltd..... | 70 |
| Vertec..... | 70 |



Ideal for: district councils, farmers, aquaculture and marine applications



M +64 21 247 1812 | E jason@vertec.co.nz | www.vertec.co.nz

ACUFLO.

NZ OWNED & NZ MARKET COMMITTED
PROVEN PRODUCTS & PERFORMANCE



MANIFOLDS

New Zealand 20 year industry favourite.
Meter, Backflow, Flow Control, Strainer.
Full range. DR Brass or Composite Materials

WATER METERS

Full range of models and sizes.
OIML R49 and ISO 4064 listed
Sensus - Maddalena - Acuflo models



BOXES

Full range of sizes. Superior polypropylene
material. Customised lids, boxes and bases.

BACKFLOW

Full range of models and sizes.
AS/NZ 2845 and ICNZ listed.
Febco - Wilkins - Acuflo models



PERFORMANCE TESTED

All Acuflo products are performance tested against pressure loss and accuracy.



ACUFLO. INDUSTRIES LTD

31 Reeve Street, Levin, New Zealand | Phone 06 368 4996 | Fax 06 367 9201
PO Box 660 | sales@acuflo.co.nz | www.acuflo.co.nz



Technology for efficient water quality management & control

Amiad EBS Filters

The largest automatic self-cleaning filter for fine filtration



Amiad SAF Filters

The automatic self-cleaning filter – suitable for more applications than ever



Krohne Electromagnetic Flow Meters

Precision German engineering from the pioneers of electromagnetic flow measurement



Dorot control valves

State-of-the-art automatic control valves designed for the most demanding water control requirements



Arkal Spin-Klin filters

Reliable, effective self-cleaning SpinKlin® disc technology for clean water



Apollo Backflow Prevention

Easy to maintain, Watermark approved and made in the USA



Arad Bulk Water Meters

Advanced mechanical and ultrasonic technology for maximising water measurement efficiency



Dorot air release valves

Optimised design for air release even at very high air flow velocities

