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JULY / AUGUST 2016 | ISSUE 195



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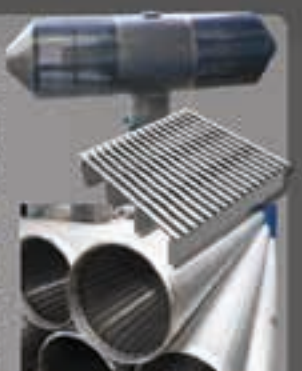
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 ISSN 1179-2949 (Print)
 ISSN 2382-1906 (Online)

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



Setting aspirational goals

Brent Manning, President, Water New Zealand

“The changing background to our water sector has provided cause for the Board to reconsider the future direction for Water New Zealand.”

I have spoken in previous columns around the drivers for change, and the need for change, as it affects our water sector. The government is crystallising its view on the delivery models for water services, and effectively demanding change through legislative reform, albeit subtly.

Your own drive for continuous improvement and a better deal for our customers should require that you regularly review how you do business. In the next year, all councils will be going through the service delivery reviews as required by Section 17A of the Local Government Act. This in itself presents a perfect opportunity for them to revisit the status quo, and identify opportunities for collaboration on performance improvement.

Also, we expect that later this year, the newly drafted meta data standards for water (and buildings and roads) will be available. These in themselves will require change to our current modus operandi for operational and asset management. Water New Zealand is assisting in mounting a bid for Treasury funding to incentivise water utilities to speed up the uptake of the new standards. Your President-elect Dukessa Blackburn-Huettner and I sit on the Governance Group of this multimillion-dollar project.

The changing background to our water sector has provided cause for the Board to reconsider the future direction for Water New Zealand, carried out through a strategic review earlier this year. As a result we have set two new lofty goals for Water New Zealand, namely:

- 1. In three years there is a consistent technical approach by Councils across the 3 waters sector; and**
- 2. In five years, Water New Zealand is the national spokesperson and standard setter on water issues.**

These are aspirational goals, and demand commitment and proper resourcing to give

ourselves the best chance of achieving them. So Water New Zealand has instituted some change of its own, to enable us to provide greater service, support and leadership to you, our members.

Chief Executive John Pfahlert will be recruiting some new key staff to complement our team in Wellington. Details of the new staffing arrangements are provided in an article by John elsewhere in the magazine.

This step change for Water New Zealand requires uplift in our budget, and as a result we will be presenting a change in the structure of membership fees for your consideration at the Annual General Meeting at Conference in October this year. As a Board we have considered ways to achieve the best mix of fees and revenue to keep fees affordable while enabling us to be effective in achieving our new goals for the sector.

I would also like to take this opportunity to publicly acknowledge and thank long term staffers Hannah Smith and Peter Whitehouse who have recently opted to leave Water New Zealand, after seven and 11 years of service respectively to the Association. I have worked closely with both through my time on the Board, and with Peter prior to that on the Water Services Managers Group, where Peter has provided the regular liaison.

Finally, as noted earlier, my successor will be Dukessa Blackburn-Huettner, who will be your President from this year's Conference, which runs from **19-21 October in Rotorua**. We expect a great line-up of technical papers, the exhibition sites are almost all allocated, and for those who attended last year, some further exciting and new changes are 'in the water' with the Conference Dinner and final morning presentations. I hope to see you there. **WNZ**

Brent Manning, Water New Zealand President.

Low flows starve fish – study shows

New research reveals that local authorities have been underestimating how much river flow native fish, trout and salmon need in order to grow and thrive – and that has implications for future water allocation.

A 15-year study carried out by the Nelson-based Cawthron Institute has found that current water-take models are short-changing the needs of drift-feeding fish with flows around half as high as they should be. That should sound a warning for any future allocations for purposes such as irrigation.

Research leader John Hayes points out that “a lot of current minimum flows and allocation rates around the country could be having adverse effects on trout and native fish”.

The Institute’s computer modelling shows that what may be good for dairy risks compromising the multi-million dollar game-fishing industry, says Dr Hayes.

“It’s all about how the changes in flow affect the productivity of a fishery. On one side of the coin is the water the farmers want to increase the productivity of the land. And what’s been happening in the past – and our new model can show this – is that for an increase in productivity on land brought about by taking water out of rivers, you reduce the potential productivity of the fishery. There’s no getting away from that – and that’s what you have to balance.”



Cawthron research team lead scientist John Hayes (front), Karen Shearer and Eric Goodwin (Absent Joe Hay).

PHOTO COURTESY OF CAWTHRON INSTITUTE.

Southland and Otago regional councils have already begun to use the drift-NREI model to revise their minimum flow rules and its potential has been recognised by freshwater scientists in the United States where the Institute’s research was first published in April.

The research has also prompted a call from the NZ Fish & Game Council to reinstate the national standard for water flows.

Waikato water shake up?

Three Waikato councils have reached potential agreement on a major shake-up of water services across the Waikato – but won’t push the “go” button until the public have their say.

Hamilton City, Waipa and Waikato District Councils have unveiled a possible agreement to form a ratepayer-owned water company which one report estimates could save ratepayers \$100 million over 10 years. The tentative agreement, negotiated by nine councillors (three from each council) is to be publicly discussed by the three councils during meetings in June and July.

If it goes ahead, a joint water organisation will be set up, run by an independent Board of Directors, to manage water and wastewater infrastructure in the region. The organisation would be owned by the three councils, with Hamilton City the biggest shareholder. No other councils or shareholders would be involved.

An independent report last year said a single-focused water entity set up as a council-controlled organisation (CCO) would, as well as saving millions, unlock major economic advantages, focus more strongly on environmental issues and help build a more resilient waters network across the region.

However, any decision made now will have to be ticked off by the new councils elected in October and then go to public consultation – which probably won’t happen until next year.

Become a Water New Zealand Member TODAY!

Start engaging now with other members of the water industry. Keep up to date with the latest news, events and trends plus get access to event discounts, industry policies and information, and much more. Join now at www.waternz.org.nz or phone +64 4 472 8925.

Manukau Harbour study

Manukau Harbour’s ecological health will be put under a scientifically-backed microscope for the first time in a complex hydrodynamic study commissioned by Watercare.

The work is part of a strategic partnership between Watercare and NIWA, and will provide much-needed information on how nutrients enter the harbour and how they subsequently move around the harbour and the lower levels of the foodweb.

Watercare chief executive Raveen Jaduram says the model will establish a very clear understanding of the various factors that affect the health of the Manukau Harbour and provide a “sound, scientific basis for collaborative decision making”.

WATER – COMING UP

This next issue of *Water* will be published in September.

Its lead theme is the Contracting Community with sub topics including **Water Quality** and **Modelling**.

Features on recent projects of interest to the 3 Waters community are also welcome.

The deadline for copy is Monday 29 August.

Please contact managing editor, Alan Titchall alan@contrafed.co.nz or phone +64 9 636 5712 if you have any story ideas, contributions or photos.

For all advertising, contact Noeline Strange on

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To view 2016 themes, visit www.waternz.org.nz

WATER NEW ZEALAND CONFERENCES

Annual Conference & Expo 2016 – ‘Pathways to Excellence’

19 – 21 October, Rotorua Event Centre, Rotorua

For more information, visit www.waternzconference.org.nz or contact waternz@venues.co.nz

OTHER CONFERENCES

PWWA

9 – 12 August, Tonga

WEFTEC

24 – 28 September, New Orleans, USA weftec.org

IWA Congress

8 – 16 October, Brisbane, Australia

iwa-network.org/event/world-water-congress-exhibition-2016

You can view upcoming conferences and events through the News & Events / National Calendar section of our website www.waternz.org.nz/events

WEFTEC 2016

Water industry professionals will soon be streaming to New Orleans to experience WEFTEC’s 89th Technical Exhibition & Conference.

Held at the Morial Convention Centre, New Orleans during September 24-28, the event will include around 1000 speakers in a range of formats including 130 technical sessions and 29 workshops that offer comprehensive education in a range of topics.

The event is run by the Water Environment Federation (WEF) – a not-for-profit technical and educational organisation. With an individual membership of 33,000, WEF’s network includes water quality professionals from 76 member associations in 30 countries. It is headquartered in Alexandria, Virginia.

WEF members include experts and specialists in the fields of: environmental engineering; industrial wastewater treatment; sewage treatment; stormwater management; and water quality analysis and planning. Its current board includes New Zealander, Beca’s water market leader Garry Macdonald who has previously been a WEF executive committee member.

PWWA: Our Water, Our People

The Pacific Water and Wastes Association is holding its 9th Pacific Water Conference and Expo and 2nd Pacific Water Ministerial Forum in Tonga from August 9-12.

The conference theme is “Our Water, Our People” and speakers will be presenting on issues ranging from benchmarking, water and

community, water and customers, jobs and skills development. The event includes an Awards Night and gala dinner hosted by PWWA at the Liku’alofa Beach resort, Kanokupolu. The main conference and Trade Expo will be held at the Queen Salote Memorial Hall in Nuku’alofa.



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Water New Zealand charts new direction

CEO John Pfahlert outlines changes in the organisation's structure and direction

Over the past few months, the Board of Water New Zealand has been working on the development of a new strategic direction for the Association. While much of what we do remains unchanged, there will be some change of emphasis going forward. There have also been some staffing changes at Water New Zealand, with some staff leaving and new staff to be recruited in the coming months.

What will remain the same is that we have agreed that our core purpose, as a community containing New Zealand's water expertise, is to ensure sound evidence and technical knowledge informs decisions on water management.

Water is currently on the government's radar because the sector is fragmented and doesn't have an agreed view on its ongoing management. The Government increasingly recognises water's importance to the economy, with the 2015 National Infrastructure Plan and recent Productivity Commission reports acknowledging that 3 waters management is an important issue to get right.

There are reservations within Government about how well water infrastructure assets are being managed with 67 autonomous owners.

Further context is provided by: the Ministry for the Environment which is focusing on improving the water quality from wastewater and storm water discharges through the National Policy Statement on Freshwater Management; the Department of Internal Affairs which is looking to change the law to enable different forms of water governance to be considered by local councils and for consistent reporting on non-financial performance measures; and work by Local Government New Zealand on 3 waters management.

In short, the 3 waters sector is not shaping its own future - and we're not helping.

As the national body representing 3 waters managers, we have an essential role to play in determining the future of the sector.

SO, WHAT'S GOING TO CHANGE?

The Board has agreed that Water New Zealand needs to position itself to be the national spokesperson and standard setter on water issues, ensuring that Councils adopt consistent approaches to water management. We are too small a country to do things 67 different ways.

There is a role for Water New Zealand to get the sector excited about the critical importance of water, and to facilitate a collaborative learning environment across the sector where we can learn from each other. The various forums we run - such as our conferences, Special Interest Groups, Water Utilities Association, Water Services Managers Group and so on can be vehicles for this - as well as our other means of communication with the sector such as the Water journal, newsletter and website etc.

To help achieve this goal, the Board has agreed to establish a dedicated position - Manager, Water Sector Collaboration - within the Association to facilitate discussion among and between our groups

to identify which areas offer scope for collective action. An example currently under development is the proposed metadata standards. The person holding this position will also work with related organizations that operate in local government to ensure we have alignment with their activities. Examples include LGNZ, WIOG and IPWEA.

Armed with those sector insights, we then need to develop technical guidance material we can promote to Councils for adoption. Reaching agreement with Councils about the priorities for technical guidance will be both challenging and time consuming - but it's essential if we are to lift sector performance. The current part-time position of Technical Manager will become a full-time role to reflect the increased importance of technical guidance within the Association and industry.

Promotion of this guidance material as good practice to Councils will be the role of another new full time position to be established - that of Manager, Sector Development. This role will be to promote the adoption of improved practice by Councils. The extent to which we can get Councils to adopt consistent ways of operating will be a key measure of our future success.

If we are to build our reputation as the "go to" advisor on water-related issues, we need to get to a position where we can demonstrate leadership in joining up the sector so that conversations about water occur within a context - not in isolated silos.

We plan to recruit a Communications Advisor onto the Wellington-based team to improve the level and quality of both internal and external communication.

Water New Zealand has been around for many years and has engaged with local government in a variety of ways. There will be a conscious move away from focusing on structural changes to local government as a means of improving sector performance. Rather, the emphasis going forward will be on getting Councils to consistently adopt good practice ways of running their water businesses.

The Board feels if we can achieve the objective of providing sound strategic advice which has a technical basis, we will ultimately enable the sector to determine its own future.

That process must start from now.

Water New Zealand CEO, John Pfahlert

Annual membership subscriptions due

Your annual membership subscription is now due. Invoices will be emailed to you early in July. Please note that hard copies of invoices will not be sent.

We take this opportunity to remind you that paragraph 6.2 of the Constitution reads:

"All subscriptions shall be payable to the Association on demand. Any member for whom an annual subscription has not been paid within 90 days of demand will automatically be removed from the membership list of the Association, with the loss of rights arising from affiliation with other organisations".

Please ensure your invoice is paid promptly to ensure continuation of your membership benefits. If you have any queries regarding your membership subscription, please notify Linda Whatmough, manager, Corporate Services, Water New Zealand at accounts@waternz.org.nz



**WATER NEW ZEALAND'S ANNUAL CONFERENCE & EXPO
ROTORUA ENERGY EVENTS CENTRE 19-21 OCTOBER 2016**

CONFERENCE REGISTRATION

Registration is now open for the Water New Zealand Annual Conference & Expo 2016 at www.waternzconference.org.nz

The preliminary Conference programme is available for preview on the conference website.

REGISTER NOW to guarantee your attendance at the only New Zealand conference and expo that covers every aspect of the water environment and its management.

Conference Theme and Programme

The core theme of the Conference is '*Pathways to Excellence*'.

There will be on offer over 120 presentations covering every aspect of the water environment and its management, including ASTT Trenchless Technology, a workshop on customer service, young water professional's stream and a "hot topics" session from water service managers.

This year's Conference format is very similar to previous years, with two full days of presentations on Wednesday and Thursday. The policy stream has been renamed Thought Leadership and we have a wide range of topics covered by people external to the industry. This year, the Water New Zealand Annual General Meeting will be held after the final session on Thursday afternoon. Similar to 2015, Friday morning will include a "wow" factor presentation, followed by brunch. The exhibitor visitor morning will also be held on Friday – this is a great opportunity for exhibitor/client meetings.

Networking Opportunities

Social functions throughout the Conference continue to provide a prime networking opportunity, with attendance of people working in the many and varied aspects of the water environment and management sector.

Visit www.waternzconference.org.nz to view the programme and read more about the social functions at the Conference.

KEY DIARY DATES FOR PRESENTERS

- 16 August:** Poster Summaries CLOSE
- 16 August:** Final Papers due
- 5 October:** Presentations due

**Water New Zealand Board Election –
Call For Nominations**

Call for Nominations for election to the Board of Water New Zealand closes on Tuesday, 30 August. The Board comprises six elected members and may include two co-opted members. Members are elected for three-year terms. This year three positions are available. Sitting members Brent Manning, Hugh Blake-Manson and Kelvin Hill will retire by rotation.

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

**Water New Zealand Annual
General Meeting**

The Water New Zealand 2016 Annual General Meeting will take place at 5.00pm on Thursday, 20 October at the conference venue, Rotorua Energy Events Centre. To meet constitutional deadlines, any notices of motion for this meeting must be supplied to the Chief Executive by 5pm on Wednesday, 14 September 2016.

Notice of Meeting, Agenda, and any Call for Notices will be sent to financial members by Friday, 19 August 2016.

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

WATER NEW ZEALAND AWARDS 2016

The following awards will be presented at the 2016 conference:

- Hynds Paper of the Year Award
- CH2M Beca Young Water Professional of the Year
- ProjectMax Young Author of the Year
- Mott MacDonald Poster of the Year
- IXOM Operations Prize
- Ronald Hicks Memorial Award
- Opus Trainee of the Year
- Best Exhibition Stands

The following are new awards to be presented at the conference:

- Veolia Health and Safety Innovation Award
- Project Award
- YWP Conference Attendance Award

CALL FOR POSTER SUBMISSIONS

Mott MacDonald Poster of the Year

Poster presentations are always a popular component of the Annual Conference.

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

CALL FOR NOMINATIONS FOR 2016 AWARDS

Water New Zealand is now calling for nominations for the Awards to be presented at the Annual Conference this year. Members are encouraged to nominate suitable candidates for relevant Awards. Non-members of Water New Zealand are eligible for some of these awards.

CH2M Beca Young Water Professional Award

The award will acknowledge and reward one young water professional who has made a significant contribution to the water industry and the general community, and has demonstrated exceptional achievement in the early stages of their career.

Ronald Hicks Memorial Award

Ron Hicks legacy is remembered annually through the Ronald Hicks Memorial Award made to the author(s) of an

article or paper considered significant in solving or clarifying sewage treatment or water pollution problems in New Zealand.

Opus Trainee of the Year

The Award is open to any trainee currently involved in an NZQA approved course applicable to the water and wastes industry.

IXOM Operations Prize

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

Veolia Health and Safety Award – New Award

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

YWP Conference

Attendance Award 2016 – New Award

This Award has been initiated to give the opportunity for recent graduates to attend the Water New Zealand Annual Conference or the Water New Zealand International Stormwater Conference, in order that they may broaden their knowledge and gain greater appreciation of the water environment, water management, water engineering and the water industry at large.

Project Award – New Award

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

Criteria and Scope for Awards

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

Water New Zealand would like to thank our Premier Sponsors for their financial support:



New national drinking-water database

The tap on the new Ministry of Health (MoH) national drinking-water database is expected to be turned on in 2017.

It replaces the existing system which is a mixture of desktop and online databases and will feature web accessible features which are intended to streamline some of the existing systems used by the sector to update and access existing information.

Beca has been commissioned to develop and host the database to supersede the current Water Information for New Zealand (WINZ) system, currently maintained by the Institute of Environmental Science and Research (ESR). WINZ has provided a comprehensive and complementary service across a broad range of work associated with drinking water supply management since the late 1990s.

This has included sample management, Drinking-Water Standards assessment and compliance, annual reporting, supply registration, recognition of test methods, and approved laboratories. Much of the current solution was developed prior to the 2007 Health (Drinking Water) Amendment Act. These changes introduced additional requirements in delivering against the Act's purpose to protect the health

and safety of people and communities by promoting adequate supplies of safe and wholesome drinking water from all drinking water supplies.

The MoH has recognised that the current system falls short in meeting the present and future requirements to provide a solution that delivers against statutory requirements while assisting the industry to manage supplies. Additionally, the current solution is fragmented between two databases (WINZ 6 and WINZ 7) and includes further workarounds that create duplication and inefficiencies for the sector.

In 2015, the Ministry went to market to procure a new solution that could be built off a pre-existing product to serve in the administration of the Health Act, whilst leveraging the Software as a Service (SaaS) methodology for delivering these types of solutions. The National Drinking-Water Database project was awarded to Beca in March 2016. Included in the brief from the MoH was an expectation to provide a modern, robust platform that will meet the needs of the Ministry and the sector over the next 15 years.

The new solution will build from the relevant functionality of the current database, as well as deliver improved benefits in accessibility, usability and integration. Successful implementation and uptake of the new solution will provide a tool for water suppliers in meeting their obligations under the Health Act. The new solution will also contribute to the evidence base that supports improved health outcomes related to demonstrably safe water supplies. A modernised national solution will also enable improved analysis and scientific support to inform policy and

administration of the Health Act.

A number of changes are anticipated that will influence workflow and processes for current WINZ users. Significant work has shaped the current project including a notice to prospective suppliers in 2014 as well as the development of a set of comprehensive requirements to inform the specifications and project. Implementation of the project is scheduled for 2016 and a number of stakeholders have already been consulted. An Industry Advisory Group of key stakeholders will be established and engaged through industry testing and feedback supporting an interactive project methodology.

The ongoing support and maintenance of the current WINZ databases will be phased out accordingly and the 2017 (inclusive of 2016/17 data) annual report on drinking water quality in New Zealand will be completed in the new solution.

ESR is supporting the project and will continue to provide scientific and analytical support services associated with the data, information and administration of the new system. Similarly, the breadth of stakeholders engaged with the current WINZ database is not expected to significantly change. Some rationalisation and right sizing will occur – for example functionality within the current databases associated with DWSNZ 2000, the Grading, and template Water Safety Plans will not be replicated.

Updates on the project will be provided to the sector at key milestones during the project.

To subscribe to these updates, please contact winz@beca.com.

Scott Rostron, MOH



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Sudden death of Abbey Systems founder

Abbey Systems founder and longtime Water New Zealand member Lester Abbey has died as a result of an accident while on holiday in the United States. Mr Abbey went missing while on a run and his body was later recovered from the Mad River in Humboldt County.

Born in the US, Mr Abbey fell in love with Wellington while on a biking trip of the country in 1974 and set up his business there four years later. Abbey Systems specialises in the design and development of SCADA and Telemetry products for water, power, energy and broadcasting. Known widely in the local waters industry, Mr Abbey presented a paper on *Resilience in Water and Wastewater Telemetry & Control Systems* at last year's Water New Zealand conference in Hamilton. He was 63 years old.



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MOU signals stronger international links

Over the past few years, there has been an increasing desire in the country's water industry to align more closely with international organisations such as CIWEM (Chartered Institution of Water and Environmental Management). This would provide water and environmental professionals here access to a broad base of international knowledge and expertise and offer a wider range of opportunities to reach chartered status.

In February 2015 CIWEM and Water New Zealand signed a Memorandum of Understanding (MOU) which recognises that the two organisations share similar goals and aspirations. The MOU sets out a framework for cooperation between the two organisations for their mutual benefit, and to make the unique benefits each organisation provides more readily available for their members. The key objectives of the MOU include:

- Holding joint events;
- Water New Zealand promoting and providing administrative support for local CIWEM activities;
- Opening Water New Zealand networking events to CIWEM members;

- Facilitation of a CIWEM promotional forum at the Water New Zealand Annual Conference;
- The use of each other's networks to source speakers for events;
- Links to promote CIWEM chartership for Water New Zealand members as a route for professional development;
- The use of Water New Zealand's database to find suitable mentors for local CIWEM members' professional development;
- Water New Zealand members being provided access to CIWEM technical information where appropriate.

For those unfamiliar with CIWEM, its history of working in environmental management dates back to 1895. However, its current form came into being when the Institution of Public Health Engineers merged with the Institution of Water Engineers and Scientists and the Institute of Water Pollution. Granted a Royal Charter in 1995, the Institution was proud to celebrate its centenary in the same year. Working for the public benefit for a clean, green and sustainable world, CIWEM is the only independent, chartered professional body and registered charity with an integrated approach to environmental, social



and cultural issues.

Today, its membership base stretches over more than 90 countries and connects a network of over 15,000 professionals worldwide. It provides input into the UN Framework Convention on Climate Change, supports training initiatives for professionals across the world, and looks to further global environmental knowledge exchange. CIWEM also helps to shape European policy by representing the European Water Association on steering groups under the Water Framework Directive.

The Institution's future aims include strengthening the links between members in each country; further internationalising existing panels, groups and networks; developing more strategic partnerships across the world; supporting the growth of professionals in the sector and campaigning on key global water, sanitation, climate and environmental issues.

CIWEM New Zealand Country Network

There are approximately 100 New Zealand based CIWEM members who operate a "Country Network" for New Zealand. A Steering Group of seven representatives is co-chaired by Pete Brooks (GreensceneNZ) and Stephanie May (Opus).

The CIWEM team in New Zealand have developed some broad objectives. These are:

- To communicate with and support CIWEM members in New Zealand;
- To deliver a number of high-quality, informative local events that enable people to engage and learn from other water / environmental professionals; and
- To mentor and develop water and environmental professionals to enable them to reach chartered

status – Chartered Water and Environmental Manager (CWEM), Chartered Environmentalist (CEnv), Chartered Scientist (CSci) or Chartered Engineer (CEng).

- To be actively engaged in matters which benefit New Zealand's water and environmental well being.

CIWEM has a broad remit across water and the environment and perhaps the biggest single benefit that CIWEM offers to professionals in New Zealand is that this provides an opportunity to achieve chartered status from a range of environmental and scientific disciplines.

The local network has an active mentoring programme which provides advice and support to help guide candidates with their professional development, provides guidance for the preparation of their submissions and

in preparing for their professional review.

CIWEM will be represented at the Water New Zealand stand at the annual conference in October and welcomes the opportunity to speak to Water New Zealand members who would be keen to find out more about CIWEM in New Zealand and the routes to chartered status.

For more information, visit the CIWEM website (www.ciwem.org/knowledge-networks/country-networks/new-zealand) or follow the CIWEM New Zealand Country Network on Linked-In. For further details, contact one of the CIWEM New Zealand Co-Chairs of the Country Network Steering Group Pete Brooks (Peter.Brooks@greenscenenz.com) or Stephanie May (stephanie.may@opus.co.nz).



Tapping in to water news

First MAR trial

The country's first "managed aquifer recharge" (MAR) pilot project has been launched in Ashburton. The project, part of a package of water solutions developed by the Ashburton Water Zone Committee, diverts clean water from the Rangitata through the Rangitata Diversion Race and Valetta Irrigation scheme into a recharge site from where it will seep down to refill the aquifer. If successful, the year-long pilot project could be extended throughout the Ashburton-Hinds area. MAR projects are more common in the US and are used to replenish aquifers and dilute nitrates.

Digging into water quality worries

Canterbury residents are worried that an application from local quarrying companies to dig deeper than the currently permitted 1m above the city's groundwater could result in its contamination. The Christchurch City Council – as drinking supply provider – is one of nearly 500 submitters opposing the move by the Canterbury Aggregate Producers Group to extract up to 30 tonnes of extra gravel. Its application to Environment Canterbury and the council was being heard in late June.

Dam backup for melting glaciers...

A European study suggests dams will be needed at the base of disappearing glaciers to capture runoff from winter rain and spring snowmelt in order to prevent summer water shortages. The summer flow in major European rivers such as the Danube, Rhine and Po will, over the next six decades, be increasingly affected by the loss of many of the region's 3800 mountain glaciers.

While historic Antarctic site goes under

Ice melt is threatening an historic Antarctic NZ research station built beside a lake now rising at around 20cm a year. When established in the 1960s, it was built about 100m from the shore of Lake Vanda but the impact of climate change could see the last part of the valuable research station going under water this year, according to Ian Hawes – a freshwater ecology professor at Canterbury University's Gateway Antarctica.

Cook's water project back on

The Cook Islands Government is confident it will get go-ahead from landowners to start on stage two of the \$US40million Te Mato Vai water project in Rarotonga. Work on the scheme had halted last year because permission could not be obtained from all affected property owners. That area will now be bypassed and the stage 2 focus is on water intakes for the scheme which is designed to provide Rarotonga's residents with clean drinking water.

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Focus on resilience

Stormwater conference report

The Nelson conference addressed the vital topic of how best to create resilient systems in the light of more chaotic weather events. Report by **Neil Ritchie**.

The 2016 Stormwater Conference, held in Nelson during May, was the biggest and the most successful stormwater conference yet held by Water New Zealand.

The three-day event attracted almost 330 delegates from around the country – from various government organisations, council authorities, educational institutes, private companies, sponsors and the media.

Nearly 70 speakers addressed the conference which had, as its main theme, “Resilient Stormwater Systems”, one of the most important issues facing New Zealand today. They covered some of the many catastrophic events that have occurred internationally and nationally this century, the lessons learned from such disasters and the subsequent

developments aimed at minimising the impacts of inevitable future floods.

Nelson Mayor Rachel Reese opened the conference, saying that “water is a big part of who are”, that “successful stormwater management is vital for Nelson”, and that her South Island city council is keen on making the region a cleaner and safer place in which to live.

Other conference speakers also addressed a great number of issues broadly based around the topics of building flood resilient communities, stormwater assets, operations and risk management planning, and the social and cultural value of the environment.

Many spoke about flood-prone Christchurch, both pre-

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quake and post-quake, the damage done to the city, and how subsequent heavy rainfall events adversely affected the region, as well as the various models proposed to best cope with future floods.

Several presentations addressed the various stormwater challenges that our biggest city, Auckland, faces. In addition, there were some case studies – from two typically Taranaki high intensity rain events to flooding at Waihi Beach.

FOCUS ON CHRISTCHURCH

Storm Environmental’s Sylvia Maclaren (representing Christchurch City Council) spoke on a controversial proposal to erect a tidal barrier across the entrance of the Avon-Heathcote Estuary to protect low-lying parts of the city.

The pre-feasibility study concluded that a barrier was technically feasible, would cost about \$300 to \$350 million to construct, and have ongoing operational and maintenance costs of up to \$7 million per year. Although this would protect a considerable area of public and private assets, the council decided against going ahead with such a “hard engineering” solution.

As well, the council’s Surface Water engineering consultant Tom Parsons talked about where to start with the city’s post-quake land drainage recovery programme, saying the scale of the increased flood risk was immense, with thousands of properties identified as potentially having increased flooding vulnerability due to the earthquakes. In addition to the physical damage, the health and social impacts on communities had been severe and reducing the post-earthquake flood risk was a necessary part of restoring community resiliency and wellbeing.



Water New Zealand Chief Executive John Pfhlerl is flanked by President Brent Manning and Tracey Mitchell from the South Taranaki District Council.



Cawthron Institute's Jim Sinner addresses the challenges of collaborative planning



The exhibition room was busy – particularly during conference refreshment breaks.



This year's Stormwater Conference was the biggest yet, attracting well over 300 delegates.

NEED FOR A MULTI-HAZARD APPROACH

Conference keynote speaker, Canterbury University’s Coastal Scientist Deirdre Hart, believes the country is “missing key opportunities to build resilient settlements”, with some of the prime reasons being a lack of understanding of the links that operate between multi-hazards and the best coordinated responses to those different hazards.

She said there was a definite “inter-connectedness” between hazards, which was well illustrated by earthquake-prone and flood-prone Christchurch, a low-lying coastal city built on a partially drained swamp – a so-called “delta city”.

It had been known for a long time that the city was vulnerable to many different hazards – seismic activity, flooding, storms and land mass movement. But the traditional

“compartmentalised” way of understanding such hazards was unhelpful.

“I am not a fan of this kind of model ... [more] opportunities become clear when we reframe our way of understanding hazards.

“In low-lying coastal cities, sea level rise will be felt first and tackled, not on the open coast, but instead via its pervasive and acute effects on inland waterways. In New Zealand we are politically hamstrung, dragging our feet in terms of open coast adaptation.”

She said a very simple starting point was to create a multi-hazard matrix.

“But the methods are transferable [beyond Christchurch], and beyond flooding-earthquake scenarios. They can, and I hope will be, applied to multiple settings and hazard scenarios.

“Thank goodness for the opportunity to build sea level rise resilience upstream from



Deirdre Hart is keen on redefining stormwater system resilience in a multi-hazard environment.

the ocean through our stormwater design and flood planning systems. If it was left to coastal scientists, I’m afraid that hillside retreats might become the next New Zealand property boom.

“A multi-hazards approach offers us some key opportunities to build more resilient stormwater systems, more resilient settlements, more resilient societies, to check the exponential rise in disaster impacts in places like Aotearoa New Zealand,” she concluded.

FOCUS ON AUCKLAND

Auckland Council's Stormwater Strategic Planning Team Manager Claudia Hellberg spoke about stormwater management under the queen city's unitary plan, saying it faced a significant challenge in providing for significant urban growth while at the same time addressing widespread existing issues including flooding, degraded water quality and ecosystem health, and the loss and modification of streams.

Fellow council staff member, Senior Stormwater Specialist Wolfgang Kanz and 4Sight Consulting's Ian Mayhew talked about the use of Green Infrastructure (GI) being increasingly accepted as best practice for land and infrastructure development in many circumstances. This is because GI supports the protection and enhancement of freshwater and coastal water quality, provides ecosystem, community and cultural benefits, reduces risks, and should be both more resilient and cost effective than traditional infrastructure.

Hayden Easton (Pattle Delamore Partners) spoke about Auckland Council's significant capital expenditure in undertaking major renewals of the city's stormwater ponds as one means of creating future resilience.

FOCUS ON TARANAKI

Flooding events in South Taranaki were the subject of a presentation by the District Council's Group Manager for Engineering Services, Brent Manning, and Development

Engineer, Tracey Mitchell. They outlined events during June and August 2015 during which the small township of Waitotara and larger town of Opunake were inundated by high intensity rainfalls which resulted in flooded houses, bridges and farmland. The multimillion-dollar cost of repairing damaged infrastructure is still ongoing, as are repairs to residents' homes.

Western Bay of Plenty District Council's Utilities Asset Engineer, Coral-Lee Ertel, talked about flood events in the coastal town of Waihi (which means rising water). Over the past two years, it has experienced three significant flood events. These brought various stormwater issues to a head, with the local community demanding solutions.

NEW STANDARDS

Last but not least, Water New Zealand Chief Executive John Pfahlert spoke about his organisation's proposed development of national rainfall and runoff standards (the New Zealand Rainfall and Runoff Guide).

It is hoped that the Rainfall and Runoff Guide – with its key focus on optimising existing water, wastewater and stormwater services – will play a pivotal part in the Government's Thirty Year New Zealand Infrastructure Plan and help ensure that by 2045, all the country's infrastructure systems are resilient, coordinated and contribute to a strong economy and high living standards for the long term. **WNZ**

BLUE-GREEN SCHEMES THE ANSWER

Coping effectively with super rainstorms and super storm surges is one of the biggest challenges facing countries today, according to keynote speaker British senior river scientist Colin Thorne.

And he believes the "Blue Green Advantage" offers a different and better flood risk future than the traditional approach of coping with stormwater involving building bigger, higher and deeper infrastructure.

He told the conference that after the massive floods covering much of the UK during 2013-15, the traditional approach of installing more and bigger underground stormwater pipes and building higher walls, stopbanks and digging deeper channels – pointed to "a grey future".

Implementing "Blue-Green" schemes, aimed at recreating naturally orientated water cycles while contributing to city amenities by bringing water management and green infrastructure together would achieve better flood resilience,

particularly in urban areas.

This was achieved by combining and protecting the hydrological and ecological values of the urban landscape, while providing resilient and adaptive measures to address future changes in climate, land use, water management, and socio-economic activity in the city.

The future success of Blue-Green projects lay with involving local communities as key stakeholders. This was because local people were the local experts, with useful knowledge; they valued Blue-Green (B-G) assets if they understood them; and they would help maintain those assets they valued.

Local people must be engaged prior to and throughout any implementation of any B-G scheme and they needed to feel "ownership" to make B-G solutions work, he said.

B-G futures could be delivered in practice. One such success was the Northumbrian declaration in February 2016 (by Newcastle city and other authorities) of a commitment



Nottingham University's Colin Thorne believes there is a "blue-green" advantage to be gained in achieving good urban flood resilience.

to expanding B-G infrastructure.

"What is required is a fundamental change in how we view flood management, from flood defence where we protect ourselves to one of resilience, living with and making space for water and the opportunity to get 'more from less' by seeing all forms of water as providing multiple benefits," Thorne concluded.

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John Palmer

Stepping out of the storm



After eight years of commitment to ensuring stormwater is no longer the ‘forgotten’ science, John Palmer is stepping back from full-on conference involvement. He talks to **Neil Ritchie**.

Water New Zealand’s retiring Stormwater Conference Committee chair John Palmer says it’s time for him to step aside after eight years of heading the group organising the annual stormwater event.

“There was no separate stormwater conference committee before 2008 and for my suggesting there should be one I was nominated to chair that committee,” says the former Tauranga City Council stormwater manager, who is now semi-retired but continues to assist that council on a consultancy basis.

He says the work of the stormwater conference committee almost never stops.

“As soon as one conference is over, planning for the next one commences with location, venue and dates to be confirmed, followed shortly afterwards by the call for abstracts, identifying potential keynote speakers, reviewing abstracts and bringing all the parts together in a draft programme in time for the opening of registrations.

“It can be a significant time commitment and I have offered to assist the 2017 conference committee in an advisory role if required.”

Decades ago, John graduated with a Bachelor of Engineering (civil) from Canterbury University then started what has turned out to be an illustrious career. He first worked for the now Hutt City Council, fulfilling various roles in the drainage, roading, solid waste and project management

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areas with that council during the 1980s and 1990s.

Then during the mid-1990s, he moved to Tauranga to work for that council in various operations roles, firstly with regard to the management of solid waste.

“Then I moved away into water, the last 10 years being solely stormwater management, which back then was known as ‘the forgotten water’.

“But now with the challenges of climate change and more urban developments, particularly those in coastal regions, we are having to learn different ways of doing things as existing infrastructure sometimes just can’t cope.

“We are very interested in learning what is happening overseas and applying those lessons learnt to our unique New Zealand context.”

This includes Kiwis going overseas, learning valuable lessons from their international experiences and returning home, as well as people from overseas choosing to live here and also having international speakers at conferences. All these different and varied experiences add to the overall pool of knowledge.

“And I believe every conference since the 2008 event has grown in size and stature.

“Every year, we seem to step up to a new level of participation from more delegates, more countries, more technology. And now we are getting non-technical papers, from cultural values

to community collaboration and the environment.”

He cites as proof of this, the fact that the 2008 conference had about 150 delegates, the 2015 event in Auckland 321 delegates and this year’s Nelson conference almost 330 attendees.

“It’s good to get a lot more people involved.”

John also says that support from organisations such as premier sponsor Stormwater360, which has supported Water New Zealand for the past 12 years, conference partner Morphum Environmental, and Avenues Event Management helps deliver successful conferences.

He says the Nelson event, only the second stormwater conference yet held in the South Island, was a great success – from the Rutherford Hotel venue, to the city and its hospitality and the support from delegates and sponsors.

“I have certainly enjoyed the challenge of every conference. There is nothing more satisfying than holding a successful conference and hearing positive feedback from the delegates.

“Stormwater issues have grown in stature and importance in recent years, primarily because of the increased recurrence of floods both here and overseas.

“I have been involved with local government for the whole of my professional career but now, having reached the age of 68, I’m in the twilight of my career ... and I’ve got interested in a few other things besides stormwater.” **WNZ**



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Raveen Jaduram

Building resilience

His connections with Auckland’s water infrastructure date back nearly 30 years, his focus is on ensuring its future resilience – and his perspective on water value is generational.

Watercare CEO Raveen Jaduram talks to **Vicki Jayne**.

He leads an organisation with assets of \$8.7 billion, a staff of 850 and ambitious multi-billion-dollar plans to ensure Auckland’s complex water infrastructure will both meet the city’s rapid growth and be sufficiently resilient to cope with whatever the future may throw at it.

It’s not a task for the faint-hearted but Raveen Jaduram wears the mantle of Watercare CEO with affable ease. He happily admits that he enjoys a challenge. He’s also an extrovert and team player who believes problems are best solved when shared.

“I talk to people a lot because I don’t know everything and people have a lot to offer. I challenge a lot and I like good banter back. I want robust discussion and debate.”

Creating an atmosphere of trust in which people can share, thrive and grow helps eliminate unhelpful information silos and frees people to come up with more creative solutions. And that’s vital when it comes to dealing with the ‘what if’ world of water infrastructure in a rapidly changing world.

“We have to be very agile because we can’t be sure exactly where the growth will happen... and we need to deal with uncertainty. With climate change, for instance, we will get more intense rainfall, sea-level rise, stronger winds. We have to be good at ‘what if’.

“So, we are investing for growth because the city is growing, but we are taking the opportunity to also build more resilience into the infrastructure.”

It’s an approach that has helped inform Watercare’s 10-year, \$4.9 billion plan to lay infrastructure foundations for massive housing growth predicted to the city’s west and north. The CCO (council controlled organisation) is currently seeking approvals for two major new pipelines.

A new wastewater pipe (the \$538 million Northern Interceptor) will divert flow from the Mangere treatment plant to the Rosedale facility. That will utilise spare capacity at Rosedale while freeing Mangere to cope with future growth in the central and southern areas.

A new watermain pipe (the \$264 million North Harbour 2) will help service growth in the north by bringing treated water from the west to the recently completed Albany Reservoir. That will also enable maintenance to be carried

out on the existing (North Harbour 1) pipe initially laid between 1975 and 1985.

Watercare already has approval to install a smaller wastewater pipeline for growth areas in Massey North, Whenuapai, Hobsonville, Kumeu, Huapai and Riverhead and will start construction on it next year. It also has plans to increase water storage capacity at existing sites and boost pumping capacity.

The company’s strategic programmes for 2027 to 2036 will involve a further \$6.1 billion spend which will include new watermains to the north and west as well as additional storage expansion.

Incorporating sustainability into all aspects of the business is high on Raveen’s agenda and plans to future-proof the water infrastructure include making its two major wastewater treatment plants (Rosedale and Mangere) electricity neutral by 2025.

He explains that bio-gas produced from treatment already provides about a third of the power needed and Watercare has entered into a three-year agreement with the Energy Efficiency and Conservation Authority to pool their expertise to meet an interim energy savings target of 8GWh (gigawatt-hours) and 1300 tonnes of carbon dioxide emissions by 2019.

The partnership with EECA typifies his approach that collaboration is king.

“Joining the minds of our highly skilled workforce with the forward thinkers at EECA will enable us to identify the most effective ways to achieve our goal.”

CAREER FLOW

An ability to problem solve and willingness to look outside the square has been a hallmark of Raveen Jaduram’s career – much of which centred on Auckland’s water infrastructure. But, if not for the 1987 Fiji coup, he might never have pursued his engineering career in New Zealand.

“I was born in Fiji and brought up there in an extended family environment. My dad had 11 siblings and most of them had two or three children, so I had a lot of cousins who were of a similar age.”



Business was in their blood. In his small hometown, the extended family business holdings included the local pharmacy, hardware, construction, commercial real estate, hotel and cinema.

“My dad ran the cinema and because he and mum had limited education, I got the job of negotiating with film distributors from Australia and New Zealand when I was in third form. They were lovely people; they’d have lunch with us and play chess with me.”

He saw a lot of movies, became a Clint Eastwood fan – and learned a lot about business and people skills.

“My grandfather had a very strong ethic that in our position as employers, we had to look after people in both good and bad times.”

Engineering was a pragmatic career choice. Because there was then no seventh form in Fiji, he went to Suva to do a year in foundation science at the University of the South Pacific.

“While I was there, the government put out a list of scholarships based on what skills they needed and right at the top was civil engineering. They had four positions available and being somewhat competitive, that’s what I went for.”

That scholarship brought him to New Zealand for the first time. He gained his Civil Engineering qualification at Auckland University before returning to Fiji to work on affordable housing projects. Then came the coup.

“I was lucky in that, although they closed all the embassies

after the first coup in May, I already had a visa to come to an earthquake engineering conference in New Zealand.”

He arrived in June, immediately started applying for jobs, was interviewed for a position with Auckland City Council and, by the time the conference was over had been offered a job.

“I had to get a work permit, then get my wife and eight-month-old daughter over – and I haven’t looked back.”

Asked about career highlights, he says spearheading the project to future-proof Auckland’s water supply by accessing water from the Waikato River is a project he is proud of. It was a big move in a career that until then had mainly focused on wastewater.

It was the drought of ’93 that first brought him to the attention of long-time Watercare CEO, the late Mark Ford, Raveen recalls.

Watercare Services had only just come into being as a consequence of local government reform and almost immediately had to deal with a water supply crisis. He’d been put in charge of an emergency scheme which involved utilising water from the Wairoa River – and a couple of years later when Watercare was undergoing a restructure, he got a surprise call from its CEO.

“He said I am offering you the water planning manager job and you have one minute to decide. I think it took me two seconds to say ‘yes’. I hadn’t applied because at that stage my



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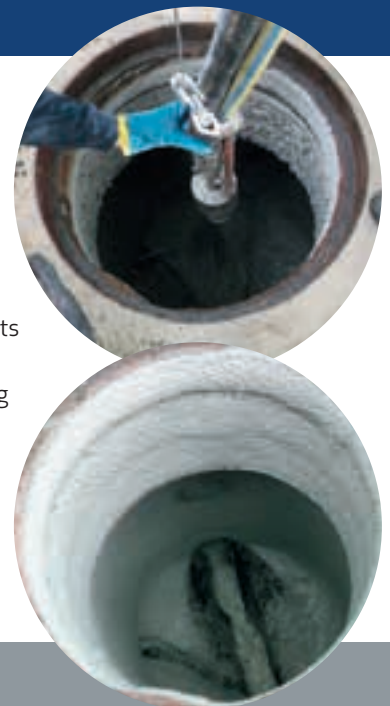
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experience was in waste and stormwater. But basically he was saying I should do something I hadn't done before. He put me in an uncomfortable zone."

It was also an energising challenge. Auckland's water supply clearly needed some future proofing and out of 99 different options on the table, he went with a plan to access Waikato River water. It took four years to get all the necessary consents and went all the way to the Environment Court but, with resilience of supply ensured, it was 'job done' and he moved on.

A shift to the retail side as Operations Manager for Metro Water led on to a general management role with Manukau and his first taste of being CEO when Manukau Water was established as a CCO. Then came another organisational shakeup as the super city came into being.

Raveen became Chief Operating Officer of the new Watercare CCO, but a sense of restlessness saw another career jump – across the Tasman to head Murrumbidgee Irrigation (MI) based in Griffith, New South Wales.

"I think once you are CEO, you don't want not to be CEO. It's not an ego thing but you tend to have strong views about the culture you want to create – and the one I wanted to create was different from what existed."

The fact that his daughter (also an engineer) was working for MI influenced the decision – and he thrived on the new challenges it offered.

"I did SO much in those 15 months. It was fascinating."

WATER SECTOR – THE WAY AHEAD

Funding and expertise are two challenges Watercare CEO Raveen Jaduram cites as facing the water sector over coming years.

On funding:

"We are lucky as we have scale. But many regional towns face dealing with an aging infrastructure from a base of no or limited growth and inability to get the funding needed to meet growing expectations and demands around water supply and wastewater."

On expertise:

"Access to people with the appropriate knowledge ... being able to afford that expertise. That is also a challenge."

He worries the profession is losing some of the wise old heads he learned so much from early in his career and has become more compartmentalised – which often means that individual experts don't necessarily get the whole picture. He notes that to offset that problem, Auckland University is now teaching engineering in teams. "They do problem solving in groups as you do in real life ... yes, that is my style. I think you can really solve problems in teams because you get all the challenging aspects and you learn to respect different views."

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"I respect choice but it does bug me when people advertise that tap water smells like a swimming pool or say it is too expensive. The reality is that if you drink the eight cups of water that we are supposed to drink every day from the tap, in Auckland for the whole year, you will pay little more than \$2. That gives you a whole year's worth of water that is AA graded by the Ministry of Health.

"We are so privileged and from an environmental point of view, it is too cheap."

Dealing with issues ranging from drought-induced farmer debt and tight infrastructure upgrade schedules to a raft of regulatory changes required creative solutions, tough negotiations with government representatives – and very long hours. His work became his life and that started to take its toll.

It took a flying visit from Mark Ford to help convince him that Watercare wanted him back and by mid-2013, he returned to Auckland to take up the role of General Manager, Maintenance Services. Less than a year later, he took over as acting CEO when Ford became too unwell to work – and was appointed CEO in late 2014.

While he saw his predecessor as both mentor and friend, Raveen's leadership style is different. Keen to create a culture in which everyone feels engaged and can communicate freely, he ensures that he is both accessible and open. People should be as comfortable about delivering negative news as the positive, he says.

"CEOs are often the last to find out what is really going on. So I open up to everyone and sometimes surprise people, especially customers who ring with a complaint. They are upset and want to talk to the CEO. When they do, they are surprised and start apologising for taking up my time. I say – but you are the most important person for me right now."

While his management style is relaxed, his vision for what the workforce can achieve is aspirational.

"We have created a vision and strategy that we want to be trusted by communities for *exceptional* performance *every* day. So there are some strong words there."

Watercare's stated strategic priorities are to be operationally excellent, financially responsible, customer centric and sustainable. That involves optimising all its many customer transactions, eliminating waste in the system and ensuring the books balance.

"We have to be very good at what we do... We spend a lot of money building new things. Our revenue is about \$520 million and we are talking about spending 70 percent of that on capital works. So we have to be very good at financial management. Finally, we have to be very sustainable – maximising the use of existing assets and working to ensure we have no impact on the



A recent Open Day at Mangere Wastewater Treatment Plant – the largest of its kind in the country – attracted more than 200 visitors. Maintenance controller Tim Burborough shows Parita (left) and Nita Dharmadhikari from Mt Roskill samples of raw wastewater as it enters the plant, and the treated water that leaves the plant 12 hours later.

environment – at either the taking or receiving end."

When it comes to valuing water, Raveen's experience in Australia and with water metering in Auckland is that measurement is vital – both in terms of eliminating waste and quantifying value.

"We are currently trialling some smart meters in Waiuku – the first ones in Auckland. I've been trialling one in my house and I can see the correlation between the toilet being flushed or a 30-minute shower, and spikes in usage. And that allows you to have a conversation – at an individual level – about how water is being used and how best to manage that use. What you don't measure, you can't manage."

Water metering also offers an economic incentive for people to undertake their own water management – such as installing storage tanks to utilise roof run-off for watering the garden, for instance.

"In a number of new developments, houses do have storage tanks – which helps with stormwater run-off as well," he notes.

But water value is not just about today's cost structures – there's an inter-generational dimension to it. And New Zealand is lucky in that it has an existing cultural context and language for measuring that value, says Raveen.

"Maori already have a classification system for pollution levels – Wai Ora is water in its purest form, Wai Mate is dead, stagnant water. For them, the value of water is measured in future generations. So, I don't believe we have an extensive understanding of the value of water – we have different understandings of that value depending on who is talking about it.

"Watercare customers get their water for free – it's the value add, the infrastructure they're paying for. So the question is really about whether there should be a cost for that water and that is a very philosophical and emotional subject.

"But if you put the cost issue aside and just talk about water's value as a resource – most people want our waterways to be clean. They want to swim and fish in the rivers – and they want it to be that way for future generations. So I think the vision, the dream, the aspiration is there for all of us – it's just the means of achieving that which needs to be addressed." **WNZ**

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Utilities of the future

Recycling wastewater



Wastewater plants of the future will be geared for minimum impact on both the environment and the public purse – as international wastewater expert **Art Umble** explains.

Wastewater treatment plants around the world face growing pressure to produce more with less. Communities want zero waste with environmentally sustainable outcomes, regulators require strict conditions to be met while plant owners operate within tightening budgets. Increasingly local authorities, as plant owners, are looking at how to re-use every drop of wastewater to create sustainable, economic, self-powered “Utilities of the Future”.



The innovative design of New Plymouth’s Wastewater Treatment Plant has significantly reduced power consumption by 25 percent in the first year of operation and has also increased the plant’s capacity. At the heart of MWH’s design was a highly efficient combination of high-speed centrifugal blowers, fine bubble diffusers and an advanced control system.

1. ENERGY RECOVERY

In New Zealand, achieving greater energy efficiency within wastewater treatment plants is one of the most pressing drivers for change. The amount of energy embedded in domestic wastewater far exceeds that required to power a conventional treatment plant. However the capital investment required to realise a self-powered plant can result in an extensive payback period.

While larger cities may find it easier to invest in this infrastructure, local authorities in New Zealand need to look at how technology and recent advances allow them to modularise their plants to scale to make the numbers work. Their decision to invest needs to also consider the plant's ability to create a revenue stream from the energy recovered, and other products that can be derived from the organics in wastewater

Traditionally, some treatment facilities have captured 'waste' energy by combusting biogas produced from anaerobic digestion to generate thermal and electrical energy. A number of recent developments in digestion technology intensification (sludge pre-treatment, co-digestion, multi-phase digestion) have advanced energy recovery efficiencies to a point where plants can operate as 'energy neutral'.

A wastewater treatment plant in Strass, Austria, generates 72 percent more power than that required to operate it, with all excess energy sold to the national grid. This means the plant gives back to the community, offsetting the rising cost of energy by creating a new, consistent revenue stream.

Other utilities around the world are harnessing the recovery of thermal energy from the heat present in the treated effluent to offset onsite thermal demands or in order to market this to local power utilities. The opportunity also exists to use this thermal energy as supplementary heating for commercial buildings in business districts.

The generation of electrical energy is also rapidly advancing with the use of microbial electrochemical cell technologies to support the neutrality objectives, although this may still be a decade away from commercial viability.

2. WATER RECOVERY

Water is a critical commodity. Based on current usage we know that if 'business-as-usual' consumptive patterns continue, global demand for accessible water – one percent of all water – will exceed supply by more than 40 percent in 2030. Being able to recover water from wastewater for reuse within and around the local community is crucial to managing their supply, while contributing to preserving the world's resources. A Utility of the Future is one that recovers water and in doing so contributes to solving issues facing its local and the global community.

In New Zealand, the vast amount of irrigation required for dairy farming is a constant source of debate in rural communities. Reclaiming water from wastewater becomes a highly effective way to offset the demand created by agricultural and urban irrigation. It also acts as a viable supplement to water supplies in areas where reserves are scarce.

3. NUTRIENT RECOVERY

Nutrients are another valuable recoverable resource with nitrogen and phosphorus both found in abundance in raw wastewater. While cost-competitive technologies currently preclude the recovery of nitrogen, phosphorus can be more easily extracted and used in agricultural fertilisers.

Phosphorous recovery can also reduce the amount of phosphate that is being mined globally. This is even more important when we consider that global reserves are expected to be depleted in 370 years (based on 2010 production levels) if we continue with current practices of global phosphorus utilisation.

The Metropolitan Wastewater Reclamation District of Denver, Colorado (USA) has taken its first major steps toward resource recovery at its RW Hite facility. These steps include innovative sidestream enhanced biological phosphorus removal and deammonification to reduce energy, chemical usage and balance carbon while improving water quality in its receiving waters. These initial steps have set the stage for Denver to move to full recovery systems in the near future.



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4. THE SOLUTION

Transitioning to a resource recovery paradigm for treating wastewater is a positive global trend. Further advancing this trend requires individual utilities at all scales to make the conscious choice to engage and start the conversation at top managerial levels. This means drafting a roadmap toward their specific recovery future, and implementing calculated, incremental steps.

With the global scarcity of water increasing, you could argue that its recovery should be at the pinnacle of the decision-making process, followed closely by energy and nutrient recovery. However it is often the social and financial factors that have the greatest influence.

Even taking these into consideration, it is still clear that a “Utility of the Future” is one where 100 percent of all wastewater is recovered and reused.

Our future is definable and if we make proactive, courageous choices today, then the reality of reusing every drop of wastewater may not be all that far away. **WNZ**

- Dr Art Umble PhD is the Wastewater Practice Lead for the Americas regions of MWH, now part of Stantec. He has over 25 years of experience in a wide array of professional posts including managing a public water and wastewater utility, university teaching, serving in government-appointed stakeholder forums and consulting in the water and wastewater industry. He recently visited New Zealand and Australia to meet with local authorities and explore the global trends and advances towards recovering valuable resources from wastewater.

Managing corrosion risk

How best to maintain high-value infrastructure assets? **Corrie Cook** outlines some solutions arising from the recent Australasian Corrosion Association's seminar.

Risk-based inspection plans are increasingly accepted in organisations that understand the importance of extending the life of high-value assets as long as possible.

Such plans can show owners the downstream dollar cost of deferring maintenance, as well as comparing the cost effectiveness of a range of protective options and offering optimal maintenance plans for each.

The recent Australasian Corrosion Association's (ACA's) one-day seminar in Auckland on infrastructure and asset protection looked at many examples of this ongoing challenge for asset owners and managers as well as for corrosion specialists.

Delegates were reminded that regular inspection carried out by qualified professionals should be an integral part of identifying risk to assets. All defects should be captured and recorded, and their risk scored against potential failure in order to allocate funding priorities.

How long can the asset's deteriorating condition be

managed, especially if its load capacity has already been reached? If it can't be reasonably managed, what interventions will be needed and when – or is complete replacement the answer?

Designing out corrosion issues is the ideal solution for any new construction, so long as the design engineers understand corrosion, how and where it might start, and how to select materials and protective mechanisms that are appropriate to the particular application and environment.

In Auckland, the Council expects that population growth in the region will increase to over two million or 38 percent of the national total within 20 years. Infrastructure, however, needs to serve the region effectively for much longer than that – and a reliable water supply underpins everything.

What materials are used for the pipes carrying potable and fresh water?

Sean Ryder, principal consultant at Phoenix Solutions, points out that because all materials deteriorate, it is critical



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to select those that deliver the best return on investment. But maintenance is also a critical factor: “durability doesn’t happen by accident”, he points out.

Pipes for this type of project need to withstand major forces to ensure sufficient water pressure remains available for the end user. These large-diameter pipes (1575mm or 1965mm outside diameter) go through a complex construction process.

Mild steel is spiral formed and welded on both sides, using an automatic submerged arc process to form the pipe.

“It’s agreed that doing appropriate maintenance before corrosion is visible to the naked eye is usually the most cost-effective way to extend an asset’s life.”

Integrity of both pipe and welds is then rigorously tested through a combination of hydrostatic testing, ultrasound and x-ray. The design is expected to withstand triple its working pressure at 60 percent of yield.

A multi-layer polyethylene tape coating system is then applied to the outside and finally a 20mm concrete layer is centrifugally applied using custom-designed equipment to

line the pipe. Both are designed to inhibit corrosion.

Cathodic protection is additionally applied as in-ground corrosion protection for the pipes. This means a DC current continuously passes along the pipe, powered by an external DC power source. Should it be interrupted, there is a risk the current can travel through the ground and away from the pipe. The point at which the current leaves the pipe will be the point where corrosion could begin.

PLANNING MAINTENANCE

Maintaining any large plant or complex can mean a huge outlay every few years, and potentially a complete plant shutdown – unless the site is divided into “blocks” or sections and a rotating maintenance plan is developed. In this way, maintenance is ongoing and frequency of inspection is managed by the risk factors found in each area, as well as by the ease of access to each section. In this way, areas that are more prone to corrosion can be inspected and maintained more regularly than those presenting a lower risk.

“It’s more economical to hire access equipment once, for example, and save on manpower and access equipment. An ad-hoc maintenance system couldn’t deliver that,” explains Ross MacKenzie, maintenance manager of International Paint. “When blocks are scheduled for re-coating they can



Corrosion concrete sewer.

PHOTO COURTESY OF: JONATHAN MORRIS.

be done at times that will pose minimal disruption to clients and their customers.”

It's agreed that doing appropriate maintenance before corrosion is visible to the naked eye is usually the most cost-effective way to extend an asset's life. By the time concrete corrosion is visible, for example, it's already well advanced and remediation options or even replacement need to be urgently considered. For wastewater systems, these can include chloride extraction; re-alkalisation; protective coatings; crystalline surface treatments; patch repairs including sacrificial anodes (to prevent incipient anodes forming); and cathodic protection.

At the ACA's international conference Corrosion & Prevention 2015, Brendan Murray of IXOM Operations (formerly Orica Chemicals) outlined the work his company has been doing with major sewer lines in Australia.

While the science behind corrosion of concrete sewer pipes is reasonably well understood, he pointed out that seawater ingress into sewers can increase the sulphate concentration within the sewage itself, resulting in an increase of hydrogen sulphide in the pipes. This can lead to increased sulphuric acid production, degrading the concrete into the soft and porous compound calcium sulphate more quickly than may have been expected. Murray has developed a sacrificial alkali coating to combat this.

He believed that an economic evaluation comparing different rehabilitation methods confirmed such sacrificial alkali coatings were the lowest life cycle cost option for managing Sydney Water's large 'avoid fail' sewers.

“This project has resulted in a cost-effective method for protecting critical sewer assets, without the need to divert sewage flows and with minimal disruption to our customers,” he said. “Initial monitoring results indicate the product continues to provide a sacrificial coating to protect the integrity of the concrete sewer walls for two to three years.”

Balancing available funding against potential asset failure is always a challenge, but a robust risk management plan helps show a clear way forward. **WNZ**

- The ACA is a not-for-profit, membership Association that aims to reduce the impacts of corrosion. It provides an expert knowledge base and disseminates information on corrosion and its control across New Zealand and Australia. The Corrosion & Prevention 2016 conference will be held in Auckland from 13-16 November 2016, bringing researchers and practitioners from around the world into the country. For further information or to register, go to www.corrosion.com.au

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Advanced Sludge Digestion



Why is sludge valuable? Mott MacDonald principal process engineer **David Hume** outlines the evaluation and selection of advanced sludge treatment technologies in the UK.

Sewage sludge is a valuable resource, both for its nutrient value when used in agriculture and land reclamation, but also because of its significant energy generation potential. This energy can be generated through various methods including the following:

Anaerobic digestion (AD) of sludge to produce biosolids and biogas. Biogas, a gas rich in methane, can be burnt to produce heat and power or converted to biomethane for injection into the local gas grid or used as a vehicle fuel. The efficiency of biogas production can also be enhanced using various advanced AD processes.

Sludge incineration to produce heat and power using a steam turbine.

Novel processes such as gasification, pyrolysis and hydrothermal carbonisation, which can produce various energy rich outputs such as ‘syn gas’ and ‘bio-coal’.

Advanced anaerobic digestion (AAD) typically involves the installation of hydrolysis pre-treatment upstream of conventional mesophilic anaerobic digestion. This significantly enhances the benefits of anaerobic digestion.

Some of the key advantages offered by AAD can include:

- Increased digester loading
- Increased volatile solids destruction
- Increased biogas production
- Increased opex savings (and possibly revenue) from power generation (or other biogas energy uses such as grid injection as biomethane)
- Improved sludge dewaterability (in the case of thermal hydrolysis)
- Significant sludge cake volume reduction, and hence sludge disposal costs
- Low odour, pasteurised cake (class A biosolids).

The two main AAD processes used in the UK over the past decade have been thermal hydrolysis (for example, Cambi THP or Veolia’s Biothelys process) and biological hydrolysis (for example, the GE Monsal process). There are also newer entrants including Veolia’s Exelys and other THP competitors, as well as water companies’ in-house developed systems such as Anglian Water’s HpH (Heating, Pasteurisation & Hydrolysis) process.

Mott MacDonald has been advising wastewater utilities on processes for extracting energy and other resources from sludge. MM has been part of several frameworks servicing the UK Water Utilities with the development of advanced AD projects using biological and thermal hydrolysis processes.

This work has included services from strategy and feasibility studies through to detailed design, construction supervision and operational support.

ANGLIAN WATER BIOSOLIDS PROGRAMME

We have set out below how we helped Anglian Water (AW) to deliver its two successive five-year biosolids investment programmes, 2005-2010 and 2010-2015.

In its first programme (2005-10), the largest AAD programme in the UK at that time, AW constructed AAD plants, with a combined capacity of 100,000 tonnes dry solids per year (tDS/y), at four wastewater treatment plants – serving King’s Lynn, Norwich, Milton Keynes and Northampton. Two plants used the Cambi thermal hydrolysis process and the other two the Monsal Enhanced Enzymic Hydrolysis (EEH) – a biological hydrolysis process. This programme helped AW to achieve £3 million annual savings in operating expenditure, a 30 percent increase in sludge treatment capacity compared to its original plan and 40 percent reduction in the volume of treated biosolids. As a result of these projects several of the sites became self-sufficient in renewable energy, meeting the needs of both sewage and sludge treatment and exporting surplus power to the national grid.

In its second programme, (2010-15), AW built on this success, using an in-house developed biological hydrolysis process, HpH, to construct a further four AAD plants. These had a combined capacity of over 60,000tDS/y and serve Colchester, Basildon, Ipswich and Grimsby.

DRIVING SUSTAINABILITY

AW’s wastewater treatment plants produce 180,000tDS/y of sewage sludge. Once treated, over ninety percent is recycled to agricultural land as a soil conditioner and source of valuable phosphorus and nitrogen. In the UK, biosolids for use on land is classified (under the UK’s ‘Safe Sludge Matrix’) as either conventional treated or enhanced treated depending on the level of pathogen reduction achieved in treatment (log 2 or log 6, respectively). Enhanced treated can be used more widely than conventionally treated biosolids.

Prior to 2005, AW relied on two sludge treatment processes – conventional AD (conventionally treated product) and lime stabilisation (able to achieve an enhanced treated product), followed by recycling of biosolids to agriculture. In lime stabilisation, sufficient lime is mixed into the sludge cake to raise the pH and achieve the required pathogen destruction.

However, lime treatment increases the total volume of solids to be transported to land and is often odorous – reducing its attractiveness to farmers. AW wanted to reduce its reliance on lime stabilisation and hence reduce its operating costs (particularly transport and lime), as well as its carbon footprint.

In the face of ever tighter health legislation, AW also needed to protect its ability to recycle biosolids on arable farmland by increasing the proportion of enhanced treated biosolids cake. Alternative disposal routes such as incineration are significantly more expensive than agricultural recycling and landfill disposal is considered to be environmentally unsustainable.

INNOVATIVE TECHNOLOGY

In 2005, AW's business plan proposed to achieve an enhanced product using dedicated pasteurisation tanks followed by conventional anaerobic digestion. AW and Mott MacDonald demonstrated that pasteurisation could be successfully delivered. But they proposed an alternative technique delivering better performance and greater technical robustness – a thermal pre-digestion treatment stage providing both pasteurisation and hydrolysis.

Hydrolysis breaks down the cellular content of sludge. There are two variants – biological and thermal. With biological hydrolysis, heat stimulates naturally occurring bacteria that

attack cellular material. Thermal hydrolysis 'pressure cooks' sludge at 160°C and eight times atmospheric pressure. Breaking down cellular matter reduces water content and therefore the total volume of sludge. Hydrolysis also makes sludge more amenable to digestion, converting a higher proportion of solids to biogas. Biogas production can be doubled compared with conventional digestion.

GREEN ENERGY

Biogas, with its high methane content, is used to fuel combined heat and power (CHP) engines. These can meet the electricity demands of the entire wastewater treatment plant and provide waste heat which is used to raise the steam needed to heat sludge during hydrolysis and digestion. A major innovation developed by the team was to heat sludge in the biological hydrolysis process by injecting steam, thus avoiding the risk of vivianite formation in heat exchangers.

Generating power and reducing methane emissions – a potent greenhouse gas – from the AD process has made treatment itself carbon neutral and helped offset the carbon emissions associated with importing raw sludge and exporting biosolids to agricultural land.

As a result of the Biosolids Programme, AW now generates more than 90GWh/y of green energy.

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process enabled AW to increase total volume of sludge treated from its baseline target of 77,000tDS/y to 100,000tDS/y.

40% REDUCTION – eliminating lime treatment and converting more solids to biogas has reduced the volume of biosolids leaving AW’s sludge treatment plants by 40 percent.

40% COST SAVING – measured in terms of cost, the biosolids programme enabled AW to treat sludge for 40 percent less per tonne dry solids compared to the standard industry cost. This equated to a £3 million operational expenditure saving per annum.

DRIVING EFFICIENCY THROUGH THE SUPPLY CHAIN

AW set up a collaborative and integrated team including client, consultant, contractors and principal suppliers. This team developed a capital and operational incentivisation model – a first for the sector.

AW’s Special Projects team appointed Mott MacDonald to provide programme management, technical support and environmental services. Contractors Galliford Try/Imtech Joint Venture (GTM) and Black & Veatch were engaged early in the design phase to advise on process selection and buildability. From the outset the contractors were asked to collaborate and share technical and commercial information and expertise with the whole team. This led to the early involvement of the key second tier process subcontractors Cambi and Monsal. AW’s



King’s Lynn Biosolids Treatment Centre (foreground) uses biogas CHP to generate sufficient power for the entire wastewater treatment plant.

operating staff were also integrated into the design process to optimise the layout and equipment for long-term management, maintenance and repair. An innovative commercial model incentivised the entire delivery team to achieve both capital investment and opex efficiencies – a first for the sector. The opex incentivisation model was based on plant performance over two years post-commissioning and both contractors were required to operate the AAD plants for this period, resulting in development of solutions and specification of equipment geared to achieving optimum operational efficiency. Any savings by one party were shared among all members of the team. This led to selection of equipment delivering greatest reliability and whole life savings in preference to low cost options. **WNZ**

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Finding efficiency in task reduction

Dayle Widdup reviews the trial and discovery process recently undertaken by Broadspectrum to evaluate Romold plastic manhole chambers

The need to remain competitive in the field of infrastructure development requires that an effective company considers all avenues of reducing operational costs. Matching project size to machinery and resource capabilities, as well as planning complementary workflows are typical approaches used to attain operational efficiency. What must not be overlooked is the efficiency that can be gained within a process, and how this can be improved by removing tasks whilst achieving the same deliverable.

THE OPPORTUNITY

During stage 2 of the Totara Parklands development in Whangarei, Broadspectrum ran a trial and discovery process on the Romold plastic manhole chamber for the reticulated

wastewater services. At five percent of the weight of an equivalent concrete chamber, plastic chambers have the ability to greatly improve the speed and safety of handling around a site. The features moulded into the Romold products offer further benefits, and it was the attractiveness of this feature set that first caught the attention of Broadspectrum.

The goal of the trial was to determine if tangible process time savings could be attained by utilising a product with a strong integrated feature set.

THE PRODUCT

Made in Germany, Romold's polypropylene manhole chambers are manufactured using an injection moulding process. This is a very accurate moulding process which allows features

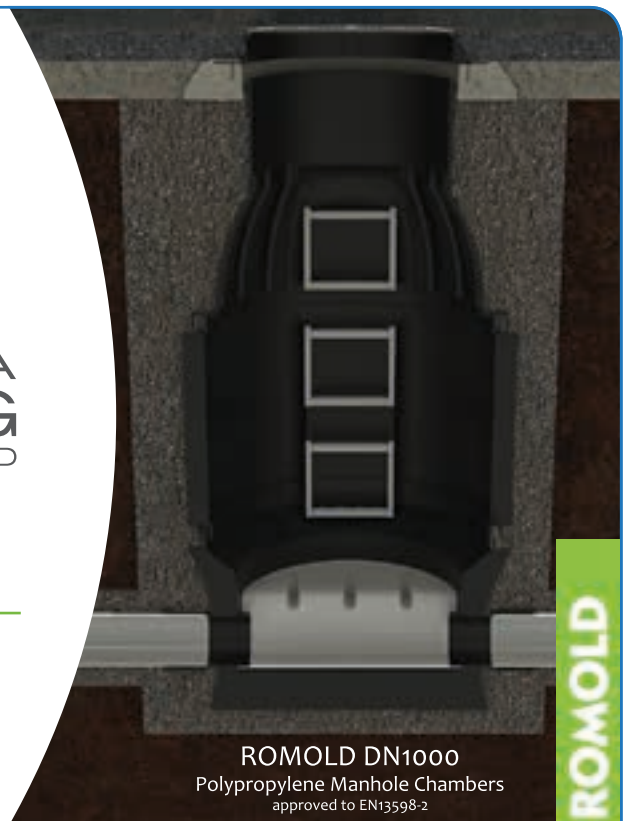
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that facilitate the installation processes to be formed into the product. The chambers are modular, pre-benched, have integrated rubber ring jointed pipe connection sockets, and even come with a durable glass-filled polypropylene ladder installed. These details remove many of the processes that consume time on site, and all show a consistent quality that can only be attained in a production manufacturing environment.

Five chambers in total were installed on a DN150 line. A DN625 maintenance chamber was used at the end of the line as this was a shallow chamber intended solely for house connections. This chamber enabled the reduction of total materials cost due to it being significantly cheaper than a full manhole chamber. Being a single component pre-benched chamber it again helped reduce installation tasks.

COUNCIL ENGAGEMENT

It is important to understand that plastic chambers are not direct replicas of concrete chambers; there are some subtle differences in their design. With this in mind, engaging with Council throughout the trial was highlighted early as a key requirement.

Support for the trial was provided by Andrew Carvell, the Waste and Drainage Manager at Whangarei District Council. He has experience with the effects that corrosive environments can have on concrete chambers so has an awareness of the potential benefits provided by plastic. The trial therefore provided a learning opportunity for them also. Council representatives were present during the on-site training and later during installation to maintain contact with the project. This engagement allowed potential issues to be addressed early and enabled the install to run smoothly.

THE BENEFITS

Whilst the first chamber installed was never expected to be the quickest, it was possible to learn very quickly that tangible time

savings can be attained. Reducing the requirement for labour intensive haunching of the invert channel or when putting pipe starters in was a key benefit. With this detail moulded into the product, the installation process was greatly simplified, involving simply bedding the chamber base, connecting the pipes at the sockets, and then building the product up. Having effective seals between each of the modular elements gave confidence that the end result would be fully sealed and would require no post assembly patchwork to correct for leaks. There was a bit of time required to compact backfill around the chamber but this was a small trade-off in comparison to the typical manual labour required for a concrete chamber.

With a three-man team, the wastewater line with five chambers was able to be laid in five days. It worked out that a plastic chamber could be installed in one third of the time that it takes with concrete, a labour savings that can then be applied to the next project.

When considering a shift from traditional processes it was important to ensure that all members of the team could see the benefits. In this case the team enjoyed working with the technology, finding it intuitive and easy to work with.

One significant advantage was that the modular chamber was complete as soon as it was assembled, meaning that the need for confined space entry was reduced. This is considered to be one of the highest risks to work site safety, so avoiding it offers a real benefit.

CONCLUSION

Whilst the benefits of task reduction provided by plastic manhole chambers were initially easily understood, it was only with hands-on experience that the value to our operations could be evaluated. In this case, the positive experience and tangible labour savings will justify future applications, and we intend it to act as a catalyst to inspire further streamlining of our process as familiarity is attained. **WNZ**

Intelligent wastewater pumping

Global technology company Xylem has launched what they describe as breakthrough technology – a water pump that’s smart enough to adapt to changing operating conditions. Xylem’s Oceania brand manager **Kirk Buckley** explains.

Xylem, a global water technology company dedicated to solving the world’s most complex water issues, has developed another breakthrough technology, launching the world’s first wastewater pumping system with integrated intelligence at the recent IFAT 2016 trade show in Munich, Germany.

Flygt Concertor, a smart, sustainable, interconnected solution, significantly advances the sustainability of the wastewater sector by offering unprecedented flexibility and reduced overall cost of ownership while consuming considerably less energy and ensuring consistent, clog-free wastewater pumping. The system senses the operating conditions of its environment and automatically adapts to pumping conditions to deliver optimal pumping performance.

“Flygt Concertor is another example of Xylem’s commitment to developing innovative and integrated designs that can meet the current and future challenges of the industry,” says Tomas Brannemo, President of Xylem’s Transport business.

“This revolutionary new solution represents a step-change in sustainable wastewater management solutions and is a real problem-solver, developed in close collaboration with our customers. Our recent report *Powering the Wastewater Renaissance* shows that adopting energy-efficient wastewater management technologies can slash electricity-related greenhouse gas emissions by almost half.”

There is a growing need for technology that optimises the performance and management of pumping systems. Aging infrastructure, increased global urbanization and rising energy costs make sustainable wastewater pumping systems an urgent priority.

By 2050, 70 percent of the global population will be living in cities – an urban wastewater challenge on a scale never experienced before. Frost & Sullivan’s report *European Smart Pumps Market for the Water and Wastewater Industry* notes that a sustained focus on energy efficiency and a reduction in the total cost of ownership of pumps are likely to lead to increased demand for intelligent pumping solutions. Flygt Concertor can help address these complex challenges in a sustainable manner.

Field tests conducted around the world have validated the benefits that Flygt Concertor delivers including:

Energy savings of up to 70 percent compared to a conventional pumping system by consistently operating at the lowest possible energy level;



Concertor 150 Shadow Approved – Xylem’s Flygt Concertor, the world’s first wastewater pumping system with integrated intelligence.

Reduced inventory of up to 80 percent due to flexible performance – the system self-adjusts or can be adapted to suit different conditions, without changing the impeller or motor size. This versatility eliminates the need for pump station managers to keep large inventory stocks;

A built-in sump and pipe cleaning function – a world first for a wastewater pumping system delivering clog-free pumping and clean wet wells saving up to 80 percent in vacuum cleaning costs; and

Compact design, reducing cabinet size by up to 50 percent compared to conventional designs

Xylem is committed to developing advanced technologies that advance the sustainability of wastewater management systems. For example, Xylem’s recently launched Flygt 4320 mixer with integrated speed regulation optimises

operators’ control over the mixer’s thrust, enabling consistent process results and reduced energy consumption. It is a high efficiency, low-speed, submersible wastewater mixer that can help reduce energy costs by as much as 50 percent.

Flygt Concertor, and the Flygt 4320 mixer, share a rich heritage with other Flygt innovations.

The name Concertor is derived from the Latin ‘concentare’, meaning “working together to orchestrate harmony”. Flygt Concertor combines IE4 motor efficiency, N-hydraulics, integrated power electronics and intelligent controls that work in harmony with each other, resulting in optimal pumping performance for the lowest cost.

Flygt Concertor will be available in New Zealand from early 2017. For more information, visit flygt.com/one-ultimate-system. **WNZ**



Tomas Brannemo, President of Xylem’s Transport business, speaking at the launch of Flygt Concertor during IFAT in Munich.



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A back-to-the future solution

Simple, reliable and low cost – the Advanced Enviro-Septic wastewater solution is breaking new ground in a range of local settings, as Environment Technology director **Dick Lamb** explains.

The combination of an old-style septic tank and an aerobic advanced secondary treatment and dispersal method is an innovation of simplicity that reached New Zealand in 2013. Developed in New Hampshire by Presby Environmental Inc. the Advanced Enviro-septic (AES) wastewater treatment system is known more for what it doesn't do than for what it does – it doesn't require a power connection, there is nothing to break down and there is no need for ongoing servicing. Testing of AES carried out in North America, Europe, and Australia consistently show advanced secondary treatment standards - and components come with a 20-year warranty.

Most homeowners and commercial users of mechanical wastewater treatment units are familiar with the ongoing servicing and maintenance requirements of these systems. At the NZ Land Treatment Collective conference in Gisborne earlier this year, the provided summary of the transactions included the following: “It was generally acknowledged that the more bells and whistles, the greater the chance of failure and the greater the need for more stringent management controls”.

AES provides a ‘Back to the Future’ solution – simplicity, reliability and low cost.

Regular sample testing and servicing requirements have become the norm with mechanical treatment systems to ensure consistent treatment quality in the field. As AES has no mechanical or electrical components, maintenance is required infrequently for the septic tank only – the aerobic treatment has occurred without any outside intervention for 30 years in early USA installations.

A recent installation at Onuku Marae on Banks Peninsular is a good example of a site and usage with multiple factors to consider in the design process - a remote, small disposal site, Category 5 massive clay soil and a nearby stream just over 20 metres distant. With the marae hosting the South Island Waitangi Day celebrations every three years along with tangi and regular gatherings throughout the year, it is an example of intermittent usage combined with occasional heavy loading. After examining other secondary treatment options, E2 Environmental of Christchurch chose to examine an AES solution in conjunction with Wastewater Design of Nelson. The brief was 55,000 litres over three days, and 170m² available for the disposal of the treated effluent to land.

A simple AES 166m² bed provided the resilient passive treatment and dispersal required. The bed is preceded by 55,000L of detention tankage after 23,000L of septic tankage with influent pumped up from the Marae buildings

25 metres below. The primary effluent is moved to the AES bed via flow-controlled dosing at a maximum of 2500 litres in 8 x 312L doses spread over 24 hours.

The flow control per dose to the AES bed is provided by a Krohne inductive unit interfaced with an N2P Controls specifically designed unit which includes the programmable timed control of the two submersible single-phase pumps in the lowest of the detention tanks. The pumps are set to operate alternately with level control provided by a pressure transducer which allows the pump operation to be controlled to an accuracy of one percent of the detention tankage volume. Alarms are raised if one pump fails to operate, the filter on the output of the septic tankage becomes partially blocked and if the detention tankage level reaches 75 percent capacity when contingency plans are in place to order a suction truck to provide additional reserve capacity. The alarm system includes a telemetry unit to send text messages to the service and management persons.



Part of the 166m² AES treatment and disposal bed.

Six weeks after the system was commissioned, 1000 attendees at this year's Waitangi celebrations proved AES to be an effective solution as the system functioned to plan. The system was shown to be based on conservative flow volumes as only 16,000 litres of influent was received on the main day of the celebration.

As well as residential applications, AES systems are used around the world in restaurants, schools, campgrounds, towns and National Parks – frequently in remote situations where the savings from the absence of maintenance requirements are magnified, and reliability, including

resistance to vandalism (no solar panels for the taking), is essential.

AES is also a cost-effective option for decentralised and municipal-scale treatment systems. Investigations are ongoing for solutions for towns such as Te Anau, Franz Joseph, and Glenorchy. Towns requiring wastewater upgrades could likely save a lot of money by adapting AES to their needs, both in capital and lifetime costs.

In Australia, numerous National Parks in Queensland have installed AES systems, while the Department of Conservation in NZ has installed AES at Lake Waikaremoana and other remote and sensitive areas in NZ.

AES is also bucking the trend by being trafficable – the passive venting system maintains aerobic conditions in the AES bed independently of the surface covering, allowing access to air. AES can be installed beneath carparks and driveways allowing an effective use of the available space.

With reasonable ground conditions in which to construct the bed, only a 200mm thickness of M4 or equivalent aggregate can provide for eight-ton axle loadings.

Greenwood Park Campground in Nelson has their newly installed 19,000L per day AES system designed by Tasman Consulting Engineers working beneath the driveway. This frees up large additional camping and parking areas which were previously required for failing sand-filter treatment and disposal.

The picture below shows the high level air exit vents from the AES treatment and dispersal pipework installed beneath the driveway.



PHOTO COURTESY OF RON O'HARA

Environment Technology (ET) promotes and distributes AES in New Zealand. The company's philosophy is to provide information on AES and let the simplicity and savings speak for themselves. Independent wastewater designers around the country are increasingly using AES for a wide range of situations.

Southland designer Don Moir of Ralph Moir & Associates remarks: "I have been designing wastewater systems in Southland since 1978 and I have to say that the AES system is quite simply the best solution that I have come across in all that time. My clients love it because it is maintenance-free

with no pumps or filters. The AES system provides secondary treatment to an extremely high level so it's very kind to the environment also. The feedback I have had from drainlayers has been positive and they find it very simple to install with very thorough manuals provided by the supplier."

ET provides professional assistance at all stages of the design/install process. They also provide a cost-free online training course to support designers, drainlayers or regulatory bodies wanting to familiarise themselves with AES procedures. Further information is available at their website www.et.nz **WNZ**



Digger installing the 35,000 litre detention tanks.



Six months after installation.

A forum for the future

Gaining trade waste traction

Getting all the trade waste stakeholders around the same table is a positive step in tackling the major issues facing the sector – as **Geoff Young**, national president, NZ Trade and Industrial Waste Forum, explains.

In April this year, the New Zealand Trade and Industrial Waste Forum held its inaugural Industrial Waters Conference.

This was a major departure from the exclusive, council staff only Trade Waste SIG (special interest group) Conferences of only a decade ago. So let's discuss what the differences are between what the old SIG did then and what the Industrial Waste Forum does now. We will also look at why there is a significant difference between the publicly owned sector and the industrial and commercial sectors before finishing off with some discussion about traditional trade waste issues.

In years past, Water New Zealand had a SIG called "Trade Waste" which originally focused on the measurement and management of trade waste from a Local Territorial Authorities (LTA) perspective. The conferences were exclusive to representatives of LTAs. Sometimes, outsiders from the commercial sector were invited to speak to the conference but they weren't invited to attend the whole technical session. The focus of the SIG and the conference was to provide information and support to the Trade Waste Officers.

A little over 10 years ago, it was decided that the doors should perhaps be opened up a bit to allow industries and service providers an opportunity to get involved. In 2011, a major shift occurred and it was decided that the objectives needed to be changed. The priority became getting regulators (Central and Regional Government), utility providers (typically LTAs) and resource users (industry and commercial interests) sitting around the same table talking about what the issues were. Hence the name – Forum.

As the engagement with industry has gained momentum,

a common theme started to appear. The issues are not just waste related. Water supply, water re-use and stormwater are all issues for industry and although the regulators all deny it, the demands placed on our industries by regulators are significantly tougher than those placed on the LTAs. This means that a lot of the technology and the dialogue taking place in the mainstream in relation to stormwater in particular which targets the municipal situation, is not adequate for industrial and commercial concerns.

There is also the issue of water quality in relation to specific industrial requirements. As a drinking supply, the local water is typically very good. When you operate a process that evaporates that water off as part of the manufacture, any low levels of contaminant will concentrate up. In the Waikato River, this can lead to issues with arsenic and silica as a result of upstream geothermal activity. Elsewhere it can be iron and manganese – not to mention nutrients.

Water for domestic use has a much higher priority than water used for industry. This leads to some interesting dynamics. Industry is typically under significant pressure to improve efficiency and reduce water use per unit of product or service produced.

On the municipal front, urban dwellers use water treated to a potable standard to wash their cars and water their gardens. Never is water demand more critical in an urban environment than in the height of summer when irrigating lawns with potable water is the norm. As an aside, it is interesting that many of these urban dwellers are the same people who so vehemently criticise farmers for their use of irrigation to produce food, not just pretty lawns!

In recent times, regulators across the country have started to grapple with the issue of the allocation of water resources in the face of increasing demand. Again this presents some interesting dynamics for the productive sector. As the supply of domestic water is given a higher priority than the supply to industry (and going back to our urban dwellers), in effect this means water to keep the lawn green is more important than the water required to run a dairy factory or a meat processing plant.

So, if the allocation model for the Waikato River has the water resource as finite and pretty much fully allocated, demand increase in Auckland will likely threaten the allocation of water to industries on the Waikato River.



Where it gets really complex is that, although Auckland will be taking this water to boost its domestic supply, a significant quantity of this water will be used to expand Auckland's industry.

So should Waikato industry have its water allocations reduced to feed Auckland's increasing demand?

On the basis that the industries have already obtained the water right to abstract this quantity of water and on the basis of that, invested heavily on that site, is it acceptable for Auckland's growing demand to take priority particularly as a significant volume of this reallocated water will end up being used by Auckland industry? Believe it or not, this is a simplified view of a very complex issue that is going to be played out throughout most of the country in the coming years and although the details of this allocation model are nowhere near as complex as the actual model, the scenario is real all the same.

Recent prosecutions of industrial sites for contamination of stormwater as a result of incidents and events have sharpened the focus on issues related to stormwater. In the bulk of the cases, although the sites had detection and containment systems, these were either inadequate, poorly maintained or deliberately disabled. The Environment Court has made it very clear that it will show no leniency towards industries that contaminate stormwater regardless of the circumstances.

This has led to a significant increase in the number of sites putting in real-time monitoring and set-point diversion. Of course, once you have set-point diversion, you now need containment and so the area required for stormwater management and the cost associated escalates exponentially.

Sadly, many of the monitoring systems which have been installed and used in municipal applications have a 10 percent or higher data failure rate, which will not be acceptable should you end up in front of an Environment Court judge. This has placed significant challenge in front of the equipment and service suppliers to industry to come up with solutions that will achieve the reliability factor required. This is no simple task and many of the consulting companies that are more used to the municipal application are coming up short.

Many industries are now making significant investment in cleaner production infrastructure. This can be as simple as capturing and re-using clean water off the process to minimising raw material or packaging wastage – or, for that matter, capturing and reprocessing cleaning chemicals for re-use.

In any case, all of these initiatives have a major impact on the quantity of water required to run the manufacturing operation and the quality and quantity of waste coming out the back end of the process. The problem is that with the exception of the dairy industry, most of these initiatives are happening in isolation from other experiences and advice. It is hoped by incorporating this into the programme for the Trade and Industrial Waste Forum that more information sharing will occur between industries.

The traditional issues of the Trade Waste sector around how to measure, how to charge and what to require in the way of pre-treatment infrastructure have not gone away and

still remain a significant part of any discussions by this group.

The loss of focus around Trade Waste issues by a number of councils has been a major concern over the past five years. An even more disturbing trend is the interference by elected officials in the relationship between local commercial concerns and the council staff who have been charged with carrying out the policy of the council.

I have a personal message for these Councillors, your job is to dictate policy, if your constituent is, in your opinion, getting a raw deal, change the policy, don't harass the staff whose job it is to enforce that policy and, no, your particular circumstance or town is not different or special.

Standardising the models for how trade waste is measured and costed is a priority and to this end, National Guidelines are being developed to provide guidance to industries as to what can be expected and giving councils a reference for how to measure and charge – and what limits are typical. This is a big undertaking and given that all the work is being done on a voluntary basis, will not be complete anytime soon.

Significant discussions took place at this year's conference between Trade Waste Officers, Liquid and Hazardous Waste Contractors, and Oil and Grit Trap manufacturers around what guidelines for the use of these devices should look like. This is what the Trade and Industrial Waste Forum is all about, getting the stakeholders around the table to develop their own solutions. **WNZ**



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Iceberg analysis of trade waste

An operator's experience

Identifying the source of trade waste going through Palmerston North's wastewater treatment plant has helped minimise its impact and saved clean-up costs – as wastewater treatment technician **Elysia Butler** explains.

Palmerston North is our country's seventh largest city with a population base of approximately 84,000 people. It is the second largest inland city, which limits viable discharge options for the treated wastewater. For this reason, the Palmerston North City Council wastewater treatment plant discharges its treated effluent into the nearest water course, which is the Manawatu River.

Currently the plant is receiving an average loading rate of approximately 7900kg BOD/day (biochemical oxygen demand) which is equivalent to a population of 113,414 people. Thirty percent of the plant's loading comes from industrial trade wastes. The average dry weather flow through the plant is 25,000m³/day. These flows can exceed 160,000m³/day during high rainfall events.

Our Trade Waste officer is based at the treatment plant and has a close working relationship with the operators as well as the environmental health team and industries. The major industries that discharge into our plant are: dairy and food industries, commercial laundries, electro and metal plating industries, pharmaceutical industries and tertiary institutes.

Illegal dumpings and industrial discharges that weren't complying with the constraints set out in the Trade Waste bylaws were having a huge impact on the plant. High amounts of fats, oils and grease were passing through the primary sedimentation tanks into our aerated lagoons and then onto our disinfection system and fouling up lamps.

Operators were spending an increased amount of time unblocking pumps and pipes, cleaning lamps and clearing blockages. Increased BOD and solids loading were making effective treatment difficult and increased phosphorous levels were increasing the amount of aluminium sulphate needed to get the DRP (dissolved reactive phosphorus) down to consent level, which was costly. All of these factors were becoming increasingly frustrating.

FINDING A FIX

In order to fix the problem, we first needed a way to identify where the waste was coming from, which industry it was coming from and more precisely, which company. We also needed a

way of proving this. That's where the S::can instrument and Iceberg analysis come into play. Following consultations it was decided to purchase a S::can unit to help us understand the constituents that were making up our influent and to help us combat the Trade Waste discharges as well as the illegal discharges.

A S::can is an online monitoring instrument that uses UV spectrum analyses to analyse characteristics in wastewater. (Figure 1)

Iceberg analysis is a sophisticated software package that was designed to identify anomalies in wastewater. It can be used to get a full understanding of the plant's incoming influent. Iceberg analysis uses UV/Visible spectrum data obtained from the S::can instrument to break down and analyse any spectral changes in the characteristics of wastewater. It detects the change in composition by looking at the anomaly spectrum



Figure 1: S::can unit.

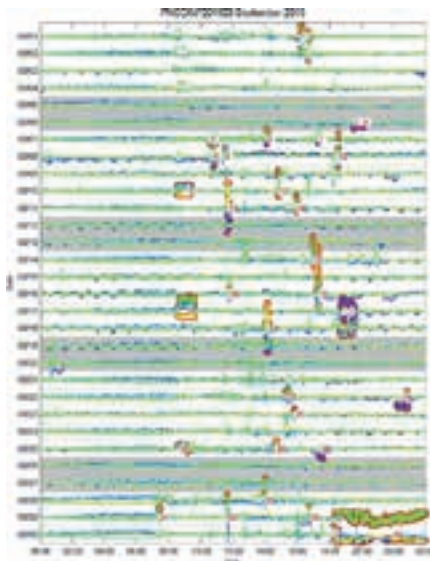


Figure 2: Iceberg analysis for September 2015.

and comparing it against the background.

(Figure 2) shows an example of Iceberg analysis for the month of September 2015. The date is along the y axis with the time along the x axis. Each line represents a full day's worth of data. You can see changes, or 'blips' in the horizontal lines. These blips are anomalies that have been detected and are known as events. These events trigger an alarm and a fingerprint of the event is taken that can be further expanded and analysed.

(Figure 3) shows an example of an event fingerprint. The background absorption, which is the black line, is compared to the event absorption, which is the red line and the compositional change or difference in absorption is calculated and displayed, this is the blue line. Please note, that the compositional change is displayed using a different scale. The y axis represents the absorbance and the x axis represents the wavelength. Different constituents absorb UV/Vis at different wavelengths. From this information, the constituents in the waste can be identified.

(Figure 4) shows the Iceberg analysis and fingerprint typical of dairy waste.

(Figure 5) shows the Iceberg analysis and fingerprint typical of laundry waste.

Five years ago, the s::can instrument was inserted into the head of the plant before preliminary screening had taken place. This position proved to be problematic due to rag and heavy gross solids getting caught on the instrument and interfering with analysis. For this reason the s::can unit was moved and re-positioned post screening, in the inlet channel to the pre-aeration tank. The unit still remains in this location to date.

We needed to begin by building a profile of all the known types of industrial wastes that we were receiving. This would also help us determine our baseline and trigger points for events. All Trade Waste discharges are sampled on a monthly basis. We collected these samples and put them through the s::can for analysis, creating a 'fingerprint'.

The s::can then gives you a fingerprint ID and these fingerprint IDs are then emailed through to DCM Process Control, along with the date, time and company tested. Using its advanced Iceberg analysis program, DCM can then extract the data collected and calculate the constituents in the samples.

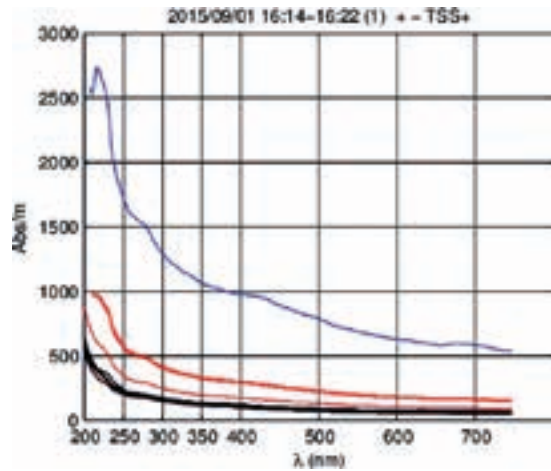


Figure 3: Event fingerprint.

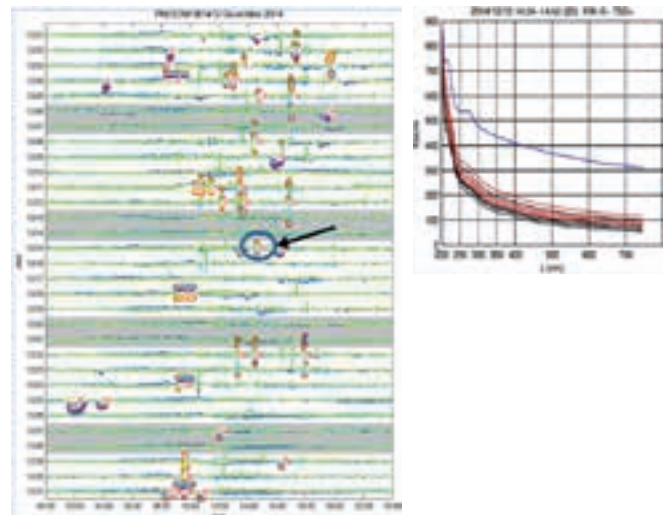


Figure 4: Fingerprint and Iceberg analysis typical of dairy waste.

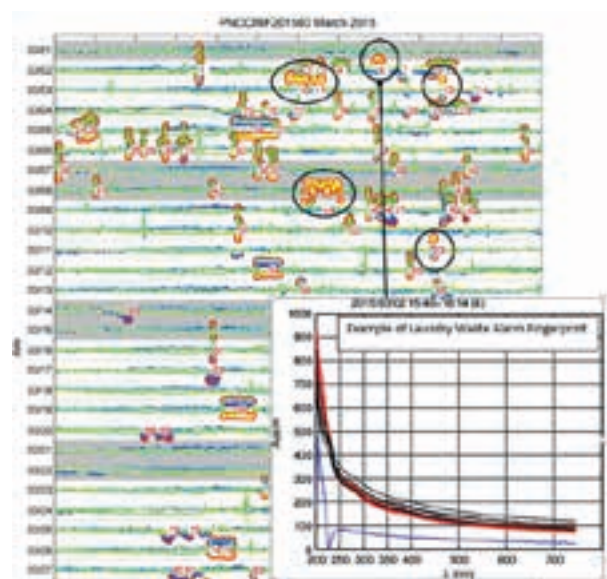


Figure 5: Fingerprint and Iceberg analysis typical of laundry waste.



Figure 6: Waste hydrocarbon.

Once enough data had been collected to build a picture, we were able to identify specific companies that were having difficulties in complying with their Trade Waste consents. Our Trade Waste officer had enough information to enter into discussions with the non-complying industries and help them understand their own trade waste and the impact it was having on our plant.

From the profiles built using Iceberg analysis, our Trade Waste officer could educate the industries, not only on what they were discharging, but also on how they were losing product down the drain unnecessarily. As a result of this, one industry installed a DAF (Dissolved Air Flotation) unit to improve its Trade Waste. This had a significant beneficial impact on our plant.

The high volumes of fats, oils and grease received on a regular basis ceased, and operators noticed a huge reduction in the amount of blockages we were having to clear. The DAF waste from this industry is now tankered to site and fed into our industrial digester and has proven to be a beneficial food source as well as increasing the gas production.

DETECTING ILLEGAL DISCHARGES

The s::can and Iceberg analysis has also proven to be a useful diagnostic tool when investigating illegal discharges. In March 2016, a huge illegal discharge of waste hydrocarbon flooded through the plant (Figure 6).

To make matters worse, it happened on the weekend and I was the sole operator working. The hydrocarbons were mostly contained within the primary sedimentation tanks. Clean up took three full days and was by way of three liquid waste

disposal trucks and operator labour. A total of 40 truckloads were required to remove the majority of the hydrocarbon waste from site. This, as you can imagine, led to a substantial clean up bill.

We were able to utilise our s::can and using the fingerprint method, we could prove that the company we suspected responsible for the incident, indeed was. A sample of hydrocarbon waste had been collected from our sedimentation tanks before clean up commenced. A second sample was collected from the company we suspected was responsible for the illegal discharge.

One at a time, both samples were put through our on-site s::can instrument and fingerprint IDs created. After interpreting the data using Iceberg analysis as well as other lab results, it was verified that the results were almost identical and from the same source. The company responsible was adamant it was not them but when presented with this scientific evidence, they accepted some responsibility.

That company was successfully held accountable. It has paid compensation to the PNCC and we were able to convince them to improve their networks and practices so that this will not happen again in the future.

SUMMARY

In conclusion, Iceberg analysis has helped us to get a clearer picture of our plant's influent. We can see the impact industrial Trade Wastes are having, we have a good idea where these wastes are coming from and when they are being received at our plant. It has allowed us to work together with industries in a healthier way, which in turn benefits all parties. Investing in this technology has helped us understand, monitor and improve the treatment of the wastewater received at the plant. [WNZ](#)

- I would like to acknowledge staff from DCM, our trade waste officer Mike Sahayam, my manager Mike Monaghan and my teammates at the Palmerston North Wastewater plant.

At the recent Water Industry Operations Group of New Zealand Conference held in Auckland, Elysia Butler won an award for best technical paper for her work on trade waste analysis. Her prize was to travel to the Australian WIOA conference in Victoria to present the same paper.

Revolution

in Trade Waste Data



Why is the wastewater industry set to benefit from today's data revolution? Mott MacDonald's process and environmental team leader **Nick Dempsey** explains.

We are currently going through what is often described as a data revolution. Recent estimates surmise that 90 percent of the world's data has been created in the past two years, and this continues to grow. Our ability to capture and analyse data is crucial in maintaining economically efficient processes – and the water and wastewater industries are no exception. In fact they are prime candidates to benefit from the big data revolution.

There are over 60 Councils in New Zealand that currently monitor trade waste from some or all industrial contributors. Some of these do so under a Trade Waste Bylaw (Local Government Act [LGA] 2002), while others are via individual trade waste agreements. In all cases, cost recovery and understanding the risks are key. How does the Council understand what proportion of the cost for the treatment of the wastewater entering the plant is associated with the trade waste customer compared with that from the domestic customer? And how does the Council cover administration, regulation and monitoring costs for its trade waste customers?

Councils that manage industrial wastes have many obligations to balance and stakeholders to satisfy. They must protect the people in their community and the wastewater system servicing them. They must minimise the effect of discharges to the environment within the bounds of their consent or other obligation. And they often have a number of other internal, regional, or national KPIs. This work comes at a cost and it must be maintained at manageable levels, so any opportunity to reduce data handling benefits all stakeholders.

MANAGING THE DATA

The more we know about a process, the more we are able to control it and if we are in full control of something we can drive efficiency. Data gives us the ability “to know”, but only if it is in a format that we can readily utilise and manipulate.

The current practice for trade waste management in many New Zealand Councils is manual data collection and analysis. This often involves many spreadsheets that collate and store information on different computers and with different people.

However, spreadsheets rely on manual user input, can be clumsy to maintain, have a limit to data storage, rely on the acquisition of special knowledge in order to use them, and lack accessibility. They often become the unwitting harbourers of human error and are vulnerable to the ‘silo effect’ whereby data is locked in a proprietary spreadsheet which in turn is hidden away on “Bob’s” computer and only remains useful up until the point when Bob leaves Council, taking with him all the knowledge and methods required to utilise the information. Spreadsheets stagnate data and take away the inherent informative power of data.

The rest of the world has moved on from this form of data “management”. Our personal lives are now hyper-connected and dynamic with interactive systems like Facebook and Google, and we would no longer tolerate isolated and clunky storage. Our modern world exists on the internet or “cloud”. This allows our data to be accessible from many devices and many different people, it gives us the power to transfer data between platforms, display, navigate, interpret and add data easily. Cloud-based data storage doesn't require special knowledge and it allows data to exist in perpetuity. If this is the way of the future, then why shouldn't this be the case for trade waste management?

“Recent estimates surmise that 90 percent of the world's data has been created in the past two years, and this continues to grow.”

Digital cloud-based middleware that links data with engineer expertise to create value from data is the solution, and it is already with us. It needs to be applied to our industry, as it is with the rest of our daily lives. This provides an easy-to-use interface that allows interaction between councils, engineers and laboratories.

Platforms such as H2knOwhow mine data from GIS, SCADA, CAD, BIM, remote sensors, CCTV and laboratories, and then funnel this through a trade waste database model. This can be programmed to include whichever proprietary model is most applicable for a Council to produce a useful output. These outputs are exposed to a wider audience to inform stakeholders with real time and fully interactive reporting and result visualisation to any device.

Collection of data through a cloud-based platform in this way allows for automation, accessibility and integrated data storage, analysis and interpretation and allows for automated

trade waste invoicing, mobile applications for field data entry, an easy and accessible platform that links treatment plant operations and consenting data and sophisticated data visualisations.

IMPROVED DATA MANAGEMENT

A number of local councils have taken the logical step of transferring their trade waste systems onto map- and cloud-based platforms for improved management and invoicing.

Palmerston North City Council (PNCC) receives and manages the discharges from a significant number of trade waste customers into its wastewater network and through the wastewater treatment plant (WWTP). The trade waste contribution is approximately 12 percent of the flow to the plant and 28 percent of the input load. This equates to approximately \$780,000 of revenue to cover costs on an annual basis. This work is currently undertaken and overseen by Trade Waste Officers (TWOs) with associated help from depot staff.

The effective management and administration of trade waste takes a considerable amount of TWO time and in particular the access to, analysis and management of the data and information. Current costs involved with trade waste management include:

- sampling scheduling;
- data inputting;
- liaising with clients and la;
- consenting and providing information and results to clients;
- inspection of trade waste premises including grease traps and interceptors; and
- calculating trade waste charges.

This was previously managed by a number of spreadsheet databases and the manual integration of these with other legacy Council financial and billing systems. This, in particular, was where a substantial portion of time was utilised with manual analysis, manipulation and presentation of data and reports. PNCC estimated that approximately 110 hours at a cost of \$9640 per month was spent on these tasks.

In addition, there was limited visibility and access for the TWOs in the field and/or by the management team to the trade waste information and thus it is difficult to share information and knowledge between departments and coordinate activities.

Utilising a centralised data management and reporting platform like H2knOwhow that is specifically catered to trade

waste management has been estimated to save PNCC at least three to four days per month of employee time which is up to an equivalent of \$12,000 in savings per year.

In addition to this, there are further unquantified savings realised through better access to the data and consenting information by other Council departments along with benefits of having a centralised system that any authorised person can use and can be accessed in the field.

Risks to the council's networks and plant are further mitigated through the more efficient storage, access to and analysis of data collected by PNCC and others as the time saved will allow for more time to be spent on other tasks and/or with customers.

Whangarei District Council (WDC) has reported similar cost efficiencies with its centralised data platform. In particular, it has stated that a centralised database platform has taken away the resource draining effort of manual spreadsheet based data analysis.

WDC uses its database to automatically generate invoices for trade waste clients from data that is uploaded directly by its laboratory, saving significant time in manually transferring data to accounting packages. It has also allowed WDC to take the trade waste dataset beyond financial management to operational management with the platform acting as a database for categorising waste discharge in order for WDC to understand the proportion of trade waste within the total waste stream.

CONCLUSIONS

Cloud-based data management is an intrinsic part of our daily lives, both at home and in the office. There is no reason why the water industry should be any different. Middleware platforms such as H2knOwhow that streamline large volumes of data from silos into usable formats have been shown to increase efficiency and reduce costs.

These savings ultimately end up with the end user – in this case industrial dischargers, by reducing their compliance charges through reduced council costs. The added benefits in terms of data accessibility, transfer, and manipulation for councils make it a win-win solution. **WNZ**



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Automation of Compliance Management A Silver Bullet?

Councils increasingly must demonstrate how they are complying with quality and environmental requirements but automating the process comes with its own challenges, as **Chris Laidlow**, CEO of h2ope, explains.

Talk to 3 waters service managers about compliance and you soon realise that they all have very similar stories to tell about the real-world problems of demonstrating adherence to the many, often onerous, rules, regulations and standards to which their organisation is subject. Automating compliance reporting is an attractive option, and one that is gaining in popularity, but care needs to be taken to ensure that the benefits of automation are fully realised

Managing water quality and environmental compliance can be complex. It demands a large amount of effort and

coordination to perform the numerous activities related to collecting and collating evidence, analysing results and producing reports against a multitude of conditions. Whilst compliance authorities specify the frequency and content of reports, the onus of determining an acceptable measure of supporting evidence (audit trail) lies with the organisation.

Developing and more importantly, maintaining a robust, transparent, and auditable reporting process is not easily achieved. Consequently, audit time can be a long and arduous exercise for compliance managers and auditors alike.



WHY IS THE TASK SO ONEROUS?

A brief look at the high level processes and issues of compliance management highlights some of the challenges.

Translation: Translating compliance rules and conditions into activities and responsibilities has certain challenges. Councils need to have a technical understanding of the subject matter in order to translate compliance requirements into actionable procedures and the wording of compliance requirements can often be open to interpretation. Where numerous conditions exist, there could be interactions between conditions that are not immediately apparent. Compliance conditions are largely written by people who have little detailed understanding of the practicalities of measuring and reporting on the conditions being set. Despite best intentions, what appears on paper to be a simple exercise of collecting data and reporting against a set of limits, is in fact a complicated and time-consuming affair, possibly involving a variety of internal and external resources.

Roles and Responsibilities: For a typical council, the allocation of compliance activities and the associated roles and responsibilities is spread across a number of different functions or teams in the organisation, commonly Compliance, Operations and IT. The resulting fragmentation can become a serious problem without clear business processes and ongoing coordination between each party. It is important to note that determining the detailed compliance activities must be a collaborative effort. If key personnel from the relevant parts of the organisation are not included in this fundamental stage, the implementation, and indeed the whole compliance management system, will be deficient.

Single Points of Failure: There are several skill sets required to implement a comprehensive compliance management system, and for small organisations where some staff have multiple roles or no back up, there can be several single points of failure.

Hard Copy Records: Councils, to a greater or lesser extent, currently rely on the use of paper records. The issues with managing paper-based systems are many and varied. Controlling hard copy documents is fraught, field-completed records are often lost, illegible, incomplete or contain errors, double handling of records wastes resources and introduces delays, the list goes on. In addition, hard-copy systems do not lend themselves to efficient work-flow management, real-time monitoring of compliance performance, supervisory oversight, or distributed access to results.

Electronic Records: For most councils, a good portion of their water-quality and environmental-compliance data is automatically collected via SCADA systems and stored in a database of some kind. The role of retrieving, cleansing and analysing this data, often falls to one person in the organisation with the requisite technical and spreadsheet skills. Spreadsheets are a natural tool to use for this purpose

but they are often uncontrolled, can contain hidden errors, are difficult for a new person to understand, and are very time consuming to audit.

Collation and Reporting: In order to compile compliance reports, all of the evidential information must be collected from the various sources, for example, maintenance/workflow systems, spreadsheets, laboratory analysis results, inspection forms etc. The information is checked for completeness and measured against the compliance conditions to determine the level of compliance. Missing or incorrect records must be located or supplementary information provided in the case of transgressions. The format of the compliance report, and the supporting records should be arranged to aid auditing.

IS AUTOMATION THE ANSWER?

The capabilities of modern data management technologies are undisputed, and given the issues highlighted above, the benefits of automated compliance reporting are clear. However, it is not a panacea for poor business practices and there are several factors to consider before using automation to ease the compliance burden.

The many complexities of manual/semi-manual compliance systems do not go away when an automated system is employed. Automation replaces many of the manual activities, which are time consuming and error prone but automated systems need to be properly configured to perform according to a robust and auditable process.

Therefore, it is important that the organisation has a good understanding of its compliance requirements before any configuration takes place. This should not be an onerous task but it must be carried out in collaboration with the system vendor to avoid later re-work, delays and loss of confidence in the project.

CHANGE MANAGEMENT

It is normal for some people in an organisation to feel uncomfortable with the introduction of new technology. This is especially relevant in the water industry where the demographics are of an aging and largely trades-based workforce.

Introducing a new system will mean changes to roles and responsibilities. Many of the current activities, such as manual data entry, complex analysis, document collation and reporting, should become obsolete, nevertheless the changes to people's normal routine will need to be identified and communicated.

In the early stages of introducing a new system, it is critical to get buy-in from key staff as they will assist (or not!) in identifying the changes to roles and responsibilities that should occur. To assist in gaining positive involvement of staff, it is sensible to explain how the revised compliance process will work and where the benefits lie. The ongoing support of the users of the new system will determine the amount of benefit returned to the organisation in the long term.

If done well, the new process will mean less administrative work, less opportunity for error and more transparency

around compliance performance. The spin offs for staff are less paperwork, less frustration and more time to do the things they're good at.

TRAINING

Automated reporting systems are powerful tools, but tools all the same. They must be matched to the job at hand and the operators must know how to use them. The need to provide adequate training is indisputable, but the understanding of what "adequate" means varies. There is a tendency for organisations to carry out training on a new process and expect that this is sufficient. For a variety of reasons this is not always the case and conformity with the new process should be monitored, especially in the first few months, and refresher training given until the process is bedded in.

A major contributor to speed of uptake of a new system is its simplicity and ease of use. The effort and cost of selecting and implementing a new system can be wasted if it is confusing to use, slow, inflexible or does not deliver the expected results.

CREATING A BUSINESS CASE FOR AUTOMATION

Creating a business case for investment in an automated compliance system should begin by defining the current state of the organisation's compliance processes. Answering the following questions will help define the process and reveal the level of risk, time input required and quality of outputs.

- Can the compliance process be easily defined?
- How many people are involved?
- How much time does it take (effort and duration)?
- Is the process reliable?
- Does the process have any single points of failure?
- Where does the data come from?
- What is the compliance history like?
- What do the auditors say?
- Do senior managers know how compliance is tracking?

By speaking to compliance system vendors, an outline of the future state compliance process can be determined and from this, an estimate of costs and benefits can be derived.

ASSESSING AUTOMATED COMPLIANCE SYSTEMS

The assessment process for any new system will involve many discussions on topics which are too numerous and complex to list here, however, a demonstration of the following key attributes can save time with further assessment of a particular system:

- Can the automated compliance performance be verified?
- How easy is the system to use?
- How long does implementation take?
- How is data security assured?
- How fast is it?
- Can a clear audit trail be demonstrated?
- What is the level of support and what does it cost?
- What is the future development path?
- What are the termination conditions?

Less tangible considerations are often left out of assessment criteria but can be just as important. The relationship and degree of trust between client and vendor are crucial to a successful long-term outcome.

CONCLUSION

The obligations on councils to demonstrate compliance with quality and environmental requirements is increasingly becoming a focus for regulatory authorities. Without some level of automated data management and reporting, the complexity of compliance activities and the resulting burden on staff resources can become problematic.

If well selected and implemented, automated compliance reporting systems have significant benefits in terms of: eliminating time consuming tasks and error prone processes; improving the reliability and consistency of reporting; and providing oversight and transparency of compliance performance.

These benefits are easily achievable if the organisation has a good understanding of its compliance requirements and takes care to identify and manage the impacts of implementing such a system on its people and processes. **WNZ**



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Safety strike for drones

Regular inspections of Taupo District Council's 84 water reservoirs presented a safety risk for workers – so they turned to some new technology for a solution, as Water Treatment Supervisor Rich Kruse explains.

It was a height safety course that highlighted some problems in the way workers were carrying out inspections of Taupo District Council's reservoirs.

As part of the water safety plans for all of TDC's water supplies, we must inspect each of our reservoirs around the district to ensure they are secure and free of potential contamination from vermin, pests or vandalism.

In total, we have 84 reservoirs with 25 of those ranging from three to eight metres in height; 52 are between one and three metres.

Working at heights requires the employer to take all practicable steps to ensure means are provided to prevent the employee from falling. We had identified from a height safety course that the way we had been working at heights was not meeting the health and safety requirements. We were climbing ladders up to eight metres without harnesses, safety ropes and anchor points and were simply putting ourselves at risk on a regular basis.

That prompted us to explore the use of drones to carry out inspection work. This would give us photo/video evidence that the reservoirs are secure and eliminate the need to put staff at risk by working at heights. It would also reduce the number of personnel required.

H&S GUIDELINES

According to the Ministry of Business, Innovation and Employment's best practice guidelines, there are three levels of requirements for working at heights.

1. Working up to one metre, using a stepladder only requires one person.
2. Working from one metre to three metres requires two people using a ladder.
3. Working above three metres requires three people (all of whom must be trained at working at heights), a rescue plan, certified equipment including harness, ropes, anchor points, and ladder. The certifications must be inspected at least annually and before each use by a competent person. Anchor points must meet the requirements of AS/NZS 1891.2:2001.

Work that we carry out around the district includes all of

the above but at different frequencies depending on the work that is required. There are two types of working at heights functions that we carry out.

1. *Regular inspection work:* Drinking Water Standards (DWS) and Water Safety Plan (WSP) requirements involve three monthly inspections of all reservoirs in the district to ensure the supply is secure and safe.
2. *Emergency/Maintenance work:* Some of this is planned though not at regular intervals and some is reactive emergency maintenance.

With both of the above we have then used the "hazard hierarchy" to determine what would be the safest option to carry out the work.

INSPECTION WORK:

Three-monthly using E, (eliminate) I, (isolate) M (minimise).

- E not climbing the ladder;
- I using a cherry picker/scissor lift; and
- M using ladder, harness and anchor points.

The risk of climbing the ladder to do the work can be eliminated by using a drone device to inspect the reservoirs.

EMERGENCY / MAINTENANCE WORK

using EIM:

- E not climbing the ladder;
- I using a cherry picker/scissor lift; and
- M using ladder, harness and anchor points.

The above work cannot be eliminated but can be isolated for 98 percent of the sites by using a cherry picker or scissor lift. The remaining two percent can be minimised by using a ladder, harness and anchor points.

Examining the pros and cons of the options – including the drone device, cherry picker and harness plus associated equipment – led to the following conclusions.

DRONE DEVICE

Pros:

- Safest option to carry out regular inspection work as it eliminates the hazard;
- Cheapest option, costs range from \$800 to \$3000;

- Minimal training required to use the device;
- No warrant or regular certification required; and
- One person required to carry out this work not three.

Cons:

- Reliability of device unknown.

CHERRY PICKER

Pros:

- Second safest option – isolating the hazard for emergency/maintenance work;
- Able to access 98 percent of the inspection points without leaving the cage/frame;
- If purchased, this equipment may be able to be used elsewhere within TDC teams;
- If hired, no ongoing maintenance costs, \$300 per day or \$1200 per week; and
- Two-person job not three.

Cons:

- Cost of purchase – \$40,000 to \$80,000;
- If purchased, need to carry associated maintenance costs; and
- Training required for all staff using the equipment.

HARNESS/LADDER/ANCHOR

Pros:

- Gaining experience using fall-arrest systems;
- Following H&S guidelines and not taking risks.

Cons:

- Regular certification required annually as well as prior to use meaning a contractor that is qualified needs to carry out this prior to using anchor points;
- Access to remote sites and distance around the district to certify all anchor points every three months would be costly and inefficient;
- Not the safest option – using EIM this option is ‘minimise’ which is the highest risk; and
- Three-person job, so labour intensive.

SUMMARY

With the information above, we concluded that using the drone devices would be both the safest and most cost-effective way

to carry out routine inspection work of TDC’s reservoirs that exceed three metres in height.

Any emergency/maintenance work using a cherry picker would be the safest option where access is attainable; then the harness/ladder/anchor system is used where access with a cherry picker is not an option.

As mentioned above, the cost for a drone device ranges from \$800-\$3000 depending on quality. The costs for a cherry picker to purchase range from \$40k-\$80k and to hire \$300 a day or \$1200 a week. For the amount of work we do, hiring would probably be the best option. If another department within council could also make use of the equipment (eg, arborist, parks and reserves), then it may be worth investigating if equipment like this should be purchased.

The harness/ladder and anchor point is the least safe option and requires a qualified person to certify anchor points prior to use which then raises the question of whether we get that person/persons to carry out the work while they are certifying the anchor points. There are so many sites in remote places that it makes the cost of this option unknown at present – but labour costs will be far higher than options 1 and 2. This also requires three trained people onsite.

EXPERIENCE

The drone has now been in use for about 12 months. There are some restrictions in its use. We have to abide by Civil Aviation rules – related to proximity to airports and permitted flying height. There are restrictions to its use on windy days and even rainy days are not ideal, so it is a case of picking the right day.

It is a lot more efficient – we can get the drone up and down within five minutes as opposed to sending three guys out and setting up the necessary equipment.

The savings in labour alone make it worthwhile. We estimated that it would take two weeks to do with three staff – now it takes one week with one staff member. Over the year, based on hourly rates, we have estimated the drone is saving around \$18,000. [WNZ](#)

- For further information, contact Rich Kruse, Taupo District Council, rkruse@taupo.govt.nz.



Mr Hands On

From his first day of work, Keith Davis has been immersed in the water industry. He talks to **Mary Bell** about a career that dates back to the 1950s.

Although Keith Davis has retired and his 84th birthday is approaching, water and wastewater is still a passion. In fact, if you'll excuse the pun, he has kept his fingers in the pool until fairly recently. Throughout the years, his hands-on approach and technological expertise has made him a formidable asset for the industry.

Keith began work in late 1950 as a laboratory cadet with the Auckland City Council while he was studying for a Diploma in Chemistry at Seddon Technical College at nights. He was based at the water laboratory at Titarangi, and later transferred to the lab in the old pumping station at Western Springs, where he was involved in the analysis of water, soil and compost.

This was a far cry from his childhood dreams to become a doctor, but the money simply wasn't there to put him through medical school. However, the science of water and waste piqued his interest and he says he has no regrets about the direction his career took.

In 1954 he got a job as a chemist's assistant with the Auckland Metropolitan Drainage Board and here he first encountered fluoridation and the hysteria that surrounds it.

As we know, tap water is fluoridated to strengthen children's teeth, but from its introduction in the mid 1950s, Keith says "the anti-lobby was vocal, screaming toxic, dangerous and



At nearly 84 years old, Keith Davis retains a strong interest in the water industry.

mass medication" amongst other protests. A big issue was that fluoride supposedly accumulated in the body. In a top-secret project, Keith was to test exactly that.

"My plan was to make up and verify the strength of a one part per million sodium fluoride solution and drink about a litre a day for five days," says Keith. He would then take urine samples and test if there was any fluoride present.

"It was eventually shown that of the fluoride ingested about 70 percent of it was excreted within about three hours of ingestion," he says.

While Keith readily admits the whole programme would now be considered primitive, his findings were checked by a government analyst who concurred with Keith's interpretation of the results.

Dr Dove-Myer Robinson, at the time chairman of the Drainage Board and a staunch member of the anti-fluoridation



Keith nearly lost his life this day in 1981. He had been collecting samples of bunker oil from the ship when he was caught unaware by a large wave and knocked off his feet. Adding insult to the dunking and near drowning, he got covered in bunker oil.

lobby, sparked the testing programme but was incensed when he heard the results.

“Eventually he accepted that I had acted in a professional manner and he was assured by all that the test results were valid and that I would not die,” says Keith. “He was rather upset and wanted all testing to stop, any test result papers destroyed and anyone involved was not to say anything more on the subject.”

Keith’s boss, Ron Hicks, made a comment that has stuck with him ever since: “Such is politics – they usually get what they want but not in this case, and well done.”

From that time Keith has been passionate about the subject of fluoridation and a keen promoter of it.

“Everyone is entitled to their view,” Keith told Water Journal. “All I do is provide them with the facts, what they do with them is up to them.”

Another such example came a few years later in the 1960s when Keith determined the weed problem in Lake Rotorua was mostly caused by farming, not sewage, as was the popular belief at the time. He received a paltry £600 for his work and the results were pooh-poohed. Years later, and at a cost of many millions of dollars, a study confirmed his findings.

Keith always enjoyed getting out in the field, preferring to be in a hands-on role rather than stuck behind a desk in management. In 1981, he was called to General Motors in Trentham where there appeared to have been a chemical spill, complete with dead pukekos and eels.

On arrival, it looked as if the big caustic soda bath, used to strip grease off imported truck panels before painting, had leaked and contaminated a local stream. Keith spent three days diligently working and determined that it was industrial sabotage, made to look like a spill.

“I have always prided myself in doing things methodically,” says Keith.

He retired in 1991, and promptly took up a position as a distant learning tutor for the Open Polytechnic in Lower Hutt and laboratory tutor at the Central Institute of Technology in Upper Hutt.

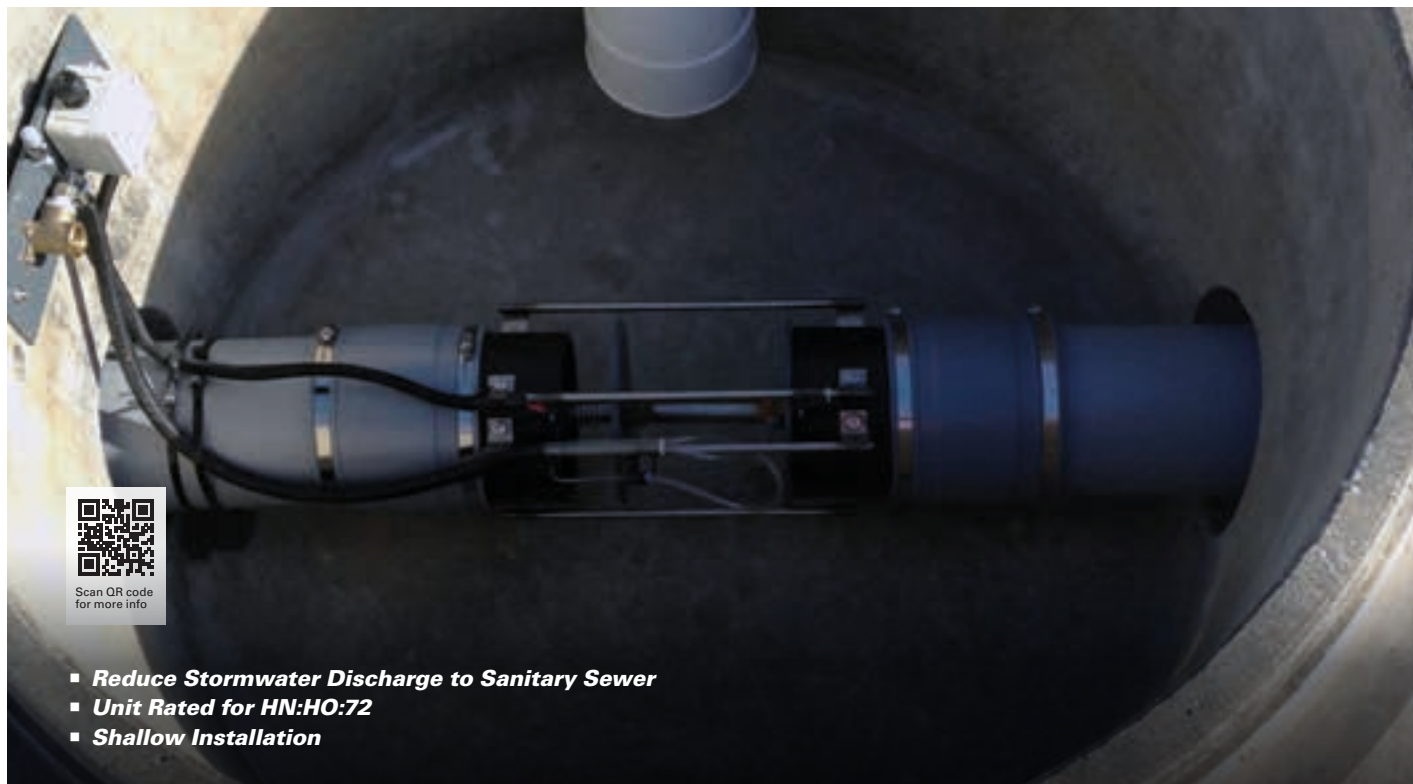
He had already had some previous experience as a tutor and was good at it.

“The students liked my style of teaching as I used anecdotal stories to back up the theory.”

For Keith, who is a foundation member of the NZ Water and Wastes Association, education is key to improving the water sector performance. He would like students from an intermediate of secondary school level to be learning water treatment, waste treatment and disposal.

He also says we need to wake up to the fact that climate change is real and work out what needs to be done to accommodate long dry spells and serious flooding.

“All the organisations that have an interest need to get around the table and sort it out,” he says. “Life could be made a lot better.” **WNZ**



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FLOODING AND FUNDING

Kate Purton (Beca)

ABSTRACT

Urban stormwater is often referred to as the “poor cousin” of the three waters, with limited funding available compared to water and wastewater. The exception to this seems to be in the years immediately following local flood events, when funding becomes available

for stormwater and flood mitigation works, often for a limited period of time.

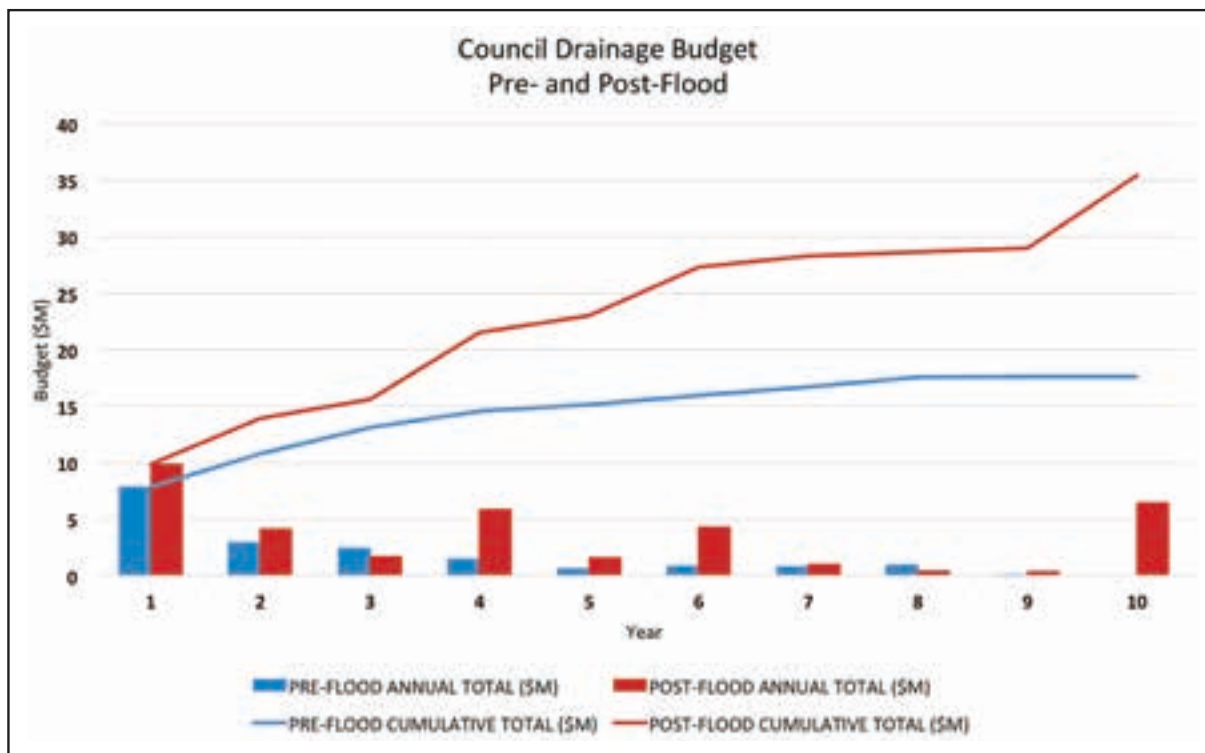
This trend appears to have persisted for generations, despite changes to legislation requiring local government to have long-term plans in place with a 10-year minimum planning horizon.

Tools available for understanding flood risk, and exploring mitigation performance and cost, should enable a more structured long-term planning approach, although costs can be high both for studies and for works, and

potentially unpalatable politically except when public consciousness of flood risk is high.

The full paper explores the relationship between flood events and funding of stormwater and flood mitigation works around New Zealand, using case studies and data from a few local authorities around the country.

It also explores alternative approaches to planning, programming and funding of these works, and how these fit with current regulatory requirements.



PRESENTER PROFILE

Kate Purton is an associate – civil engineering at Beca, with over 15 years’ experience in three waters civil engineering. Kate is based in Christchurch and focuses on stormwater management and engineering, working on projects in Canterbury and around the country.



Takanini Concept Design: The Takanini stormwater channel has been designed to reduce a large flood plain by channelising and conveying large event flood flows, but provides other benefits. A naturalised channel and streamside planting provide a sense of place and good open space outcomes. The channel links key open spaces and the intent is to provide parkside roads and pedestrian and cycle access. A part of the channel design process entailed consideration of urban design elements and subdivision layouts adjacent to the channel.

IMAGE COURTESY OF HARRISON GRIERSON.

THE COMMERCIAL BENEFITS OF WATER SENSITIVE DESIGN

Katja Huls & Andrew Chin (both from Auckland Council)

ABSTRACT

Water sensitive design is being implemented via the Housing Accords and Special Housing Areas Act which implements the Proposed Auckland Unitary Plan (PAUP). Special Housing Areas have allowed Auckland Council to test planning provisions to encourage water sensitive design (WSD) in greenfields and brownfields scenarios.

Our recent experience with implementing WSD is that it leads to a decentralised approach which provides strong commercial benefits which have been well received by the private development sector.

While WSD is intended to lead to good ecological, urban design and amenity outcomes, it also has less obvious benefits. Good WSD can do away with the need for large scale communal stormwater devices.

The retention and protection of streams avoids engineered flood

management approaches because stream corridors can be designed to allow flood flows to be conveyed safely. Hydrology mitigation leads to stormwater management at a sub-catchment level with multiple devices higher in the catchment – a more decentralised approach.

This decentralised approach means that the implementation of stormwater infrastructure is not tied to negotiated agreements between private landowners or cumbersome public land acquisition processes.

It also leads to a shift in asset types,

the use of smaller pipes and smaller devices which are significantly cheaper to build. Valuable land can be used more efficiently as smaller devices can be located within the road corridor, stream corridors and private lots.

Consequently there has been a shift in asset funding sources; from straight ratepayer investment to a mix of private, ratepayer and transport corridor investment. Decentralisation and the use of a treatment train approach is also less likely to result in significant device failure, providing a more resilient network.

PRESENTER PROFILES

Katja Huls is a qualified planner with 13 years' experience in the planning profession, she has specialised in water for the majority of this time. She works for Auckland Council as a senior stormwater specialist providing stormwater input to structure and area planning processes for greenfields developments, and large scale brownfields development.

Andrew Chin is chartered engineer and qualified planner, with experience in three water infrastructure approaching 18 years. He has worked professionally in the public and private sector both in New Zealand and the United Kingdom. He is currently the stormwater asset management team manager for Auckland Council.

PRECAST CONCRETE MANHOLES

A REVIEW AND UPGRADE OF CURRENT PRACTICE

Husham Issa Al-Saleem & Wayne Langdon (both from Humes Pipeline Systems)

ABSTRACT

Stormwater manholes and access chambers are traditionally constructed using precast concrete components supplied by concrete pipe manufacturers. Many years of good performance have provided confidence in the adopted approach.

As a result manhole components have been accepted as fit for purpose and most TA specifications are related to hydraulic and operational requirements rather than the structural design.

The recent development of new performance design standards in New Zealand has increased serviceability life expectancy of main infrastructure components to 100 years.

Recent NZTA and TA specifications require a review of existing product designs to ensure compliance for “strength” and “durability”.

This paper presents the results of intensive research work conducted by the authors to achieve this goal. The main design parameters investigated were loading, load factors for the design of lids to suit various infrastructure construction conditions, lateral load on manhole walls, foundation stability and buoyancy.

Durability design is defined in the terms of the existing New Zealand Standards which define exposure conditions for which manhole components are designed to achieve 100 years’ life.

The paper also lists service conditions which allow designers to specify standard manhole components for safe bearing capacity, traffic loads and depth of installation.

The conditions cover existing design and construction practices allowing designers to select the correct product or carry out an alternative specific design.



Belmont Structure Plan: The Belmont stormwater management approach provides for the detention of large storm events within naturalised detention basins. The basins provide ecological and amenity benefits and contribute to open space outcomes, linking key open spaces together. The overall layout was designed to enable development, each large landholding having one basin. This approach reduces dependence on other landowners to enable development and is made possible by implementing the lower value communal basins in combination with distributed at source devices; rather than higher value catchment wide devices.

PRESENTER PROFILE

Husham Issa Al-Saleem holds BSc, MSc (Civil Eng) qualifications from the University of Baghdad, Iraq, and is recognised in New Zealand with CPEng, IntPE, MIPENZ.

Since 2009 Husham has been working as a senior civil engineer with Humes Pipeline Systems, where he is involved in research and development, management of technical projects, sales training and technical support.

EVALUATING THE VIABILITY OF SUSPENDED RAINGARDENS FOR STORMWATER TREATMENT

Eugene Salmin (Opus International and University of Auckland, Department of Civil & Environmental Engineering), Suman Khareedi (Opus International) and Lokesh P Padhye (University of Auckland, Department of Civil & Environmental Engineering).

ABSTRACT

Biofiltration low impact designs (LID) such as rain gardens are proven stormwater treatment technologies. However, with Auckland and other cities of New Zealand witnessing increasingly high-density developments, the land required for such traditional LID is not readily available. While green roofs are a possible LID alternative in high-density developments, their suitability depends on the angle or pitch of the roofs.

Suspended raingardens can be an ideal LID alternative for urban environments, providing a runoff treatment without needing land space.

This is a multi-stage research project aimed at creating a novel approach to stormwater treatment in urban environments. The first stage of this research is focused on finding suitable lightweight media for suspended raingardens. To ensure that this new approach is reasonably equivalent to the treatment efficiencies of conventional practices, we tested different lightweight media compositions with densities in the order of 350kg/m³ in the laboratory.

Our trials were batch experiments focused on assessing their efficacy in removing total suspended solids (TSS) and



Vertical vegetable garden on a residential building

SOURCE: [HTTP://GARDENIOUS.COM/VERTICAL-VEGETABLE-GARDENING/](http://GARDENIOUS.COM/VERTICAL-VEGETABLE-GARDENING/)

dissolved metals: lead (Pb), zinc (Zn) and copper (Cu) from Stormwater runoff. The media we tested complied with TP10 regulations from Auckland Council in terms of TSS removal.

The removal of all three heavy metals was significant too. However, we also encountered some practical challenges with the use of these media during our experimental runs. This paper discusses these findings and the viability of suspended raingardens as an effective stormwater treatment alternative for high-density urban environments. **WNZ**

KEYWORDS

LID, Stormwater Runoff, Raingardens, Suspended Raingardens, Stormwater Treatment, Green Roofs, Bridge Drainage, Contaminant Removal

PRESENTER PROFILES

Eugene Salmin In 2012, Eugene joined the Masters in Environmental Engineering program at The University of Auckland to broaden his knowledge in Stormwater engineering. His passion for resolving water related issues and exposure to real life water-quality issues encouraged him to become involved in this project.

Suman Khareedi Suman is the Work Group Manager – Stormwater and Water Sensitive Designs at Opus International Consultants, Auckland. For more than 22 years, Suman has been involved in the design, construction supervision and quality control of stormwater management projects, including public infrastructure, building drainage and reticulation for subdivisions. In recent times, Suman has been the Project Director and Technical Reviewer for a number of recent stormwater capital works design projects in the Auckland region. Suman has also been the project manager and lead designer for many technically challenging stormwater

design projects, including the high-profile Daldy and Halsey Streets Redevelopment, which involved implementing a number of innovative, alternative LIDs in challenging site conditions.

Currently, Suman is leading the project to design suspended raingardens, an innovative LID for urban environments.

Lokesh P. Padhye Dr. Padhye is a senior lecturer at the University of Auckland. His research is focused on water quality management and water/wastewater treatment. Dr. Padhye obtained his master's and a doctorate in environmental engineering from Georgia Institute of Technology (US). He then worked as an environmental engineer at Geosyntec Consultants in Atlanta for three years before entering an academic career.

He has been working in the field of emerging environmental contaminant research for past 15 years and has published numerous research articles and book chapters.

NEW PROCUREMENT QUALIFICATION

This country's best known qualification for tender evaluators has been given a major facelift and adapted to make it relevant to a wide range of industry sectors, including the 3 Waters. The brand new NZ Certificate in Infrastructure Procurement Procedures is a leading-edge qualification expected to be available for enrolment this month (July).

With a projected water infrastructure spend of over \$17.5 billion between 2016 and 2025 covering capital works and the replacement of aging infrastructure (Source: Infometrics), there is increasing pressure for the 3 Waters to procure products and services efficiently. A focus on transparency and cost-effective delivery means that using appropriate procurement methodologies and making good quality decisions is more important than ever before.

The Level 6 Procurement qualification has been around in various forms for over 20 years and is already a staple for transport procurement. Developed specifically to recognise practical skills for procurement practitioners, it is regarded as the benchmark for industry best practice and is a requirement for at least one tender evaluator on NZTA-subsidised contracts valued over \$200,000. An adaptation of this proven formula, the NZ Certificate in Infrastructure Procurement Procedures will become the new benchmark of excellence across the infrastructure industry. The new qualification includes added innovations from the best in national and international procurement.

It has been specifically tailored to our procurement environment, and has a strong focus on knowledge and application of the NZ Government's five mandatory Principles of Procurement and its Rules of Sourcing.

The certificate can be achieved entirely on-the-job or through a blend of on-the-job learning and off-job courses. The courses have the added benefit of enabling candidates to fast-track their practical skills and are the ideal way to achieve an effective blend of structured training and workplace evidence of competency. Connexis Chief Executive Helmut Modlik believes the NZ Certificate in Infrastructure Procurement Procedures is a significant move forward for the 3 Waters. "Up until now, there has been no recognised industry standard for water procurement. With the broadened focus and added innovations in best practice, this new qualification represents a real opportunity for the 3 Waters to take its procurement to the next level. We strongly encourage water asset owners and procurement professionals to get on board."

Lesley Smith of Water New Zealand agrees. "With rates affordability emerging as an issue for a number of communities, efficient procurement and cost-effective delivery is becoming increasingly vital. Having appropriately skilled staff engaged in the procurement process is an important first step in raising industry standards. Ultimately, this new qualification will help to maximise efficiency and value for money across the board." **WNZ**

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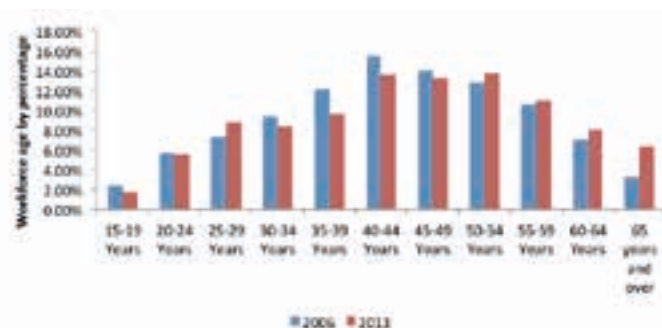
As statistics reveal an aging water industry workforce, Water New Zealand technical coordinator **Lesley Smith** outlines initiatives to attract younger people into the sector – and prepare the next generation of water professionals.

If you have recently attended a water industry gathering, you may have noticed a few grey hairs in the room. This should be no surprise as retirement age is less than a decade away for a quarter of water professionals in the 2013 census. With this age departs a rich history of experience and knowledge that benefits the industry and ultimately, society at large.

To ensure industry retains suitably experienced water professionals when the current cohort of baby boomers retires, it is essential knowledge is passed to the next generation. Young people bring new ideas, approaches and enthusiasm. This article explores existing initiatives to attract and retain young people into careers in the water sector.

We have an aging sector

A census of water service personnel taken between 2006 and 2013 demonstrates the aging trend. The above-50 age group increased from a third [33 percent] of the workforce in 2006 to 39 percent in 2013. Representation in all other age groups under 50 declined, with the exception of professionals in the 25-29 year age bracket, which experienced only slight growth.



Changes in Water Supply and Sewerage Drainage Services Personnel in the 2006 and 2013 census. Data source: Census data was provided by Connexis and accessed using the Infometrics platform.

CAREER PATHWAYS INTO THE SECTOR

Annie Yeates, Water Industry Manager at Industry Training Organisation, Connexis, thinks that some growth in the 25 to 29-year-old age bracket may be attributed to the development of apprenticeships in the water and wastewater sector.

“Providing structured career pathways helps raise the profile of the sector with young people considering their career options, and attracts them into the industry.”

Formal training programmes such as the New Zealand certificates and diplomas in drinking water, wastewater and drinking water assessment also give young people a clearly defined and nationally recognised route to enter the industry.

Graduate programmes are also in place to support university graduates entering engineering consultancies. Most of the country’s major engineering consultancies including Beca, Tonkin Taylor, Opus, Harrison Grierson, AECOM, and Aurecon offer graduate cadetships. A number of smaller consultancies also offer graduate programmes. Our Water New Zealand intern for example has just joined the BBO graduate team in Hamilton (congratulations BBO and all the best Zac!).

Other services providers also have structured on-the-job learning and facilitated development programmes. For example, Veolia provides support for a number of staff to undertake National Certificates in Water Reticulation, Water Treatment and Wastewater Treatment. The graduate connection website www.gradconnection.co.nz (a common portal used by university students on the first job hunt) also includes a programme at Downer. However Auckland Council is the only council group with a programme on the website.

Supporting young people

Water New Zealand coordinates a Young Water Professionals network based in each of our main centres. Each of the groups has a unique approach to supporting and attracting the best young minds on offer. Updates on initiatives their committees have underway are provided by our committee chairs. More information is available on the Young Water Professionals network and people can find out how to get involved via the group’s website: www.waternz.org.nz/YoungWaterProfessionals.

More work is required

Despite efforts to date, data suggest we are not doing nearly enough if we want to attract and retain young people in the water sector. For those with an interest in exploring further professional development opportunities, come and join the conversations at the inaugural Young Professionals session at this year’s Water Conference.

FIONA MYLES, Wellington Committee Chair

Fiona has a background in environmental engineering and is currently working at the Ministry for the Environment. Her current role, supporting the implementation of the National Policy Statement for Freshwater Management, has demonstrated to her the importance of establishing effective networks across the spectrum of organisations involved in the management and use of fresh water.



The Wellington Chapter's inaugural event this year was a walking tour of water sensitive urban design (WSUD) features around the Wellington CBD. This was open to both young professionals and members of the regional stormwater SIG and was well attended by both. The WSUD topic attracted interest from a wide range of professions including engineers, planners, policymakers and landscape architects. This provided an opportunity for robust discussion about the benefits and challenges associated with the WSUD approach.

RICHARD GRAMSTRUP, Canterbury Committee Chair

Richard is a Three Waters Engineer currently working for City Care. His specialisation is providing technical support and project management in the maintenance, rehabilitation and replacement of urban three waters networks.

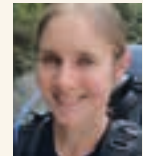


The Canterbury Chapter has been active since forming in February 2014. The group has been working to develop a professional network

of like-minded young water professionals and university students to foster networking and technical conversations amongst the younger members of the water industry in Christchurch. The group has run a number of successful events. These have included technical presentations and networking evenings, as well as promoting Water New Zealand and the water industry to university students with guest lectures at the University of Canterbury and sponsorship of university club events.

MARIA UTTING, Auckland Committee Chair

Maria is a Civil Engineer, currently working for Mott MacDonald. Maria is particularly involved in the modelling and design of stormwater and wastewater networks and working with clients to develop solutions that meet with the objectives for the wider catchment area.



The Auckland Chapter of The Young Water Professionals has been operating since 2013, with the aim of providing events and opportunities to encourage networking and engagement within the industry. The group runs an annual "Speed Networking" event, which provides a fantastic opportunity for young water industry professionals to gain career insights from senior industry professionals. Additional initiatives being developed include focusing on improving the attendance of young professionals at the Water New Zealand conference and providing CPD opportunities to support career development. **WZN**

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Joining the Smart Data Revolution

There's a new industrial revolution in the making – and the 3 waters sector will benefit from a more open-data environment, says **Thomas Joseph** who chairs Water New Zealand's newly formed Digital Water Special Interest Group.

You would no doubt have heard the global buzz around "big data". It's a mega trend growing in use nearly as fast as the volume of data itself. Between now and 2020, the world will experience a fourth industrial revolution due to the rapid development of technologies such as artificial intelligence – that's according to the World Economic Forum.

This revolution will no doubt have a major impact on the way we operate and plan water, wastewater and stormwater infrastructure in the future. Digitally enhanced or "Smart Infrastructure" will form a key part of this movement and will transform how infrastructure is delivered, managed and utilised.

The disruption has already started in many related industries with the most relevant example transportation where ride sharing, mobile data analytics, and eventually autonomous cars will significantly increase the efficiency of our existing roads and transit use, improving access to mobility for all without the need to build any more new roads or major public transportation networks. The water sector must pursue these same advances and increase efficiency of supply and disposal to meet the current and future needs of the communities it services.

At the heart of this revolution is the rise of abundant digital communication and information and a group of Water New Zealand members have formed a Digital Water group to take on the challenge of trying to extract meaning from the sea of 1's and 0's with the ultimate aim to provide improved information and enable better evidence-based decision making, faster and more cost effectively. The group's first challenge is to educate and promote the spread of open data in the sector. Making data more freely available to the industry allows others to extract meaning and develop "information" essentially encouraging a crowd source type model to drive innovation and efficiency.

Digital Water ultimately aims to be a conduit to interact with Central Government, Government Departments, Crown Research Institutes, Regional and Local Councils, and industry groups about data issues, initiatives, and policies. Currently, there are many national initiatives underway where the agency tasked with the initiative does not have a mechanism to engage and interact effectively with the people who'll benefit from it, and who need to have input into the work. The membership of Water New Zealand and the Digital Water group spans local and regional councils, consultants, contractors, and suppliers, which gives us the ability to provide meaningful direction to data initiatives for the water sector.

Central Government has already signed up to the open-data principle. In 2011, the Cabinet approved "The Declaration on Open and Transparent Government Data" that states "Building on New Zealand's democratic tradition, the [New Zealand] government commits to actively releasing high-value public data." The government open-data principle enables the private and community sectors to use data to grow the economy,

strengthen our social and cultural fabric, and sustain our environment.

A number of datasets representing the environments and communities that interact with our water assets are already available in the public domain. The River Environment Classification provided by Ministry for the Environment, climate data held by NIWA, population and income statistics from Statistics New Zealand are all examples. Combined with asset and operational datasets, there is the opportunity to extract powerful insights that could optimise the management of our water assets. One of the Digital Water group's key initiatives is to further engage with relevant Crown Research Institutes (NIWA, MetService, GNS, Landcare, LINZ) so we can better understand the available data sets and facilitate the extraction of value to our members.


The Declaration on Open and Transparent Government Data also encourages local councils to take a similar approach to sharing their own data. To support local government in their journey the Department of Internal Affairs has produced a toolkit, available at: www.ict.govt.nz/guidance-and-resources/open-government/toolkit-for-local-government.

At present, each stakeholder sits on their own silo (or silos) of data with relatively poor awareness and poor access to the datasets held by the other agencies. The potential of open data is to open up each silo and make the value of that data realisable to the other stakeholders. Technological advances are rapidly creating a digital mesh through which data can be appropriately exchanged, but the landscape of different standards for expressing and sharing that data is currently highly fragmented.

Open data not only means sharing information, but sharing it in a meaningful form. Standards facilitate the integration that releases the value from the data. The metadata standard is an initiative that aims to bring consistency to data. The project is being led by LINZ and aims to create a consistent set of definitions for recording data. The Digital Water Group is actively involved in the metadata standards project. More information about this project is available on the LINZ website: www.linz.govt.nz/about-linz/what-were-doing/projects/metadata-shared-data-standards-project.

Digital (Smart) Infrastructure is built on data, at the moment the water sector suffers from data access and data quality issues, particularly in relation to existing assets. In order to deliver the potential value of this data, it is of fundamental importance to improve the accessibility and quality of the data on which it is built. "While change is inevitable, progress is optional." Let's educate our water networks and change the water world from New Zealand. **WNZ**

-
- To get involved in the excitement check out our group page, www.waternz.org.nz/digitalwater or contact the digital water chair, Thomas.joseph@mottmac.com.



Hup
2,3,4,

...keep it up

2,3,4

The reforms are
marching on



By **Helen Atkins**, partner, **Vicki Morrison-Shaw**, senior associate; and **Phoebe Mason**, solicitor – Atkins Holm Majurey

For those of you who are old enough to remember the Jungle Book (or who have seen the recent re-release), you will be familiar with the elephant dawn parade led by the unflappable (but rather forgetful) Colonel Hathi. Hathi refuses to let the pace slip, with his rhythmic marching chant, 'Hup two, three, four, keep it up, two, three, four!'.

The Government, a bit like Colonel Hathi, is also keeping up the pace in terms of local government and resource management reforms. But unlike Colonel Hathi, who seems to have forgotten the purpose of his march, the Government has some very clear goals it wishes to achieve. More flexible

and responsive local government structures, more affordable housing, and ensuring sufficient capacity for accommodating urban growth. While the goals themselves are hard to argue against, some of the mechanisms suggested to achieve the goals, and in particular the increasing central government intervention in local government matters along with the speed of the reforms, have raised concerns in some sectors.

Unlike Colonel Hathi's hapless crew, in the local government and resource management world, we like to know where we are heading and why, how we are going to get there and when. We also like to make sure we have buy-in along the way – rather different to the "military style" of the Colonel.

In this article we provide an overview of the recently released Local Government Amendment Bill which seeks to improve service delivery and infrastructure provision at the local government level. We then move on to discuss the proposed national policy statement on urban development and some of the key issues we see with the statement in its current form. We close this article with comments on a case that provides a timely reminder to all those purchasing (or acting for purchasers of) rural land with water permits – that permits do not automatically transfer with the land. We hope you enjoy the read.

LOCAL GOVERNMENT REFORM

In March this year Local Government Minister Hon Peseta Sam Lotu-liga announced further reforms to the local government sector to "enable councils to deliver better services for ratepayers".¹ This announcement was followed in mid June 2016 by the introduction of a new local government reform bill² (Bill) which sets out the content and detail of the proposed

1. <https://www.beehive.govt.nz/release/major-reforms-improve-services-ratepayers>.

2. *Local Government Act 2002 Amendment Bill (No 2) 144 -1*.

reforms. In essence the Bill seeks to do four things:

- To enable a broader range of functions to be transferred between local authorities, joint governance arrangements for areas of shared interest and greater use of joint council controlled organisations for providing services.
- To provide the Local Government Commission, subject to appropriate checks and balances, with discretionary powers to decide what investigations into reorganisation proposals it should undertake – either on its own volition or in response to requests from the Minister of Local Government, local authorities, or members of the public.
- To enable the Commission to facilitate the provision of more streamlined regional services and arrangements through providing for:
 - a local authority to act as a unitary authority in one district and a regional council only in another district; and to
 - allow a local authority to exercise specified functions, duties and powers in another district that has its own territorial authority.

The changes proposed clearly seek to streamline the efficiency of local government by providing a range of options for “reorganisation” as well as “amalgamation” of services. Providing the flexibility for local authorities to innovate and collaborate in solving the issues specific to their community, the Bill intends to enable the delivery of more tailored and efficient services. As the Department of Internal Affairs notes,³ the regions and territories of New Zealand face differing challenges in respect of demographic changes, economic shifts, environmental pressures, and technological innovations, and constituents expect councils to keep up with these changes responsively and quickly. While greater flexibility may enable innovation, there may also be complications arising from the changes.

One such complexity could be unforeseen consequences of a lack of uniformity in local government structures across the country, and potentially a lack of certainty if the structures continue to change.

Another is, given that the current local government system is structured around territorial boundaries, ventures which cross territorial boundaries, like joint council controlled organisations (CCOs), could cause challenges for the fulfilment of the separate obligations of local authorities. More so than singly-held CCOs, where a CCO is multiply-owned, Councils may find their obligations to their ratepayers in tension with their corporate obligations to the CCO. The Board of any joint CCO must be given the opportunity to comment on the long-term plans of any shareholding council (clause 25, new section 63E). The Bill also provides for accountability policies to address this tension and ensure that shareholding Councils’ objectives and priorities are met (clause 22, new section 56S).

The joint CCO capability appears to be largely aimed at essential services such as water and transport. Territorial boundaries become markedly irrelevant in respect of services relying on immovable physical resources, and so the practical benefit of enabling joint provision of such services is clear. Particularly in the case of water services in contexts like Auckland and Waikato, where municipal supply issues are closely intertwined, the ability to amalgamate water CCOs may be of great benefit.

There will also be costs associated with the Bill. The Local Government Commission receives a number of new functions and responsibilities under the Bill. The Commission may need additional resourcing to cope with the workload of assessing and approving/declining reorganisation proposals and joint-CCO proposals for local authorities, as well as reporting to the Minister. There will also be implementation costs as Councils review their

services in light of the new options. It will be interesting to see how such costs compare to any perceived long-term savings from adopting the new models.

The Bill has already been making waves, with the Hon Winston Peters leading the charge in opposing it. He described the Bill as needless “meddling” in the affairs of local government and an attempt to fix something which was not broken. In his view, “local government is not, repeat NOT, accountable to Central Government” and the Bill was a “new exercise in Nanny State micro-management”.⁴ It will be interesting to see what other reactions are forthcoming. The Bill is open for submissions until 28 July 2016 with the Local Government and Environment Committee’s report due by 28 October 2016.

PROPOSED NATIONAL POLICY STATEMENT – URBAN DEVELOPMENT CAPACITY

In early June 2016, the Government released the proposed national policy statement on urban development capacity (PNPS). Its purpose is to ensure regional and district plans provide adequately for business and housing growth.

The objectives in the PNPS apply to all local authorities whether or not they are experiencing growth. The policies apply in a stepped manner. All local authorities are required to comply with policies PA1 to PA3 which set out general responsibilities regarding providing for urban development. Policies PB1 through to PD4 inclusive, which require housing and business land assessments, monitoring, and potentially changes to plans and consenting process, apply to local authorities with areas experiencing medium or high growth. In addition, local authorities with high growth areas are required to comply with policies PD5 to PD9 which require: the setting of minimum targets for dwelling numbers and types; overestimating capacity by up to 20 percent to take account of the likelihood that not all capacity will be developed; and the development of a future land release and intensification strategy to demonstrate there is sufficient capacity and that targets will be met.

There are a number of issues with the PNPS in its current form. These range from big picture issues regarding whether the PNPS will achieve its goals, and how it fits with the other legislation, policies and plans, through to drafting issues regarding lack of clarity in terms used and lack of certainty in the extent of obligations. While there is not space to go through all of the issues in detail, we will briefly note three, which we consider to be of particular relevance to the water sector.

One particularly thorny issue arises in relation to the issue of infrastructure. In determining development capacity and making land available for urban uses, local authorities are required to consider the “provision of adequate infrastructure”⁵ and “actual and likely availability of infrastructure”.⁶ No definition or guidance is provided around what “adequate infrastructure” means. The potential for delays in the provision of infrastructure (and the flow-on effects this would have on development capacity) are not addressed and nor is the somewhat fraught issue of funding. In terms of the latter, the accompanying consultation document notes that infrastructure will be provided by a combination of development contributions and rates from the new ratepayer base resulting from the growth. Such an approach fails to recognise the existing shortcomings of infrastructure in some areas and the limitations on development contributions (requiring a causal nexus with a particular development).

Another difficult issue is how the PNPS fits with other national policy statements such as the NPS for freshwater management or the

3. [https://www.dia.govt.nz/diawebsite.nsf/Files/Better-Local-Services/\\$file/BLS-information-sheet-package-summary-20160317.pdf](https://www.dia.govt.nz/diawebsite.nsf/Files/Better-Local-Services/$file/BLS-information-sheet-package-summary-20160317.pdf)

4. <http://www.scoop.co.nz/stories/PA1606/S00295/local-government-nz-speech-by-rt-hon-winston-peters.htm>.

5. Refer definition of development capacity in section 3 interpretation.

6. Refer policy PB3.

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New Zealand Coastal Policy Statement. No guidance is provided in the PNPS as to which national policy statement would prevail in the event of a conflict – such as for instance where urban development is proposed in coastal areas or in areas that may impact freshwater resources.

While the consultation document notes that non-statutory guidance on this (and other issues) will be provided once the PNPS is in place, as the guidance is not mandatory, decision makers can choose whether, and to what extent to apply it. Such an approach creates uncertainty for both local authorities and the public and is likely to lead to litigation. It would be far preferable for the issue to be dealt with in the PNPS itself. While that would not necessarily avoid litigation, it would at least provide local authorities and the courts with a clearer starting point.

The final issue we will mention here relates to consultation. While the PNPS provides for consultation with certain groups when the housing and business land assessments are being undertaken, a local authority is only required to take into account views of certain groups when it is developing its future land release and intensification strategy. As this strategy is likely to set a direction for areas to be opened up for urbanisation, it is considered that consultation with all potentially affected parties should be required.

Submissions on the proposed NPS close on 15 July 2016 and current expectations are that it would be introduced and take effect from October 2016.

RECENT CASE ON WATER CONSENTS TRANSFER

Terracedale Developments Ltd v Cavell Leitch Pringle and Boyle⁷ is a cautionary tale for those involved in buying and selling properties with water permits that water permits do not automatically transfer with the land.

Terracedale Developments Limited ("Terracedale"), a rural property development enterprise, purchased a block of rural farmland in Swannanoa, with the ultimate intention of subdividing it. The vendor of the land owned two water consents that authorised the taking of water from two irrigation wells on the property. The sale and purchase agreement, which was drawn up by Terracedale's lawyer, did not provide for the transfer of the water consents and the consents were subsequently surrendered by the vendor. It was only after this occurred that Terracedale realised that the consents had not transferred as part of the sale and applied unsuccessfully to Environment Canterbury to have them reinstated.

Terracedale then sued its lawyer for breach of contract and negligence and sought to recover its loss. In particular, Terracedale claimed loss included the money it spent trying to reinstate the water rights, the income lost – prior to subdivision – in having to farm an unirrigated property and the loss caused by not having the water rights. The Court found that the lawyer had breached his duty to his clients "since access to water is an important component to the utility and value of the land, the matter should have at least been raised with the client."⁸

The Court accepted that Terracedale had incurred losses on all three bases but decreased the costs awarded as it found Terracedale had contributed to its own loss by "failing to advise the lawyer of options for the property other than subdivision".⁹

Total costs awarded were just over \$147,000 plus interest from the date of the judgment. It was a rather expensive reminder for all those involved that water consents do not automatically transfer upon the sale of land and that where a sale involves rural farmland, water availability and rights are key issues to consider. **WNZ**

⁷ *Terracedale Developments Limited v Cavell Leitch Pringle and Boyle* [2016] NZHC 605 ("Terracedale").

⁸ *Terracedale*, paragraph [51].

⁹ *Terracedale*, paragraph [95].



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CANADIAN PACIFIC – still evolving

Canadian Pacific (CPL) is a water, wastewater and process-systems specialist that is continuing to evolve after more than 20 years in operation. Managing director Peter Leitch says he decided about two years ago that it was time to take a “fresh look” at the business.

“I wanted to see how we could do things better and since then we’ve been making changes that are already making a difference.”

CPL has been in business for more than two decades, beginning soon after Peter returned to New Zealand from working in a number of oil and gas project engineer roles in Canada. Building up the business to offer the full range of services from design through to commissioning reflects the company’s attitude of being able to take on any project. With this attitude comes the ability to adapt and adjust to changing market needs.

Evidence of CPL’s innovation is demonstrated by the manufacture of portable membrane wastewater treatment plants. These are constructed within shipping containers with

pumps, blowers, electrical distribution and PLC (programmable logic controller) all self-contained. These turnkey plants provide an excellent upgrade option, giving a high-quality effluent, minimal site disruption, medium cost and a small footprint.

As specialists in water treatment, wastewater treatment and process systems, CPL has a strong track record of fabrication and installation of piping and separation. The company has recently partnered with international specialists Andritz Separation and OsmoFlo Water in New Zealand. Their world-class products expand the range of specialist expertise available to the local market.

Strengthening the organisational structure was another area identified for change. This has included creating a role of Head of Engineering to draw on specialised skills and further broaden the overall strength and agility of what the business can offer. CPL has a family feel to it, a medium-sized business employing

up to 30 fulltime staff brings with it additional responsibility. “Looking after our staff has always been hugely important to us. We’ve looked at how we can do this better and in a more concrete way,” says Leitch.

“We now have weekly training sessions to make sure everyone is growing and learning. We also give our guys medical and income protection insurance as a matter of course – as far as I’m aware not many companies do this. Our people do work in all kinds of conditions and they don’t whine about it – so we need to look after them.”

CPL has further developments “in the pipeline” and has also identified the need for a stronger focus on communication.

“Letting people know what the company is about and what we’re up to is something we’re also putting more resource into. We are developing a new website and have committed to communicating to our clients and the industry more – so watch this space,” says Leitch.


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New role at Harrison Grierson

A top specialist infrastructure manager and engineer has been appointed to a key role at Harrison Grierson. James Leach fills the newly created position of Business Development Lead, where he will focus on major projects in the public sector. A highly qualified civil engineer with an infrastructure project and senior business leadership background, James has over 20 years' experience designing, managing and controlling a wide range of major, high-value civil engineering and construction projects in the buildings, rail, water, utilities and aviation sectors both here and overseas.

James is based in the company's Newmarket office in Auckland.

Mott MacDonald appointment

Mott MacDonald has appointed Nick Gillespie as structural practice leader for New Zealand. Based in the consultancy's 100-plus office in Auckland, Nick will lead a 20-strong specialist structural team that will deliver major projects in the country across sectors including transportation, buildings, maritime and water.

He joins Mott MacDonald from the Meinhardt Group, where he led the company's UK civil and structural business for the past five years. He has more than 20 years' experience in the construction industry, with a strong background in structural engineering gained across a wide range of projects. These include roles on globally renowned schemes such as the Heron Tower and Battersea Power Station redevelopment in London, Auckland International Airport and the headquarters and Knowledge Centre of Abu Dhabi's Urban Planning Council. **WNZ**



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