

CONCURRENT SESSIONS

SESSION ONE: THURSDAY 22 JUNE – 1335 to 1500

Water Supply, Stormwater, Wastewater

101: Time: 1335

SPOTLIGHT PRESENTATION

Consumer attitudes and the water sector: findings from AWA / ARUP water consumer survey

Presenter & author: *Daniel Lambert, Arup Pty Ltd*

A presentation of high level findings from the Australian Water Consumer Outlook, a collaboration between AWA and Arup to investigate public attitudes which cut across local and state boundaries. We survey residential water consumers across Australia, with an online survey sample size of 3948. The survey focused on themes of interest to the water sector. We find a high level of knowledge and awareness of the water sector across the Australian population. There are regional differences in attitudes towards water pricing and private sector participation. Community support for alternative water sources such as recycled water contradicts political experience.

Three Key Points:

1. The findings of the national survey of water consumers inform both national policy discussions and water industry development.
2. From a policy perspective, the change in sector focus from compliance to customer, as noted by the National Water Commission in 2013 with the Urban Water Futures Discussion Paper, presents a challenge for greater understanding of the community in water resource management. In this study we identify the jurisdictions in which national reforms to water sector regulation, pricing and private sector participation may challenge community attitudes.
3. From the perspective of the water industry, we identify the community attitudes that are broadly based and cross local and state boundaries. Broadly based attitudes, such as the support for alternative water sources, can be utilised to support national reform and change in the water sector. Awareness of broad based attitudes can support ongoing efforts for industry and resource management reform.

Daniel Lambert is Arup's Australasia Water & Urban Renewal Leader. He has worked on water projects throughout Australia, New Zealand and Asia. Daniel has a passion for working with clients at a strategic level to help develop innovative solutions to their challenges. He recently led the development of highly regarded publication: "The Future of Urban Water: Scenarios for Water Utilities in 2040" in collaboration with Sydney Water. Daniel's expertise as a thought leader in the water industry has been recognised through numerous awards including the Consult Australia Future Leader's Award, the International Water Centre and Water Leader Scholarship and selection for the prestigious Aquarius Global Water Leaders Programme.

102: Time: 1405

NZ's largest proprietary treatment device – an innovative centralised Stormwater treatment & pumping facility

Presenter & author: *Troy Brockbank, Stormwater360*

Co-authors: Mark Groves, Peter Christensen, Brendon Mills & Liam Foster

A project to address flood risk mitigation in Christchurch offered a unique opportunity to retro-fit a large-scale stormwater treatment device to remove contaminants and reduce adverse environmental downstream effects. A project team consisting of experts from Opus, Beca, CCC and Stormwater360 collaborated to design and supply New Zealand's largest StormFilter.

Land drainage systems within Christchurch City have changed significantly due to subsidence and damage to waterways, land and infrastructure caused by multiple earthquake events since September 2010. Consequently, this has increased the risk of flooding in a number of catchments across the city. The Land Drainage Recovery Programme (LDRP) has been setup to deliver projects which aim to mitigate the effects of the earthquakes in the city's most affected areas, restore the flooding risks to 'pre-earthquake levels' and develop sensible area-wide solutions that offer the most benefit, to the most people.

The Bells Creek - Woolston catchment was identified under the LDRP as an area at greater risk of flooding since the earthquakes, due to ground subsidence. The catchment is approximately 160 hectares of commercial/residential land types and includes all flows draining to the Ferry Road Stormwater main, Moorhouse Avenue, Fitzgerald Avenue and part of the CBD. An initial project team consisting of Opus, Beca & CCC were engaged to design an end of line stormwater pump station at Richardson Terrace. The pump station needed to receive peak stormwater flows from the catchment, when the existing gravity fed and tidal influenced reticulation is at capacity, and pump discharge into the Heathcote River.

Christchurch City Council (CCC), under their Heathcote Stormwater Management Plan, identified this catchment as a significant source of contaminants, namely dissolved metals and Total Suspended Solids (TSS). Stormwater360 joined the project team to assist in the design and supply of a StormFilter to treat the first flush stormwater runoff.

This paper presents findings and learnings from the design stages of this collaboration.

103: Time: 1435

An integrated water team for Queenstown Lakes District Council

Presenters & authors: *Mark Baker, Queenstown Lakes District Council & Nasrine Tomasi, Mott MacDonald*

Co-author: *Deborah Lind*

The Queenstown Lakes District is a place of extremes and not just the adventure activities that people partake in. There are some unique challenges QLDC faces in maintaining the levels of service for 3 waters within the district including:

- The natural topography dictates a complex network that can be difficult to upgrade.
- Extremes of environment with long hot dry summers, frequent winter snow falls, frozen ground water and varying lake level
- A varying population culminating a ratio in excess of three visitors to each resident over the peak tourist periods.
- Rapid growth in resident and tourist population is quickly eroding headroom.

QLDC identified the need to rapidly identify system performance issues by developing robust hydraulic models that can be used as an operational and strategic tool.

A team of water experts were commissioned to ensure the most effective outcomes. The team, led by QLDC staff, includes operators, technical specialists and hydraulic modellers from multiple contractor/consultancies. Working within an integrated team has brought

together a wide range of experience and has enabled cross pollination of ideas and knowledge.

This paper case studies the development of the Queenstown Water supply model and its subsequent success in informing the Better Business Case approach to develop a Water supply strategy.

201: Time: 1335

**Visitor driver issues in Otago and Southland – perspectives and perceptions BEST
BRANCH PAPER – Otago / Southland**

Presenter & author: *Jeremy Byfield, MWH Global*

In 2015, Jeremy provided crash analysis to assist the Transport Agency with the Visitor Driver Signature project. Since then, there has been considerable publicity associated with tourist involvement in fatal and serious crashes. In the lower South Island, these drivers make up a significant proportion of road users and there are concerns that this issue will become worse as tourist numbers continue to grow. Jeremy has looked beyond the media headlines to determine why these crashes occur and what can be done to make our roads safer, not only for the visitors who are so important to our economy, but also for local drivers who share the road with them.

202: Time: 1405

Auckland double decker buses – retrofitting a city

Presenter & author: *Fiona Tang, Auckland Transport*

Co-author: *Remi Cruz*

Key points

First double decker buses to operate within urban centres in New Zealand – working to retrofit an existing constrained road envelope to accommodate a higher vehicle. The political and social enhancement required to be developed, especially for the modification of verandas encroaching onto the road corridor, protected trees and services. Worked collaboratively with consultants, clients, arborists, planners, contractors, and stakeholders to determine the best design criteria and solutions to retrofit existing verandas, kerb lines, footpaths and trees.

Project significance

Auckland Transport is improving the bus network throughout Auckland. Part of this effort is to increase capacity on certain routes on Auckland's bus network where services are operating at or near capacity. Increasing vehicle numbers on these routes is not feasible due to the capacity constraints. One way to accommodate this increase in capacity is to introduce double decker buses. However, there have been some unique challenges due to retrofitting and upgrading of existing infrastructure.

The double decker buses introduce a new safety risk which requires careful consideration and mitigation. The additional height of vehicles places them in the path of potential obstacles (verandas or shop canopies, trees, overhead cables and service poles) which were out of reach of standard passenger buses and out of the direct line of sight of drivers.

With no clear guidelines on corridor clearances for the buses, the project team had no reference for how much the kerbs should be shifted, how high and back the trees needed to be, could existing verandas be cut back and be in accordance with the Building Code, would the sag on service cables be affected by the height of the buses, and how will this affect cyclist and cycle lane construction and pedestrians on resized footpaths.

This project required the determination of design and operational criteria from first principles. A mock-up of a double decker bus, built using a standard bus with a frame on top, was used for survey purposes on the first trial run held in February 2013. Eventually, after a series of tests on a short piece of road built for the trials using an actual double

decker bus fitted with survey instruments, the clearance envelope was established in October 2014. A year later, the first double decker bus started operation in Auckland.

203: Time: 1435

Cycle investment in NZ – from famine to feast

Presenter & author: *Andy Lightowler, Beca Limited*

A few years ago funds for cycling projects were very difficult to secure. Recently Government allocated \$10m to Council's nationwide to spend over 3 years. This step change in funding left Councils, consultants and contractors challenged in gearing up to deliver the outcomes envisaged.

Cycle design solutions have made amazing progress. The painting of a simple white line to demarcate a cycleway has given way to separated cycle lanes of all sorts of colours. Designers have innovatively interpreted current NZ Design Standards, drawing on overseas guidance and experience, as they seek specific solutions to local challenges. Increasing the width of the road corridor to accommodate separate cycle lanes is often difficult to achieve. Reallocating existing road corridor space can be controversial. It often involves removing car parking spaces and reducing intersection capacity for example. Council's are increasingly confident at overcoming these challenges. Combining cycling projects with urban streetscape amenity improvements greatly assists in obtaining community buy-in.

This presentation gives an overview of the challenges faced by designers and the innovative solutions developed for urban cycling projects in NZ. It also comments on best practice from overseas and how this has been applied to the NZ urban context.

3 key points:

- The availability of funding has proved challenging for Council's, consultants and contractors
- Cycle design solutions have made amazing progress
- Best practice from overseas has been applied.

Asset Management - sponsored by Infor Global Solutions

301: Time: 1335

SPOTLIGHT PRESENTATION

All on board

Presenter & author: *Stephanie Campbell & Gordon Munro, KiwiRail*

KiwiRail is one of the country's largest landowners but for many years did not take a commercial approach to its portfolio.

That has changed in recent times as the organization looks to control, develop and manage its property assets to enable KiwiRail to realise its vision to be a trusted, Kiwi-owned logistics partner growing New Zealand.

Historically many lease and license transactions were undertaken on favorable terms to the tenant including discounts for freight partners, multiple rights of renewal in the tenants' favour, poor valuation processes and not approaching the land from a highest and best use point of view.

Our drive has been to put a commercial policy across the portfolio and work with the business to educate on how this positively impacts KiwiRail revenue returns.

In this presentation, we will discuss the transformation required within the business to enact this change and detail how adopting a commercial focus allows the organisation to positively contribute to the future of rail in New Zealand.

***Stephanie Campbell** is Development Manager Property Investment and Revenue at Kiwirail. Stephanie has degrees in Architecture and Building Science. She is a property management professional with experience managing a diverse and varied portfolio. As a leader within KiwiRail, her current focus is to developing property expertise, improving stakeholder management and to develop a strong property strategy. With a background in program and project management for other agencies, including NZTA, Corrections and Fire, Stephanie is looking to bring development thinking to the business as a mechanism to support wider business objectives.*

Gordon Monro *details to follow*

302: Time: 1405

Making asset management great again

Presenter & author: *Tony Urqhart, Aecom*

The recent Kaikoura earthquakes provide a stark reminder of the threats that natural events pose to NZ's infrastructure. We live in a beautiful country, but much of that beauty is a result of massive geological forces that shaped and made it what it is today.

With physical infrastructure a basic requirement of our cities I often wonder why, despite the wealth of infrastructure plans and planning, that we seem to have no national strategic planning framework for infrastructure. We have a wealth of infrastructure plans at the local government level, a National Infrastructure Plan, which contains a pipeline of projects but no overarching strategy. In the authors opinion the NZ infrastructure industry has failed to deliver real tangible benefits to NZ. The National Infrastructure Unit established by Treasury have been in place for some time, and failed to deliver strategic value, and likewise the NAMS Group has become increasingly less relevant.

The authors view is that we need a complete rethink as to how infrastructure is governed and managed in New Zealand.

A national infrastructure strategy would provide framework for managing risk, dealing with population growth, and answer key infrastructure questions, such as:

- Is it appropriate to have the majority of NZ's ports on the Pacific given the likelihood of a major tsunami from the east?
- If Port of Auckland was to relocate, what key infrastructure would be required to provide services and access to the port?
- What plans are in place for dealing with the inevitable 'mega' quake on a fault in or near Wellington? How and where would government continue?
- How do we deal with population growth on a national scale rather than the 'ad-hoc' city driven approach? Can we think beyond our local boundaries?
- How do we get economies of scale, and maintain local input?
- How do we keep infrastructure viable in small communities, with limited growth and declining revenues?

Is there a common framework for assessing the risk of events such as tsunami, volcanic eruptions and earthquakes to ensure we are spending capital in the right areas? The consensus of opinion seems to be that local and central government agencies are left to plan for these events using their own frameworks, and in doing so vastly underestimate both the likelihood and consequences of such events.

A National Infrastructure Strategy dealing with these issues is urgently required. This paper will suggest an improved governance framework for NZ's Infrastructure.

303a: Time: 1435

Failure mode analysis and how it impacts your strategy

Presenter and author: *Helen Ramsey, Downer*

Asset owners want to clearly understand what drives reactive expenditure and the causes of asset failure in order to effectively target maintenance programmes. When failure modes are well understood by a review of historic maintenance records, then sound strategies can be developed to align to business strategy. In some cases it may be acceptable to have a high level of reactive expenditure.

Modern Asset Management Systems are about reducing the friction between the data and users so that engineers can focus on improved solutions. The key to gaining benefits from any asset management system (or job management system) is the analysis of the data captured.

Being able to visualise that information makes it more available to users. Too often significant amounts of data is captured and never effectively analysed to realise benefits in improved operational performance or targeted renewal programmes. The data may not be captured in a consistent manner to analysis. However, this should not be used as a reason not to clean the data ready for analysis. Providing evidence based decision making and validating field observations.

The key behind strategic asset management is a transparent line of sight which includes network needs, predictive modelling, forward works programmes and an agreed/delivered outcome. All this will provide confidence and auditability for network funders and decision makers.

303b: Time: 1445

Blurring the lines towards one road network

Presenter and author: *Steve Browning, Downer*

In 2013 Downer and Hamilton City Council entered into an Alliance to plan, design, deliver, maintain and manage the roading and related infrastructure in Hamilton. From about the same time, Downer was busy bidding and implementing the Network Outcome contracts on the highway network. The NOCs were the catalyst for Downer to create and implement a process oriented culture to the way we manage infrastructure assets. This was rolled out on the state highway maintenance contracts first, and has since been adapted and extended to fit the requirements of local road asset management. Adopting a process culture creates some challenges, but also unlocks a huge array of benefits including: capturing institutional knowledge, training for new staff members, streamlining the adoption of new technology, standardisation of procedures, continual improvement.

Adopting a single, enterprise wide way of managing road infrastructure assets across state highway and local roads assets moves us a step toward the goal of having a true One Road Network, and provides some tangible benefits for us and our partner organisations.

- Implementing a process culture
- Integrating our approach across state highway and local roads
- The benefits of blurring the lines between our state highway and local roads asset management practices

Working collaboratively

401: Time: 1335

SPOTLIGHT PRESENTATION

Industry wide collaboration using engineered structures and technology in contributing to a clean-green New Zealand dairy industry

Presenter & author: *Ross Monaghan, AgResearch*

Co-authors: *David Houlbrooke, Seth Laurensen & Rachel Millar*

Public recognition of the pressures that are now placed on our soil and water resources has greatly increased within the past decade; barely a week passes without some prominent media story alerting readers or listeners to a pressing water contamination issue. Particular attention is often directed at NZ dairy farming, which is a relatively intensive land use activity. In response to this concern, significant investments of money and energy have been made by industry and government groups to develop dairy production systems that have reduced environmental impact yet remain profitable. This presentation provides some background to the changes that have been made to NZ dairy farming systems in recent decades to improve farm environmental performance. Particular focus is placed on the role that engineered structures and technologies have for improving farm performance in three key areas:

- Effluent management, particularly the role of effluent pond storage and improved methods of effluent application to land. The presentation will include a brief overview of the collaborative process that was undertaken to formulate rules and guidelines that are now broadly accepted by communities.
- Alternative approaches to cow wintering, focussing on the role of built structures such as barns and standoff pads that can accommodate herds during periods when the risks of runoff or soil damage are relatively high.
- Irrigation management, focussing on the contribution that modern systems now offer for improving water use efficiency and reducing nutrient losses to water.

Dr Monaghan is a soil scientist specializing in nitrogen cycling in grazed dairy systems and is based at AgResearch's Invermay campus near Mosgiel. Much of his current research focuses on quantifying nitrogen (N) and phosphorus (P) losses to water and assisting end user groups with policy development and/or management guidelines that can reduce these losses. He has been closely involved in research undertaken within the national Dairy Catchments study, an Industry-led initiative that benchmarked soil and water quality in 5 contrasting catchments located in the country's key dairy regions. He has also been heavily involved in a wide range of Dairy Industry-funded research projects that seek to develop on-farm mitigation practices that allow for profitable dairy farming whilst meeting regionally-based targets for water quality.

402: Time: 1405

The Queen Street infrastructure upgrade

Presenter & author: *Don Young*

Due to recent severe flood events within the Richmond CBD, the Tasman District Council has committed to a series of stormwater upgrades.

Stage 1 of the works are in the main street and include installing a large stormwater pipe, roadway reconstruction as an inverted crown with central slot drain, replacing aging

water and sewer infrastructure, providing telecommunications and power ducting, and a safer shared traffic and pedestrian area.

The work results in an active construction site from shop front to shop front along the main street. To minimise disruption, the Council and MWH developed an innovative contractual framework that requires the works are carried out in a travelling “box”.

Each box has strict timeframes for each stage as it moves up the street. This ensures all work is completed in one pass, and the contractor has the full street width available with no conflicts from other users. The public are also safely separated from the construction.

Additionally, the contract includes other innovative elements, such as requiring a full time “Stakeholder Liaison Officer”, clear expectations around cartage effects, and a bonus linked to KPIs developed with the contractor.

A tender process that actively encouraged alternative methodologies, and included a negotiation workshop, ensured that the contractor was heavily involved in bringing their own expertise to the final outcome.

403: Time: 1435

The evolution of road maintenance- challenge accepted BEST BRANCH PAPER – Wellington – Taranaki

Presenter & author: *Jarrold Bates, Fulton Hogan*

In an ever changing environment the demands on roading authorities and suppliers are growing; big data and our customers thirst for information has been a catalyst for how we manage routine maintenance contracts. This presentation details how Fulton Hogan in partnership with our clients are responding to these challenges.

Key learnings:

- The generation change in our workforce is upon us, we need to download experience now or it will be lost forever.
- Communicating through data is not easy: simple is best, visual and simple are better.
- Always look to use what you currently have – sometimes what is right in front of your eyes will surprise you.

501: Time: 1335

Fit for purpose aggregates for local roads

Author & Presenter: Clare Dring, Fulton Hogan

New Zealand aggregate is a highly sought after resource for the construction of roads and is heavily dependent on the geology of the source rock. M/4 specification enables the characterisation of basecourse aggregate but as knowledge and technologies are advanced the aggregate standards are getting stricter and additional test methods are being introduced.

This can result in good quality aggregate being eliminated from contention that would still be suitable for pavements that experience lower loads. By allowing for a tiered M/4 specification, aggregate that is fit for purpose will be required rather than having one blanket specification which may over design some pavements causing cost to the client. This would allow for premium product to only be used for State Highways and higher load pavements.

This paper focuses on M/4 basecourse specification with particular mention of the Plasticity Index and Clay Index. It addresses the variability in results across sources and laboratories and also how additional tests allows for greater understanding of material properties. By correlating results from these additional tests to those currently in the M/4 we are able to gain a better understanding of what the values indicate and therefore begin to categorise basecourse M/4 into a tiered system.

Learnings:

- M/4 Specification could allow for a tiered system to ensure fit for purpose aggregate.
- Additional testing allows for greater understanding of the M/4 specification results.
- A tiered system would allow for good quality aggregates, that don't meet all of the M/4 requirements, to be classed in contention for local roads

502: Time: 1405

A Cross Tasman Approach to Asset Management

Author and presenter: Chris Pacey & Sean Rainsford, Fulton Hogan

Co-author: David Paine, Fulton Hogan

Data empowers us to make decisions about more efficient use of limited resources available to us to address the ever increasing demand put on our assets. The higher quality of data available to us, the more efficient our decisions can be.

Fulton Hogan has developed a new flexible asset management system that allows the gathering of data on location and condition of infrastructure assets, both known and unknown. Data quality controls are ensured at the time of capture, following the recent MetaData standards. The system can be deployed to most GPS enabled smart devices, allowing us to leverage the power of crowdsourcing to collaboratively gather data on our client's asset; so any issues can be reported by a user who first discovered them.

This system is highly flexible, enabling a wide range of application environments: from road corridors, to port facilities, to car parks, and even parks. Our clients use a wide range of different systems to manage their assets, so all quality data gathered through

our system is platform independent allowing us to quickly and efficiently push the data into our clients system of choice, following the standard metadata process.

<http://www.austrroads.com.au/road-operations/asset-management/road-data-harmonisation-project>

Key Points:

1. High quality data leads to more efficient management of assets
2. Standardised approach to asset management and asset assessments
3. Agile process, and system agnostic, enabling wide range of application environments

503: Time: 1435

The Kaikoura earthquake response

Author and presenter: *John Mackie, Christchurch City Council*

Co-authors: *Chris Gregory, Gerry Essenberg, Tim Drennan*

Having just dealt with the tsunami alert and the overnight evacuation of 20,000 people from coastal areas of Christchurch, following the 7.8 magnitude earthquake at two minutes past midnight on 14 November 2016, key Civil Defence personnel from Christchurch were requested to assist with the response effort in Kaikoura who had suffered severe damage as a result of the quake.

This paper outlines the priorities and challenges presented to emergency personnel that were deployed to assist the community and meet their immediate needs in response to one of New Zealand's largest recorded earthquakes.

The first wave of responders from Christchurch included a Controller, EOC staff including operations manager, engineering support, planning and intelligence, welfare manager and staff, building and structural engineers, who were booked to fly to Kaikoura at first light on Tuesday, 15 November, day 2.

In a very short space of time after arrival on Tuesday morning, the team were briefed to gain a situational awareness from the local EOC team on the extent of the known damage, emerging issues and welfare needs in the community, which they had identified over the gruelling 34 hours since the event.

We understood already that there was no road or rail access to the town due to landslips and cliff collapses, but the boat harbour had been rendered almost useless due to the seismic upheaval of the coast line. One of the short term priorities was to restore a temporary water supply as it was reported that three of the town's five reservoirs were damaged and there was one day of storage remaining at normal demand.

There were also around 1,000 stranded tourists who, without road egress, were putting a real strain on the scarce food and water provisions, which in turn put enormous stress on the welfare centre at the Takahanga marae.

The paper talks about how the EOC worked with the emergency services, defence forces, volunteers, contractors, utility providers and the Community to develop the plan to take Kaikoura from response to recovery.