

## CONCURRENT SESSIONS

### SESSION THREE: FRIDAY 22 JUNE – 1340 - 1510

#### WATER

##### 108: Time 1340

###### **To replace or refurbish? Sludge dewatering press case study**

Author & Presenter: Graeme Wells, Beca

*With their trusty but aging dewatering presses reaching their service life, Christchurch City Council was faced with a tough decision, to replace or refurbish?*

In making this decision, they were forced to weigh up the proven performance of existing units against the exciting but risky prospects of new technology alternatives.

With the excitement of new things as a potential distraction, a rational and carefully considered evaluation process was adopted. This focussed on whole of life cost and resilience as key factors.

The decision to refurbish, rather than replace with new plant or new technology, de-risked the project and enabled specific improvements to be incorporated that reduce maintenance and optimise resilience. The refurbished presses are now set to serve another 25 years.

This paper describes the decision process leading to refurbishment being selected as the preferred option, risk management aspects, and the improvements in resilience that was achieved.

*Graeme Wells is an Associate Engineer with Beca, with 47 years' experience across a broad range of disciplines, the last 30 primarily in the wastewater treatment plant sector. With a background in design detail and considerable site experience, his practical knowledge fitted well with the final decision to refurbish the dewatering presses.*

##### 109: Time 1410

###### **Something new for townie poo**

Author & Presenter: Peter Ross, Clutha District Council

*A new American technology is being pressed into service in the deep south to improve the quality of oxidation pond effluent.*

Clutha District Council is trying something new as it looks to improve the effluent from its oxidation ponds. The Council has already added additional treatment to five of its ten oxidation pond systems to meet new resource consent conditions and now, with numbers six and seven, is adding bioshells, new to New Zealand, and membrane filtration. This paper describes the systems being installed and how the decision was made to adopt the solution, in which the bioshells aim at nutrients and the membranes at solids and biota. Some early data is given on performance. The combination of biological and mechanical treatment is expected to ensure consent conditions are met, with an increased resilience over purely biological systems.

*Peter Ross commenced has 40 years' experience in local government engineering since graduation, including technical and executive managerial roles. These have included positions in city and district councils with responsibilities which have covered all disciplines in local government engineering. He is currently a part-time Senior Projects Engineer at the Clutha District Council and spends the rest of his time in ministry at the local Anglican church, having completed a PhD in theology in 2016.*

##### 110: Time 1440

###### **Highlights from the OzWater'17 Conference – BEST BRANCH PAPER**

Author & Presenter: Bridget O'Brien, Christchurch City Council

*New technologies and best practice that is directly applicable in NZ from Australia's water and wastewater conference.*

The OzWater'17 conference was a great opportunity to learn about best practice and new technologies in the water and wastewater industry. Highlights from the conference that are directly applicable to New Zealand will be presented. This includes a caged drone for inspecting structures and confined spaces, a sewer camera that can be built from readily available components, best practice from Yarra Valley Water, the importance of wastewater aeration diffuser monitoring and

care, public education promoting tap water and not flushing wet wipes, and an odour wheel for determining the underlying source of odour from biosolids.

## TRANSPORT

### 208: Time 1340

#### **The implications of new and disruptive technology for public transport**

Author & Presenter: Andrew Lightowler, Beca

*A number of disruptive technologies that are emerging that could make public transport better able to meet the challenge of increased automation of cars.*

There has been much discussion recently about the likely impact of emerging and disruptive technology on transport. A number of pilot projects have shown that autonomous vehicles are likely to be introduced soon. This sometimes leads to the view that the days of public transport are numbered. What tends to receive less discussion is whether disruptive technology could actually benefit public transport and help them more resilient.

This paper explores the range of disruptive technologies that are emerging that could benefit public transport. It focuses on how new technologies could make public transport more resilient. It explains how the recent developments in New Zealand and elsewhere in the world are utilising improved sources of data on traffic disruption to improve bus services and make them more resilient to traffic congestion and more responsive to customer needs and future growth.

*Andy Lightowler is a Technical Director at Beca Ltd with 309 years' experience in planning and designing a wide variety of transport projects in the public and private sectors. He has led the planning and design of a number of public transport projects in the UK and in New Zealand, including the planning of improved bus services for the Western Bay of Plenty area.*

### 209: Time 1410

#### **C-AV dedicated freight roads; increase productivity, increase ev uptake and reduce demand on other public roads**

Author & Presenter: Andrew Maughan, Stantec New Zealand

Co-author: Mike Rudge, Stantec New Zealand

*Transport corridors have been an essential foundation block for economic growth.*

This paper presents a unique opportunity that New Zealand has to take advantage of connected autonomous vehicles and electrification of the vehicle fleet.

The benefits realised from this opportunity are expected to be:

- reduced cost to the freight supply chain improving New Zealand's productivity and economic competitiveness
- reduced cost of public infrastructure, particularly inter regional state highways and potentially much of the rural local road network
- optimised use of rail corridors and freight transition to public roads
- reduced conflict between freight transport and people movement leading to better safety and tourism outcomes
- efficient transition of the public road network to autonomous vehicles
- incentivise use of electric vehicles with reliable journey times and lower net energy costs
- establishing New Zealand at the forefront of technology change

The paper presents real data to demonstrate the significant opportunity that New Zealand has.

*Andrew Maughan is a principal consultant with over 25 years of experience, specialising over the last 15 years in infrastructure and asset management predominantly in transport assets. Andrew's public-sector experience covers project and programme management across local and state government in both New Zealand and Australia including the delivery of capital works programmes and maintenance and operations management. Andrew holds a bachelor's degree in civil engineering and a master's degree in engineering management. His expertise spans strategic planning, business cases, asset management, capital delivery programmes, maintenance and operations management.*

## **210: Time 1440**

### **Transport resilience and earthquakes – learning lessons from Christchurch**

Author & Presenter: Glen Koorey, ViaStrada Ltd

*How do people respond to dramatic changes in transport patterns? What can other communities learn from the transport effects of the Christchurch earthquakes?*

Typically, transport patterns in a city only change gradually over time, as land use and population patterns evolve and new transport facilities are developed or modified. That altered dramatically in Christchurch following the 2010 and 2011 earthquakes. In a very short time, the city experienced rapid transformations in the shape of both the transport network and the surrounding land uses. While that created significant problems for the provision of adequate transport options, it also allowed the opportunity to radically rethink the nature of how we get around the city in the future. This paper summarises some of the key post-quake transport changes in Christchurch and identifies a number of valuable lessons for other areas faced with similar disasters.

*Glen Koorey joined ViaStrada in April 2016, after 12 years as a senior lecturer in transportation engineering at the University of Canterbury. Prior to that he was a consultant researcher with Opus International Consultants. He specialises in road safety and sustainable transport but has also undertaken research and consulting work across numerous areas, including road network reliability, and future transport technologies. Dr Koorey experienced the Christchurch earthquakes first-hand and was involved in numerous rebuild-related activities including student master-planning projects and the Major Cycleway network. He contributed a chapter on post-quake transport in the 2014 book *Once in a Lifetime: City-building after Disaster in Christchurch*.*

## **Asset Management**

### **308: Time 1340**

#### **Building resilience through a Totex efficient approach...**

Author & Presenter: Ken Gedman, Stantec New Zealand

*Totex driven solutions are delivering efficiencies and improving the resilience of water and wastewater services in the UK, this paper shows how.*

Water companies in the UK are preparing their second Totex based plans to Ofwat (Water economic regulator) for 2020-25. In addition to presenting Totex efficient plans to drive value for customers, the regulator is also looking for companies to demonstrate a specific focus on resilience in their long-term asset management planning.

This paper shares examples of Totex driven approaches and solutions which are delivering efficiencies and improving the resilience of water and wastewater services in the UK.

We examine how to embed a Totex approach in the persona of an organisation and the wider supply chain. We also show how a Totex approach can be extended to facilitate co-creation and co-delivery of solutions with customer and other external stakeholders to enhance resilience of water and wastewater services.

*Ken Gedman is the Director of Stantec UK Business Consulting group. He is a member of the Institution of Civil Engineers, Institution of Asset Management and a Chartered Civil Engineer. Kens consulting career spans 25 years, primarily in the UK water sector, with specific experience in Asset Management, Strategy & Planning, Business Improvement and Technical Assurance. During his career, he has held positions with Yorkshire Water, the Environment Agency, as well as a number of consulting advisory, technical and operational roles.*

### **309: Time 1410**

#### **Local Government excellence – Is New Zealand infrastructure up for the challenge?**

Author & Presenter: Adam Feeley, Rationale

*What does the Local Government Excellence Programme tell us about the performance of councils in infrastructure management?*

In 2016, LGNZ launched an Excellence Programme aimed at improving public knowledge of council work in their community, as well as providing greater transparency as to council performance. 18 local authorities have signed up as Foundation Members, and the Reports of the Independent Assessment Board were publicly released throughout 2017. With infrastructure management a major part of all council operations, the reports highlight some major achievements, as well as significant areas for improvement.

Adam Feeley, a former council chief executive, was an independent assessor for 11 of the council reviews. His presentation will focus on the councils who have demonstrated themselves to be "best in breed" with innovative infrastructure practices and a holistic approach to infrastructure planning.

*Adam Feeley is a lawyer by profession and has held a number of senior management positions in the public and private sectors, including chief executive roles for Queenstown Lakes District Council, the NZ Serious Fraud Office and the Eden Park Redevelopment Board. Adam is a chartered director and acts as an independent director for Rationale. He provides advice to a variety of local government, central government, and private sector clients on organisational reviews, governance, strategy and business planning, as well as business case development. He is currently engaged as an independent assessor for LGNZ.*

### **310: Time 1440**

#### **Out with the old, in with the renewals**

Author & Presenter: Pulith Kapugama, WSP-Opus

Co-author: Philip McFarlane, WSP-Opus

*There is a disconnect between predicted renewals expenditure of wastewater pipelines and the amount that local authorities are depreciating. This disconnect needs to be addressed.*

In 2014, the Auditor General observed, between 2007 and 2013 local authorities consistently spent less on asset renewals than intended. If actual spending trends continue to match those forecast, the Auditor General estimates that by 2022, the gap between asset renewals expenditure and depreciation for the local government sector could be between \$6 billion and \$7 billion (Controller and Auditor General, 2014).

This paper presents a framework to improve pipeline renewals so that renewals are undertaken in a cost-efficient manner which delivers the intended service. In doing so, New Zealanders can continue to enjoy a high standard of health and clean water bodies with the added confidence of improved resilience.

*Pulith Kapugama is a stormwater professional with interests in both infrastructure design and asset management. Most recently, Pulith has delivered multiple stormwater system upgrades throughout Auckland. In the asset management space, Pulith was engaged in delivering national data standards and national seismic guidelines for underground utilities.*

## **Working Collaboratively**

### **408: Time 1340**

#### **River recharge with groundwater – adaptive management in practice**

Authors & Presenters: Tracy Clode, CH2M Beca & Martyn Cole, Kapiti Coast District Council

*How adaptive management is ensuring that the Kapiti Coast's River Recharge with Groundwater scheme is responding effectively and efficiently to changes in social, economic and environmental influences."*

We will show how adaptive management is ensuring that the Kapiti Coast's River Recharge with Groundwater (RRwGW) scheme is responding effectively and efficiently to changes in social, economic and environmental influences.

In late 2017 Kapiti Coast District Council's award-winning River Recharge with Groundwater (RRwGW) scheme completed three years of baseline monitoring, and is set to transition into ongoing mitigation monitoring. The three key points/learnings that will be explored and documented are;

- How a collaborative and pragmatic approach to monitoring has resulted in more efficient and effective data gathering, data analysis and reporting,
- How adaptive management has worked in practice and how it is programmed to continue into the future, to ensure the project can respond effectively to changes in social, economic and environmental influences, and
- Because RRwGW is an innovative water supply scheme, a conservative approach was taken in the consenting, resulting in a high level of baseline monitoring. For ongoing mitigation monitoring, Council has worked extensively with the regulator, iwi partners and stakeholders to optimise the level of monitoring to achieve the intent of the consent, whilst remaining sustainable for the local community.

*Tracy Clode is an Associate Project Management for CH2M Beca based in Wellington. She is a Project Management Professional with a background in Civil Engineering focused on the water industry. Her 15 years plus of experience is predominantly in delivering local authority and remote community water and wastewater infrastructure and includes working for 7 years in Scotland. Tracy is currently the Project Manager for the three-year commission for the monitoring of River Recharge.*

*Martyn Cole is the Water & Wastewater Asset Manager for Kapiti Coast District Council. Martyn leads the team that delivers Kapiti's water and wastewater capital construction programme and all things asset management for these services on the Coast. Of his 24 years in the industry he's spent nine working overseas and six in local government roles in New Zealand. He's a passionate about making a positive difference to the communities he serves and raising the profile of the industry in those communities.*

#### **409: Time 1410**

##### **Balancing regional infrastructure requirements with local effects**

Authors & Presenters: Jenny Vince, Beca & Fiona Matthews, Watercare

*This paper will share lessons learnt during the planning process undertaken for establishing critical infrastructure, where the primary benefit is regional water supply, whilst facing challenges such as limited local benefits.*

The location of new regional water or wastewater infrastructures is often constrained by need, size, land requirements and proximity to existing infrastructure and available resources. When coupled with a city like Auckland, where unprecedented growth means available land is in short supply, finding acceptable locations for new infrastructure is fraught with challenges. Often there is a need for the location of new infrastructure to be within a rural setting, where the community often considered this an encroachment of urban Auckland on an otherwise rural community. This can be compounded when there is no perceived local benefit from the new infrastructure. How do we manage this conflict between regional requirements and local effects? What weighting do we give to local effects where there is a wider regional need for critical regional infrastructure? This paper explores this issue, using the Pukekohe East Reservoirs project as a case study.

*Jenny Vince is a senior associate planner who has specialised in the field of environmental assessment and resource management. She particularly enjoys working on water infrastructure projects and has delivered a range of infrastructure projects from concept through to construction, both in NZ and internationally. Jenny was a fundamental part of the Pukekohe East Reservoirs team, responsible for preparing the resource consent application and managing the various technical specialist through both the council and Environment Court hearings.*

*Fiona Matthews is an experienced planner in the Infrastructure and Environment Team at Watercare. She has had a particular focus on project managing the consenting phase of large infrastructure projects, both at Watercare and previously at the Environmental Protection Authority. She led the consenting for the Pukekohe East Reservoirs project through the Council and Environment Court hearing, she has also been involved in other notable projects including Pukekohe Trunk Sewer, Albany-Pinehill pump station and watermain and the Central Interceptor.*

#### **410: Time 1440**

##### **Planning for success in a water limited world – spatial planning enabling rural transformation**

Author & Presenter: Sean Newland & John Duffy, Beca

Water limits are one of many challenges the primary sector and rural communities face. What role can spatial planning play in supporting and enabling the transition in land uses that is likely to follow?

NZ's primary sectors face many challenges including a water quantity and quality constrained operating environment. Historically the primary sector and rural communities have had the ability to grow knowing the water they needed would be available. This assumption no longer holds true. As a result, land owners and producers are considering different production options to maintain returns and support their communities. An enabling spatial planning framework, well informed on resource availability and constraints, can support transitions in land use. NZ's shift in water objectives can be the catalyst for a planning approach that enables sector and community transformations that provide

the optimal social, economic, cultural and environmental outcomes with the water available.

**Sean Newland** - Currently a Business Director and water lead with Beca, Sean has worked across the rural and primary sector of New Zealand for 25 years. As a senior manager within the sheep and beef sector and a sustainability champion within Fonterra Sean has followed first-hand the increasing challenges rural communities face in responding to resource limits and changing market demands. An ecologist by training, Sean's interest is in helping ensure the primary sector can maintain its economic strength while adapting to meet the communities changing expectations. interest is in helping.

**John Duffy** is a Senior Technical Director - Planning and General Manager of Beca's Environments Team, holding overall responsibility for the business' Planning, Urban Design, Landscape Architecture, Architecture and Environmental Science disciplines. With over 20 years' experience in the leadership of multi-disciplinary projects and teams, he has particular expertise in development and implementation of growth or sustainability strategies for District and Regional councils, infrastructure owners, communities and businesses.

This included his role as Beca Project Director for the Waipa 2050 growth management strategy. The project looked at varying growth scenarios for the Waipa District communities up to 2050 with the view to creating a clear plan for Council, community and business to collaborate on together to help make Waipa District the 'Home of Champions'. Once approved by Council, the integrated strategy informed land use planning, infrastructure asset planning and investment prioritisation as well as organisational design.

He is an Associate Member of the New Zealand Institute of Directors and a Member of the New Zealand Planning Institute.

## **Environmental / Resilience / Sustainability**

### **508: Time 1340**

#### **Insurance risk transfer: quantifying natural hazard losses**

Author & Presenter: David Milner, Tonkin + Taylor

Co-author: James Russell, Tonkin + Taylor

*To allow informed decision making, Tonkin + Taylor and Aon combine their skills to provide clients with a clearer view of their potential losses through the modelling of credible natural hazard scenarios.*

The Canterbury Earthquake Sequence was a timely reminder of the vulnerability of distributed infrastructure to natural hazards. Risk transfer is one of the tools available to infrastructure owners to manage natural hazard risks. However, in order to use risk transfer appropriately, it is vital that potential losses to natural hazards are understood through the modelling of credible scenarios. Traditional methods have tended to rely on high level assumptions, however T+T and Aon have developed a detailed methodology to estimate losses associated with various probability events for a range of natural hazards. To date, the team have provided this service for more than 25 infrastructure owners throughout New Zealand with support from Treasury (and in the context of the review 60/40 insurance cost sharing arrangement). This paper provides an overview of the methodology applied, summarises the results of the work completed to date, and provides the vision for the future.

### **509: Time 1410**

#### **Three Waters Asset Loss Modelling - Vulnerability - Analysis and Applications [BEST BRANCH PAPER](#)**

Author & Presenter: Mark Baker, Queenstown Lakes District Council

*Earthquake loss modelling not only quantified potential asset and financial losses, but enabled QLDC to initiate the development of three waters resilience and insurance strategies.*

The results of an Asset Loss Modelling exercise (Tonkin & Taylor / Aon) has given QLDC critical insights into its Three Waters asset base and risk exposure through the improved understanding of hazards and asset vulnerability as well as potential asset/financial loss for the modelled scenarios. This exercise identified direct opportunities to improve resilience that can be prioritised and progressed rapidly where appropriate, as well as enabling QLDC to initiate the process of understanding potential disaster recovery timeframes.

Further to the direct results, QLDC are using these insights, along with criticality and risk management practices, to begin the development of resilience and insurance frameworks the will be used in public consultation on post disaster levels of service and recovery.

**Mark Baker** has been involved in the asset management of infrastructure since 2006 and comes from an engineering and analytical background. He is the Senior Three Waters Engineer in the Asset Planning Team at QLDC, he is responsible for the asset management as well as strategic planning of QLDCs rapidly growing three waters asset base. In this role Mark is responsible for developing and implementing the physical and financial resilience strategies for the three waters networks as the district grows from small tourist towns to metropolitan area and international tourist destination.

## **510: Time 1440**

### **Can we wait to deliver future urban resilience!?**

Author & Presenter: Liam Foster, WSP Opus & David Boothway, Christchurch City Council

Co-authors: Jules Scott-Hansen, Vivienne Ivory, Jack Earl & Wayne Rimmer, WSP-Opus  
*Responding to climate change impacts is predicted to cost us more (socially, environmentally and economically) if we maintain the status quo for our urban water environments. It's time for a paradigm shift!*

Disruption - Natural hazard events impact on our wellbeing. The most common being flooding and erosion.

The Pathway - Set a vision that reclaims our natural hydrological catchments to redress the degraded urban water environments and deliver greater resilience to the likely increasing frequency of these damaging events. The paper will seek to share recent work within Christchurch that has national resonance, looking to:

- Set a long-term vision to restore a neglected and hidden waterway;
- Change the urban form to be adaptive, resilient, cohesive and self-fulfilling across the four wellbeing indicators, and:
- Build resilience within the community to reduce current risks and withstand future climate change impacts.
- Allow an adaptive response pathway to respond to shocks along the way.

**Liam Foster** has over 18 years' experience delivering a broad spectrum of water environment and urban drainage management projects. He is a Chartered Environmentalist and Chartered Water and Environmental Manager. He has particular expertise in stormwater, land drainage, flood risk management, green infrastructure, wastewater infrastructure and integrated catchment management planning and delivery. Liam has a strong experience in developing strategic infrastructure planning projects, including developing long term asset plans to support least regrets infrastructure investment to help deliver robust and resilient communities and businesses.

**David Boothway** is a professional engineer with a master's degree in engineering. He has over 30 years experience in asset management of city infrastructure. David move to Christchurch two years ago to work for Council to help rebuild the city into a regenerative, net positive city. Recently, he was invited to speak at Tedx Tauranga on the subject of "finding our stolen Rivers".

