

## CONCURRENT SESSIONS

### SESSION TWO: FRIDAY 22 JUNE – 1100 – 1240

#### WATER

##### 105A: Time 1100

###### **Rotorua Lakes Council Mobile Sewer Pump Station**

Author & Presenter: Riaan Rossouw & Geoff Kitson, Rotorua District Council

*A mobile sewer pumpstation provided the solution to keep the sewage moving while the pumpstation was out of service – no spills, no stops, and no worries – just plug and play!*

How do you deal with the relentless flow of sewage when you have to refurbish a critical wastewater pumpstation? Rotorua Lakes Council (RLC) has come up with a novel idea in conjunction with Armatec that consists of a plug-and-play mobile pumpstation.

To make matters even better, it utilises the existing pumps, power, controls and telemetry system. The mobile unit is easily transportable, quick to set up, and requires the minimal valves and piping to connect to the existing rising main.

RLC has recently refurbished five wastewater pump stations that required the installation of new fibreglass inserts to provide a long-term protection against severe H<sub>2</sub>S induced corrosion. No disruption of the wastewater service provided to the residents occurred, while resilience of the infrastructure has been improved through securing corrosion-proof relining of the pumpstation sumps.

*Riaan Rossouw has 28 years' experience in civil engineering since graduation, including technical managerial roles. His experience includes construction, consulting and local government engineering. He is currently Lead Infrastructure Planning at the Rotorua Lakes Council.*

##### 105B:

###### **Improving the resilience of key pipelines**

Author & Presenter: Leigh John, Aquatech Solutions

*How do you turn drainage or conduit pipes into a pressure pipeline?*

The main focus is on the rehabilitation of pressure pipelines to restore integrity & design life whilst reducing disruption and safety related claims & risks during installation. An overview of rehabilitation techniques is presented along with recent seismic testing and local case studies.

All underground assets have value and these systems can also be used to turn drainage or conduit pipes into a pressure pipeline to increase capacity or overcome access limitations.

*Leigh John is a professional Civil Engineer, who has been working in the drainage and watermain industry for over 20 years throughout New Zealand & Australia. Leigh has established relationships with contractors, engineers & suppliers in the Civil sector and is focused on bringing innovative solutions to market to rehabilitate drainage & pressure pipelines.*

##### 106A: Time 1130

###### **Where are we heading after the Havelock North drinking water inquiry?**

Author & Presenter: Andrew Watson, Beca

Co-authors: Noel Roberts & Jim Graham, Water New Zealand

Find out how the Stage 2 Inquiry report from the waterborne disease outbreak in Havelock North in August 2016 could impact on your short and long-term planning for water supply.

The waterborne disease outbreak in Havelock North in August 2016 caused much disruption to that community and widespread concerns within the water industry. The Stage 2 Inquiry report was released in December and made bold and far-reaching recommendations. These will bring significant disruption to all parts of the drinking water industry – its regulatory framework, its people, and its assets. This paper will summarise the key findings and recommendations of the Inquiry, describe the government's response (as far as is possible), and set out how and when the changes are likely to impact on the industry. It will provide an early prediction of the potential implications for water supply managers to assist in their short and long-term planning.

*Andrew Watson is Beca's Technical Director Water Supply and is based in Wellington. His 35 years of*

experience includes water treatment and supply projects in New Zealand, Australia, Singapore and the Pacific.

## **106B:**

### **Havelock North – a big red warning light**

Author & Presenter: Iain Rabbitts, Harrison Grierson

*We can deliver the changes demanded in the Havelock North Stage 2 Report if we drive the changes.*

The Havelock North Stage 2 Report has recommended significant structural changes to the way water services are regulated and delivered. These changes will improve the protection of public health and the resilience of our water supplies.

Resilience is normally associated with capacity. The Stage 2 report refocuses this towards quality. This paper will examine the implications of that report and what that means for the water industry in New Zealand. We will examine the implications of the main themes from the report, particularly around revised drinking water standards, what independent regulation means and reform of the way water services are delivered.

The Havelock North Contamination Incident has provided an impetus for change. The stage 2 report outlines those changes. This paper will pull together those themes and directions.

*Iain Rabbitts is a water treatment specialist with over 25 years in the water industry. He has designed a number of significant plants in New Zealand and around the world. He has written and presented a number of papers for WaterNZ and other organisations over the years including papers on water treatment, Havelock North and Rainwater tanks.*

## **107B: Time 1200**

### **Modelling durability of concrete below ground**

Author & Presenter: Americo dos Santos, Hynds Pipe Systems Ltd

Co-authors: Norwood Harrison, Concrete Pipe Association of Australasia, Daksh Baweja, BG & E Materials Technology & Peter Sleep, Humes Holcim Australia

*Resilience has many facts.*

There is a need for greater awareness of the factors such as aggressive soils and how they affect underground infrastructure.

The Standard for manufacture of Precast Concrete Pipes in Australia and New Zealand is AS/NZS 4058. This paper presents the research used to determine exposure classifications, specifically the development of the table in Appendix E of the Standard. This table enables designers to make appropriate decisions about durability requirements for the pipe in service. The intent is that this research becomes more widely known and is used in the further development of that Standard and the understanding of concrete in the conditions prevailing below ground.

Natural agents potentially aggressive to concrete below ground include acids, dissolved carbon dioxide, sulfates and chlorides. The research undertaken supports the specifications in the concrete pipe Standard AS/NZS 4058, with the possible exception of exposure to high levels of sulfate.

### **Americo Dos Santos**

BSc Eng (Civil), CEng (UK), MICE, MStructE, CMEngNZ, CPEng

Technical Services Manager Hynds Pipe Systems Ltd.

Dos has considerable experience in design, development and manufacture of precast concrete, including reinforced concrete pipe for open trenched and trenchless installations.

Dos is a member of the Standards New Zealand/Standards/Australia Committee WS-006 â Concrete Pipes and was actively engaged in the development of the current Standards relating to concrete pipe, AS/NZS 4058 and AS/NZ 3725, and a member of the Management Committee of the Concrete Pipe Association of Australasia and has represented the CPAA at many Presentation, Roadshows and training sessions.

## **107C**

### **Learning from the Storm: Lessons from SH25 in the Coromandel**

Author & Presenter: Mike Manion, Higgins

*Using lessons learned during the January 2018 storm in the Coromandel to improve the way major events are managed and how coast protection systems are designed.*

The Coromandel was packed full of holiday makers when the first storm of 2018 hit the Coromandel on 5 January with its full force. 42kms of State Highway 25, between Thames and Coromandel, was

severely affected with seawalls and whole sections of road washed away or littered with rocks and debris. This event, a combination of storm surge and gale force winds coinciding with a king tide brought waves crashing over the road and into houses.

The storm occurred during the implementation phase of a Networks Outcomes Contract, with the new contract team still coming to grips with the details of the network and developing operating systems, forming stakeholder relationships, and training staff.

The recovery was planned in three distinct phases:

- Response
- Initial Recovery, and
- Resilience Building.

The learning from each of these phases become more important in a time of potential climate change and rising sea levels.

***Mike Manion** has over 30 years' experience in road maintenance internationally. He has spent the last 19 years of those specialising in advancing network maintenance practices worldwide, and implementing practices such as the Performance Based delivery of road asset management. He has a passion for putting 'Customer First' ethos at the forefront of civil works planning and delivery and an established reputation for successful contract management.*

## TRANSPORT

### 205: Time 1100

#### **Innovative application of apps and systems**

Author & Presenter: Neil Bennett, Fulton Hogan

*Finding solutions to what keeps our clients awake at night is a good challenge, and using tools in ways that weren't imagined, is satisfying.*

RoadRoid, a cell phone app designed to test roughness on sealed roads, has been in New Zealand for 4 years now, but we continue to find new ways to use it from rail tracks to footpaths and cycleways. When information is combined from existing management systems - cloud based access to the interrogated data using business intelligence software, enables engineers to "sleep easy" knowing we have the solution at hand.

This presentation outlines examples of where the tools and systems have been successfully combined and producing outstanding results.

***Neil Bennett's** principal responsibility is to support Fulton Hogan's local authority contracts throughout New Zealand. He is passionate about low volume roads and has been on the committee of the organising committee of the biennial low volume roads workshops held in New Zealand since 2003. The aim of these workshops and Neil's work role is information sharing and determining best practice. This paper updates projects where the systems and tools such as RoadRoid have been successfully used by Fulton Hogan and our clients.*

### 206: Time 1130

#### **Public transport and the ride-hail disruption**

Author & Presenter: Gavin O'Connor, Stantec New Zealand

*Does good transport have to be **public** transport? Arguably, the private sector is already showing how to integrate and deliver efficient, effective and convenient transport to our communities better than we ever have... and they're making a buck from it too!*

Following a tour of USA, UK and Europe to explore the developments in Autonomous and Connected Autonomous Vehicles, Gavin presents an insightful overview of the global disruption observed of the ride hail companies and their role in the public transport of the future.

The presentation includes discussion on the significant impacts the ride hail companies have made to more traditional public transport services, and how the ride hail companies are planning and positioning their offering for the supply of future autonomous door-to-door public transport services. A thought piece discussion on how to harness this movement to create better access for our customers.

***Gavin O'Connor** is the General Manager - Transportation at Stantec NZ Ltd*

### 207A: Time 1200

## **Lifting our planning for the 4<sup>th</sup> Emergency Service**

Authors & Presenters: Shaun Perrin, Fulton Hogan & Margarita Gonzalez-Borrero, NZ Transport Agency

*Are we ready for the next big emergency event? Can we improve our current response? How can we improve collaboration across stakeholders?*

This presentation will focus on the development of a new national framework for an Emergency Procedures and Preparedness Plans (EPPP) for Highway road maintenance contracts. It provides the background to what has occurred, challenges that it seeks to solve and how and where learnings can be applied for local government and industry.

Following a nationwide review of Contractors' EPPP's, a number of improvements were identified. A working group was established, feedback was sort from industry, a new national template document was created, and a supporting Detour Mapping system was developed. This project will help advance best practise for incident management and leads to opportunities across multiple organisations, greater consistency in our work and most importantly, better service for all New Zealanders in time of need.

*Shaun Perrin is a Performance Manager for Fulton Hogan, based in Christchurch. He is involved with Fulton Hogan's NOCs and roading maintenance business, helping to deliver outcomes for our communities. He has a background as a Contractor, Local Government client and with the NZ Transport Agency. He has worked from locations across the South Island and central north island and is currently residing in Christchurch.*

### **207B:**

#### **Modelling disruption**

Author & Presenter: Alan Kerr, Stantec New Zealand

*In an increasingly uncertain world, disruption has a large impact on our transport networks.*

Disruption is caused by a number of factors, both natural and anthropogenic and results in congestion, delay, unreliability and customer dissatisfaction. Traditional transport modelling focuses on normal modes of operation - we try to forecast and replicate average conditions and use this as a basis for investment decision making. This presentation will cover a different approach to modelling - using modelling techniques to understand the implications of disruption and variability, and how this approach is resulting in more robust design. Examples will be drawn from recent projects in Wellington and Sydney.

*Alan Kerr is an experienced transport planner with a range of experience across a number of transport disciplines including development planning, traffic modelling, freight analysis, demand forecasting, congestion charging appraisal, economic and business case analysis, accessibility and mobility planning, and journey time variability research. He has developed an international reputation in interchange and terminal planning and pedestrian modelling, and has been involved in a large number of high profile projects and events in recent years.*

### **207C:**

#### **REG; The new programme – a call for action**

Author & Presenter: Jamie McPherson, Tasman DC

*Jamie is Transportation Manager at Tasman District Council, and is currently Chair of the Road Efficiency Group (REG) Leadership Group. Jamie has particular interest in achieving better alignment of operational road maintenance activities with activity management planning and strategy.*

*REG is responsible for enabling the transport sector to implement the recommendations of the Road Maintenance Task Force.*

## **ASSET MANAGEMENT**

### **305: Time: 1100**

#### **Searching for the light at the end of the pipe**

Author & Presenter: Daniel Johnson, WSP-Opus

Co-authors: Adam Wheeldon, WSP-Opus & Robert Blakemore, Wellington Water

The question of pipe data quality is frequently raised, commonly answered 'our data is very good', good news! Ask the question differently, 'how do you know if the quality of your pipe data is good' the answer is often less clear.

Water asset management plans, hydraulic modelling, renewal planning and capital infrastructure programmes are heavily influenced by pipe attribute data, in fact are dependent on this. Pipe data management utilises existing attributes recorded in datasets. Using well defined processes and procedures, pipe data confidence is allocated to each pipe asset.

'Searching for the light at the end of the pipe' outlines how good practices and processes built on extensive knowledge of pipes, can build resilient pipe data to make better informed decisions.

**Daniel Johnson** has a wealth of experience from a wide range of water asset management and engineering projects from working in the UK, Australia, Middle East and New Zealand over the last 20 years. Daniel is passionate about making smarter decisions and managing assets more efficiently. Daniel has assisted numerous local authorities and infrastructure owners with the development and implementation of asset management plans and practice, using his in-depth practical knowledge of this subject to infuse and illustrate these sometimes-challenging concepts with clients. Daniel leads the Water Asset Management Work Group at Opus in Christchurch.

### **306: Time 1130**

#### **Y2k – lessons from a global resilience event**

Author & Presenter: Colin Gerrard, Harrison Grierson

*Was Y2K a knee jerk reaction to a perceived problem or a fine example of global foresight and collective action?*

As the world approached the year 2000, experts and the media warned of catastrophes due to the coming Y2K bug. Although many of the problems experienced were inconsequential, there were enough to make us realise that the Y2K bug was a real problem, however hyped by the media. Ongoing debates argue about whether the investment to tackle the bug actually were worth it, because money was invested in advance to fix a problem or because the issue was wildly overblown. This paper will look to critically assess the global response to Y2K, identify key lessons learnt, and how we can incorporate these into our own resilience and asset management planning.

**Colin Gerrard** with over 19 years professional experience in NZ, the Pacific, Africa, Australia and the UK, Colin is Wellington Infrastructure Business Unit Leader for Harrison Grierson. Colin understands of the importance of high-level strategy, which combined with the ability to use his engineering knowledge to dive into detail allows him to successfully deliver to clients. Colin has a wide range of asset management experience covering a broad spectrum of assets, including working within client organisations on a secondment basis for a range of clients. Colin experience includes operational and asset management roles working for both water utility and consultancy companies.

### **307A: Time 1200**

#### **The flow of data - delivering critical asset data using BIM**

Author & Presenter: Brett Naylor, Beca

Brett will present on how using the best industry 3D modelling tools to produce design and construction documentation, combined with cloud and mobile technologies can capture and deliver critical data for asset management and operations. He will demonstrate how cloud and mobile technologies can be used through construction, and the benefits that they bring. He will also show how digital progress reporting on critical data can be achieved, including an insight into the mobile platform that are now available for asset owners for day to day operations that utilise 3D models, assets and their data and documentation.

**Brett Naylor** has over 20 years of experience working within the design and construction industry. With a background in Architecture, he has been part of multi-disciplinary teams delivering capital projects across Buildings, Water and Industrial sectors. Latterly in his career Brett worked in the UK for a BIM Consultancy engaging with Facility Owners and Operators, Design Consultancies and Contractors to help them understand the benefits that BIM can bring to all stages of project delivery. He works for Beca as the Group Manager, Digital Delivery, leading the implementation of BIM across the business.

### **307B:**

#### **What's "Good" Worth? Taking the guesswork out of tender evaluation**

Author & Presenter: Caroline Boot, Clever Buying and Plan A

Co-authors: Bruce Buxton, Clever Buying

*This presentation re-mixes a traditional well-known tendering tool, to create a powerful new calibration gadget.*

It's always difficult to determine ideal attribute weightings. They control procurement decisions, yet most often weightings are based on recycled RFTs and gut feel.

We will introduce you to SQP25 - a clever spreadsheet that reverses time-consuming and uncertain guess-and-check methods, and bases procurement decisions on quantified project risk analysis. Enter the potential values determined by your risk analysis, and presto! The ideal weightings for price and non-price attributes are automatically calculated.

Using SQP25, you'll not only have total confidence that you have weighted your procurement correctly, but you'll also be able to justify your tender decisions based on quantified, project-specific risks.

***Caroline Boot** - over the past 20 years, Caroline has been heavily engaged in improving tendering practices, for both clients and suppliers across the Asia-Pacific region and beyond. She is a qualified assessor for the NZQA Level Six Procurement Qualification for qualified tender evaluators; and has implemented a training course for procurement professionals that aims to drive practical application of best practice procurement. Caroline is recognised in international best practice procurement, working with organisations to sharpen the tools and processes that they use to make public expenditure decisions.*

### **307C:**

#### **Managing unsealed roads**

##### **Managing unsealed roads**

Author & Presenter: Steve Browning, Downer NZ

*Sometimes it seems like unsealed roads are the poor cousin, but these roads are vital parts of our economy, and our communities. They are also quite different best to maintain from a sealed road.*

Unsealed roads are the backbone of the NZ economy. "Most of the things you use started their journey on an unsealed road." This statement was from the keynote speaker at the Low Volume Roads Conference in September 2017.

Sometimes it seems like unsealed roads are the poor cousin, but these roads are vital parts of our economy, and our communities. They are also quite different best to maintain from a sealed road. Specifications and materials for unsealed roads have often passed down from the rich cousin which may not be the optimal solution.

Applying a different way of thinking might reap some rewards.

This was the logic behind a refresh of the way Downer manage unsealed roads, and led to the development of a specific set of material requirements, logistics management techniques and environmental measures to ensure we are doing the best we can to manage unsealed roads.

***Steve Browning** has been back in NZ for a couple of years now after working in the UK and Canada for a decade. He has worked in the construction and maintenance of infrastructure for 20 years in client, consultant and contracting organisations. Steve is the National Asset Manager for Downer overseeing the capability and delivery of asset management practices in the Local Authority sector and is part of the National Asset Management Team steering the strategic direction of asset management in Downer.*

## **Working Collaboratively**

### **405: Time 1100**

#### **Together doing it better**

Author & Presenter: Rob Burchell, CH2M Beca & Sven Harlos, Watercare

Co-author: Pete Hodgson, HEB

*An intentional culture of collaboration has shaped the success of the biggest Wastewater Treatment Plant constructed in New Zealand in the last 15 years.*

Designed by CH2M Beca and constructed by a McConnell Dowell - HEB Joint Venture, the new \$140M Bio Nutrient Removal (BNR) upgrade to Watercare's Mangere WWTP will add capacity for 250,000 people, helping meet Auckland's projected growth, and improve the water quality discharged to the Manukau Harbour.

Designed and tendered as an NEC3 contract, the project delivery approach went beyond the expected technical excellence and value-add innovation to deliberately develop a culture of visibility and trust.

Contractors, designers and client chose to 'leave their egos at the door' and take a 'best for project' approach of top-down and bottom-up collaboration that valued honesty, shared ideas, teamwork and continual re-evaluation.

This presentation will discuss the approach and benefits, from design, through six major phases to operational handover.

**Rob Burchell** has more than 25 years' experience managing programs and projects valued from USD\$9M to USD\$500M. His work has ranged from the design and construction of municipal water, stormwater and wastewater collection and treatment to agriculture, food, light industrial and process treatment plants in Asia Pacific Region, Europe, Canada, and the United States. Robert is actively engaged on program delivery, design-build projects, and provides oversight to project managers on strategic projects. As a Program Manager for CH2M HILL, in the southeast Region, he was responsible for Program financing, planning, administration, delivery management and risk analysis. Currently Rob is the Program Manager for Watercare's Mangere BNR Upgrade in Auckland and the Waikato Water 175MLD Upgrade.

#### **406: Time 1130**

##### **Driving business transformation: excellence through procurement [BEST BRANCH PAPER](#)**

Author & Presenter: Raj Suppiah, Tararua District Council

*The balance of power is shifting - good contractors are limited, are busy and don't have to work for us - so we needed to engage the contracting sector in a different way.*

The Tararua District Council is undertaking a 4-year procurement transformation. Previously, procurement followed a tendering process that created a "master-servant" relationship. Through a process requiring Councilors to rank the objectives sought, the weighting on cost dropped, and collaboration became the focus.

An opportunity for a new paradigm emerged, and we took advantage of it. This new approach has reaped some great returns and savings - a streamlined delivery team, reducing man-marking overhead proportion, and most importantly gave internal staff and the partner more ownership over the projects and outcomes.

A win-win for all.

*Raj Suppiah has expanded his role as the Chief Financial Officer of Tararua District Council to also become a trusted strategic advisor to his Councillors, staff and Chief Executive.*

*He sees that having exceptional interpersonal skills and being able to communicate the bigger story behind the numbers is critical. "It is the story that makes people believe, and once they believe, people are inspired" he says.*

*He demonstrates an unwavering commitment to be a partner and that reinforces his drive to excel and make a difference. He has a strong desire for staff development and to see others succeed. His efforts have resulted in two of his accountants progress to the role of finance manager, with one of them being awarded the Young Financial Manager of the Year at the 2015 NZ CFO Summit and Awards.*

*Since joining Tararua District Council, Raj has helped deliver on three robust (2012, 2015 and 2018) 10 year strategic plans that underpin the Council's Vision, and the Financial and Infrastructure Strategies.*

#### **407: Time 1200**

##### **Resilience in advance of disruption | putting theory into practice**

Author & Presenter: Monique Cornish, Tonkin + Taylor

Co-authors: Nathan Bittle & Chris Money, EY, Nick Rogers, Richard Reinen-Hamill & Marje Russ, Tonkin + Taylor

*One of the key insights from our practical application has been the potential value that can be generated by bringing forward decision-making in advance of disruption.*

This can help avoid decisions that necessarily occur post-event, when short-term response measures take precedence over solutions that are in the long-term interests of communities.

In 2016 we developed an approach to prioritise resilience-focused investment decisions as part of NZTA's research programme. This approach has subsequently been tested prioritising options for the Wellington Lifelines Resilience Programme Business Case, as well as in augmenting the natural hazard risk profile in Franz Josef. Our approach fundamentally takes a wide view of the challenges (stresses and shocks) to our assets and communities, as well as the value at stake. It also explicitly places resilience in the context of risk appetite - including the potential to live with risk as well as avoid, manage or transfer risk.

**Monique Cornish** specialises in risk and opportunity assessment, and strategy and policy development and implementation. Monique has particular expertise in developing frameworks to assist in prioritising and valuing resilience risks, impacts and outcomes to assist decision-making. Most recently Monique co-developed the resilience decision-support tool for NZTA, which frames the evaluation of resilience measures in the context of broader environmental, social, cultural and economic costs and benefits. This work has been showcased at the World Bank and used as the basis for the natural hazards options assessment undertaken for the Wellington Lifelines Programme Business Case and Franz Josef Township.

## **Environmental / Resilience / Sustainability**

### **505: Time 1100**

#### **Climate change: understanding and managing risks**

Author & Presenter: James Hughes, Tonkin + Taylor

*In order to manage the impacts of climate change we need new ways for the public and private sector, as well as communities, to work together and openness to new solutions.*

The 2015 report on sea level rise by the PCE highlighted the exposure of our communities and critical infrastructure to coastal inundation. This report considered a single climate-related hazard (coastal inundation), and the exposure of infrastructure and people across a number of major NZ centres. It is well understood that there are a wide range of potential climate change effects that will impact on all elements of our economy, society, built and natural environments. In order to manage the potential effects, a comprehensive risk-based approach to climate change is needed, which considers a range of sectors and risk receptors - including infrastructure, health, biodiversity and water to name a few. In addition to understanding exposures, we need community-centred approaches to develop solutions that have the best chance of success. The authors suggest this requires new ways of Councils and communities working together and openness to both engineered and non-engineered solutions.

**James Hughes** has an 18-year career in the infrastructure and environmental sectors. He has developed a broad understanding across a range of sectors from asset management and infrastructure planning, through to natural hazards, climate change adaptation, risk management and sustainability. In late 2016 James was appointed to The Ministerial Climate Change Technical Advisory Group, and he has been involved in other initiatives such as the Deep South Science Challenges, the Rockefeller 100 Resilient Cities Project, and has developed risk and resilience guidance for NZTA, Los Angeles Metro, as well as the proposed Local Government Risk Agency.

### **506A: Time 1130**

#### **Roads with a spring in their step - the optimisation of crumb rubber binders in NZ**

Author & Presenter: Clare Dring, Fulton Hogan

*Finding a solution for the 62,000 tonne of waste tyres in New Zealand by utilising it in road construction is one hurdle, optimising it is another.*

Approximately 62,000 tonnes of waste tyres are disposed in New Zealand each year, consuming valuable space in landfills and creating a great health and safety risk. Finding a solution for this that is practical and safe has always been a challenge.

Road construction is one of the few applications that can potentially use large volumes of the material through the use of crumb-rubber-modified bitumen (CRMB).

This paper details the optimisation of a crumb rubber binder with a focus on NZ capabilities, and discusses applications for local authorities. The project faced a number of challenges that included sourcing NZ product, scheduling, logistics and health and safety concerns which are also detailed.

**Clare Dring** is Fulton Hogan's National Materials Specialist. She completed her master's degree in 2017 in Engineering Geology at the University of Canterbury. Her areas of focus include aggregates, quarrying,

binders and asphalt as well as providing support for the implementation of new specifications and test methods. She manages a number of projects developing innovative products for Fulton Hogan's clients. In recognition of Clare's specialist knowledge, she has been invited to be a member of a number of the Aggregate and Quarrying Association (AQA) technical committee and the NZ-Wide Aggregate Inventory Working Group.

## **506B**

### **Kaitiakitanga – Wai? Whenua? Or wastewater treatment plant?**

Author & Presenter: Frances Teinakore-Curtis, Rotoiti Wastewater Liaison Group

*In a society where 'flush and go' toilets allow people to walk away without a second thought of where it ends up, for iwi in Rotoiti and Rotomā, who have spent many years trying to get agreement on a scheme for their community, it has been difficult to accept that the wastewater treatment industry has little in the way of solutions that show concern for cultural values and issues.*

This project seeks to ask how the provision of Māori Land for a municipal wastewater treatment facility is validated in a cultural context, reflecting on the underlying cultural values of those holding the responsibility of Kaitiaki. It focuses on the decision by owners of the Haumingi 9B3B Māori land block in Rotoiti (Ngāti Pikiao Iwi) where, after successfully obtaining a Resource Consent, a wastewater treatment plant will be constructed on part of their land to service the communities of Rotoiti and Rotomā.

Questions posed are: What would culturally appropriate solutions look like and how do they fit with the demands of modern times? Where could we make cultural concessions when there are not a lot of practical options to choose from? How could we mitigate against cultural offence? These questions are considered in relation to iwi aspirations for their communities.

**Frances Teinakore** – Frances is currently a Lecturer at TWOA on the BEd Teaching Degree Programme. She is a 2nd year PhD Candidate at Te Whare Wānanga o AwanuiĀrangi. She has published a chapter in an environmental publication: Teinakore-Curtis, F. and Kayes, P.H. (2016). *Shaping a sustainable environment: The challenges facing iwi from water management practices on Lake Rotoiti*. In P.H. Kayes, N. Matthews and V. Warriner (Eds), *Environmental Research @ AwanuiĀrangi 2016*. Te Whare Wānanga o AwanuiĀrangi, Whakatāne, New Zealand. Her aim is to contribute to the health and well-being of her Iwi of Ngāti Pikiao and Ngāti Rongomai of Lake Rotoiti. This will happen through her developing expertise and mātauranga on environmental sustainability, which in turn will support her to help her Iwi at understanding what that looks like.

## **507A: 1200**

### **Assessment of the resilience of the north Canterbury transport network following the 2016 Kaikōura earthquake**

Author & Presenter: Doug Mason, WSP-Opus

Co-authors: Richard Justice, ENGEO & Tim McMorran, Golder Associates

*The 2016 Kaikōura earthquake caused major damage to transport infrastructure. This paper presents an assessment of the future resilience of the coastal transport corridor.*

The November 2016 Kaikōura earthquake triggered thousands of large landslides and caused severe disruption to the regional transport network in the upper South Island, with State Highway 1 and the Main North Rail Line closed for over 9 months. The damage caused by the earthquake provides valuable lessons on the impacts of large earthquakes on transport network performance and the duration of outage, and forms the basis for assessing the future resilience of the coastal transport corridor. The resilience of this route has been assessed taking account of the increased vulnerability of hill slopes to future landslides, improvements from slope repair and remediation, and establishment of response priorities for subsequent hazard events. This was vital for the recovery and underpinned initiatives to enhance resilience. It also enables the asset owners to manage the future outage risks to their networks so that service levels and social and statutory responsibilities can be met.

**Doug Mason** is a Wellington based Senior Engineering Geologist with over 14 years' experience. He has held key roles in a variety of projects including infrastructure seismic resilience, natural hazard risk studies, and development of site appropriate risk management strategies. He has been seconded to the North Canterbury Transport Infrastructure Recovery alliance since the Kaikōura earthquake to assist with the

*repair and recovery of the road and rail infrastructure through Kaikoura, as well as assessing the post-earthquake resilience of the transport network.*

## **507B**

### **When a patch won't do, watchman road and the northern gateway to Napier**

Co-author & Presenter: Nick Aiken, WSP Opus

Co-authors: Michelle Frey and Josh Taylor, WSP-Opus

*What to do when faced with an intersection considered dangerous by the local community, lodged between an expanding airport, business park, expressway, rail and an ecologically and culturally significant wetland.*

When faced with the challenge of what to do with two busy intersections and a nationally notorious crash black spot, smack-bang in the middle in a very constrained highly sensitive area and a major urban gateway, the response could've simply been 'it's too hard', 'let's just patch it'. Instead we took the opposite view, with exceptional results.

Ambitiously, the project set out to address multiple issues through strongly inclusive, well-considered design; always with a watchful eye on the urgent need to get improvements not just designed but built as soon as possible. The outcome is a robust State Highway enhancement, providing a unique northern gateway to Hawkes Bay, with huge social, aesthetic, cultural and environmental appeal, a vital connection between all major transport hubs, all within just 3 years of project inception.

## **507C**

### **Contract terms – removing the roadblocks**

Author & Presenter: Duncan Halliwell, Kensington Swan

*"But we always do it that way" – Why some common contract drafting is a bad idea.*

Unfortunately, not every project runs as smoothly as either party would like and when matters do get adversarial the root cause tends to be the terms of the contract. It is surprising how often the terms causing the problem are those in common use throughout the industry, but with potential consequences that are not fully appreciated. This paper sets out some of the terms (both in standard 3910 and in amendments) that seem to most commonly lead to disputes, identifies the root problem and asks whether it is time to change the approach, or ditch them altogether.

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