

CONCURRENT SESSIONS

SESSION THREE: SATURDAY 24 JUNE – 1030 to 1230

Water Supply, Stormwater, Wastewater

107: Time: 1030

BEST BRANCH PAPER

Hastings trunk sewers pipe rehabilitation

Presenter & author: *Saadia Ali & Gary Schofield, MWH Global*

Hastings District Council (HDC) operates three large diameter trunk sewers between the urban area of Hastings and the wastewater treatment plant (WWTP) at East Clive, each is approximately 10km long. The flat topography and long residence time lends itself to the generation of hydrogen sulphide (H₂S) which through biogenic action is corrosive to the concrete pipes conveying the sewage.

With increasing demands the trunk sewers were constructed between the 1930's and early 1980's and range in size from 900mm to 1800mm diameter. To optimise the WWTP requirements HDC operates a separated sewerage system with industrial waste separately reticulated through part of Hastings.

This paper describes the investigation and monitoring of the damage caused by H₂S to the concrete pipes, programming of works and rehabilitation works undertaken.

Monitoring included odour monitoring, CCTV, laser profiling and pipe samples. Trenchless rehabilitation works were chosen over open cut to reduce disruption to the public, road users, land owners and overall cost. Monitoring of the sewers allows programming and prioritising of works and planning HDC's forward budgets.

108: Time: 1100

All on guard – a collaborative approach to machine guarding at Christchurch water treatment

Presenter & author: *Raylene Stewart, Beca Limited*

Co-authors: *Patrick Gledhill, Bruce Cassidy*

The Christchurch Wastewater Treatment Plant (CWTP) utilises a wide range of mechanical equipment as part of the treatment process. The equipment dates from the 1970s through to items installed in 2016. Driven by tightening of health and safety legislation, in 2014 Christchurch City Council commissioned CH2M Beca to audit machine guarding at the site. The audit identified equipment where guarding did not meet the new standard and recommended a range of improvements to achieve compliance. This led to an implementation phase where improvements to machine guarding were rolled out across the site.

This paper outlines the machine guarding audit methodology, and the collaborative process for engaging with the installation contractor and operations and maintenance teams who were central to making the project a success.

Key lessons learned during the project include the importance of operator engagement in both the development of guarding solutions and to change the way equipment is operated and maintained. This can reduce interface time with machinery and can also simplify operational and guarding requirements.

The second lesson was that that one size doesn't fit all; similar machinery could require a different guarding approach when used for different jobs or applications. Sometimes physical guarding was not practicable and it was more cost effective to replace with new equipment. However not all new equipment is created equal and some off the shelf items can still be non-compliant.

The project emphasised the importance of working with personnel to change the mindset from a "compliance focus" to one where "everybody wins". By working closely to get buy in from stakeholders about guarding solutions, safer ways of working can be embedded and cost-effective operations can be maintained.

109: Time: 1130

Retaining focus in the blur – how (and why) to build a network where there is none

Presenter & author: David Somerville, Rationale Ltd

Co-author: Michael Goldingham

Many small, remote New Zealand towns have historically been served by independent water and sewerage facilities administered by their District Council from the provincial capital. At the same time they receive various network services (roads, power, telecoms) administered from even further afield, often by a national entity.

In recent years, there have been pragmatic and regulatory initiatives to extend water and sewerage reticulation from larger towns and cities to these more remote towns. But how are these decisions made? And once the decision is made, how do we implement the expansion of the network; particularly when long-distance pipelines may need to be installed within private property because existing corridors are overcrowded, expensive, or unable to accept the disruption?

This paper reviews the process adopted by Waitaki District Council when replacing river water intakes at Herbert and Hampden with a 34km pipeline from Oamaru's recently expanded water treatment plant. We (1) present options analysis, economic modelling and community engagement processes used to achieve success. We also draw on Council's experience with the development of cycle trails to (2) highlight some key risks to be considered when installing public networks through private land, where there may be no perceived benefit to the landowner, or where the improved level of service is viewed as unnecessary or costly. We (3) highlight the importance of a robust business case and a staged-gate review process to achieve a reliable and valid outcome for network projects that may be out of the ordinary.

110: Time: 1200

A Curio Bay development – an integrated approach

Presenter & author: Joseph Findley, Southland District Council

Co-author: Ian Evans

Curio Bay, located on the South Catlins Coast in Southland, boast huge visitor numbers each year, in excess of 100,000. Tourists attracted by the ancient Petrified Forest, Yellow Eyed Penguins and Hector's Dolphins makes Curio Bay an area of national significance.

Catering for an ever-growing number of visitors, is a project currently being undertaken through a unique integrated approach with the South Catlins Charitable Trust, Southland District Council and Department of Conservation, at Curio Bay in Southland. Leading the collaboration is Venture Southland while Te Ao Marama Inc are supporting and advising

all parties to ensure the best protection of the Curio Bay area which holds great significance to local Iwi.

The Council have undertaken development of a Wastewater Treatment Plant and associated reticulation, as a means of stepping away from the current septic tank disposal to preserve the natural environment and receiving waters. This is a critical step to the success of any future development in the area.

The South Catlins Charitable Trust are upgrading the camp facilities as well as constructing a new Heritage Centre. The upgrade facilities will better cater for the visitors staying in Curio Bay and help to attract further visitors to spend the night, while the Heritage Centre will tell the story of the area and provide much needed amenity to the area with its' associated café.

The Department of Conservation are building a new public car park to handle the traffic influx and constructing new public toilets integrated into the Trusts new heritage centre. These developments are to provide suitable amenity for visitors to its' spectacular sites while investing in area that holds such great significance.

207: Time: 1030

Achieving Community and Culturally Responsive Design - The He Ara Kotahi – ‘Karakā’ walk-cycle bridge – Palmerston North

Presenters: *Nick Aiken, Opus Consultants & Rob Green, Green Infrastructure*

A \$7.6M new walking and cycling bridge is to span the Manawatu River, connecting the city with Massey University and Linton Army Camp.

An iconic bridge structure was desired, within the constraints of time, budget and environmental impact. Innovative modelling and community engagement were employed to select the best site and secure community support for the new bridge in a highly used riverfront environment. A proactive and responsive approach to engagement with the community, iwi and other stakeholders was vital.

Key principles of urban design responding to feedback from engagement played a substantial part in iterative design evolution. A unique design was secured, one linked heavily to local cultural identity and that changed some of the closest neighbours from opponents to supporters of the project. The bridge location was moved to reduce environmental impact and a bridge theme conceived to reflect a significant local Karakā Grove; and respect other natural, cultural and built heritage features.

This presentation focusses on a range of tailored engagement processes and their influence on the evolution of a locally relevant and unique design response; in a sensitive and highly used peri-urban riparian and river-front residential environment.

208: Time: 1100

Innovative traffic management – SH1 Russley Road upgrade

Presenter & author: *Aidan Brannan, McConnell Dowell*

As part of the Christchurch Western Corridor programme (one of the Government’s Roads of National Significance) the McConnell Dowell - Downer Joint Venture has been contracted for the SH1 Russley Road Upgrade, featuring the 3.5km widening of SH1 adjacent to Christchurch International Airport. Key components of this upgrade are the Harewood Roundabout reconfiguration including a 150m long underpass, Russley Road/ Memorial Avenue interchange with a 400t Arch and the Southern Airport Access interchange.

During the latter stage of the ECI period, an alternative traffic management solution was identified for the Russley Road/ Memorial Avenue interchange. The solution incorporated the use of the at grade slip roads to form a circulatory 3 lane, 500m wide roundabout with traffic light controls.

A detailed assessment was undertaken by the project team, to measure both the potential increase in traffic flow efficiency, and the expected driver behaviour for this unique option. An extensive national communications strategy was also prepared with NZTA to maximise awareness of this proposal.

The scheme was installed on 20 March 2016.

This paper describes the journey.

Three key learnings:

- Diligence in traffic management assessment
- Thorough communications strategy
- Effective planning process

209: Time: 1130

Cost effective surfacing for local roads

Presenter & author: *Jeff Waters, Fulton Hogan*

In the past two decades Roading Clients in New Zealand have undergone some massive changes in focus including safety, environment and budget. In response to these changes in direction the industry has developed some innovative surfacing products that tick all of the boxes. Some of these products are at the “Business as usual” stage with proven performance over the past 10-15 years.

This paper presents two of these innovations with examples from around the country.

1. **Otta Seals** - Dust management for gravel roads became an issue in the early 2000's when the use of waste oil was banned from use. After numerous trials of various chemical products the Otta Seal technique was identified as the most cost effective, sustainable treatment with early trials lasting more than 10 years with more life left and many satisfied stakeholders and clients. Otta Seals:
 - Last more than 10 years on low stress low traffic roads.
 - Eliminate dust emissions from gravel roads
 - Are more waterproof than normal chipseals.
2. **PAVEtex UTA** – A cost effective ultra-thin asphalt designed to provide texture, skid resistance and noise reduction for state highways and urban roads. Millions of square metres have been laid successfully throughout New Zealand since the first trials in 2000. PAVEtex UTA:
 - Provides texture and safety at relatively low cost
 - Uses less binder and polish-resistant aggregate than conventional asphalt
 - Is a neighbourhood-friendly surfacing design - reducing noise emissions

210: Time: 1200

Details to follow

Asset Management – sponsored by Infor Global Solutions

307: Time: 1030

Local government obligations in relation to infrastructure safety by design

Presenter and author: *Sarah Sinclair, Auckland Council*

Co-authors: *Stephen Scard, Anmar Taufeeek*

The new H&S regulations focus on whole of life workplace safety, and have specifically identified pre-construction stages as highly influential in ensuring safety in construction, operation, maintenance, modification and decommissioning of assets. Local government, by carrying out the roles of can be a designer, a customer (Principal), a regulatory decision maker for infrastructure assets, as well as an asset manager. We enable both developers and community groups to develop infrastructure, which is vested to Council to be managed once constructed. This means Council staff have a number of key roles and responsibilities in managing health and safety for infrastructure.

This paper explores Council's potential obligations under the new H&S regulations, as a designer and as a procurer of designers, and discusses how Auckland Council has defined its approach for project and contract managers in capital delivery. It also discusses Auckland Council's philosophy around decision making by development engineers and planners for vested assets . Its raises the fundamental importance of consultation, collaboration and/or co-ordination in the new H&S regulations, and how this is best achieved that with planned and vested assets, and highlights the role of the asset owner across decisions made around infrastructure assets.

308: Time: 1100

An integrated approach to managing Auckland's coast BEST BRANCH PAPER

Presenter & author: *Paul Klinac, Auckland Council*

Auckland is characterised by over 3000km of coastline, the bulk of which is owned and managed by Auckland Council directly. Historically, much of the way New Zealand has managed its coastline has been reactive. However, increasing erosion rates coupled with predicted climate change effects, and a finite pool of ratepayer monies indicate that for Auckland, a more proactive and integrated approach is necessary.

A strategic approach to identifying management options for high risk areas is intended to enable more informed decision making, reducing the urgency associated with storm responses and improving the prioritisation of coastal structure renewals or replacement. An asset data review project, based on an improved understanding of the quantum of coastal assets under Council control, seeks to provide the framework for strategic planning and decision making based on potential future development risk.

This paper outlines progress in respect of developing a coastal management framework and Auckland Council's journey to coastal compartment management plans, our engagement of stakeholders and governance in developing a strategic approach to coastal decision making, and key insights and challenges.

309: Time: 1130

Operating readiness – launching capital projects successfully in local government

Presenter and author: *Mark Christison, Beca Limited*

Co-authors: Stephen Scard, Anmar TaufEEK

We have all been involved in capital projects of importance to our communities only to have teething problems with these projects when they are handed over the business for operational use. The concept of Operational Readiness, developed after some very large North sea oil projects failed to deliver on investment criteria due to commissioning and handover issues, is aimed at ensuring that large capital projects and/or projects with significant changes in Levels of Service, are successfully launched and handed over to a business line that is ready to accept them.

This paper looks at the concept and methodology associated with Operational Readiness and how it is integrated with the capital development of the project to provide an integrated delivery solution. A couple of projects from a New Zealand Local Authority, one which successfully utilised the concept of Operational Readiness and another that did not, are used to illustrate the benefits of this methodology in delivering certain types of projects. Lessons learned from the comparison of these two projects are also discussed.

310: Time: 1200

Driving strategic transformation at Sydney airport with asset management in the cloud

Presenter and author: Graeme Sharp, BPD Zenith

Sydney Airport faces many unique challenges in uncertain times. In order to meet its evolving business needs, Sydney required a Managed Facilities Management Business Solution. As part of this effort, BPD Zenith and UnifiFM partnered to implement MaxiCloud for Airports. Our solution is agile and cloud-based, and is powered by IBM Maximo. The solution enhances the visibility and control that each area has of their maintenance information. With integration with the Call Centre for incoming reactive work, the solution can gather real-time data from certain assets to enhance the overall efficiency of the maintenance teams. Integrated reporting provides management with financial, operational and service insights. Real reductions in asset downtime have occurred, improvements in passenger satisfaction has increased, and this presentation will discuss the drivers for requirements, why MaxiCloud was chosen, and how the solution is improving efficiencies, achieving passenger experience, and providing quality data for informed decision making.

Working Collaboratively

407: Time: 1030

Collaborative integration

Presenters and authors: *Su Young Ko, Western Bay of Plenty District Council, Kelvin Hill, Western Bay of Plenty District Council*

Within the Local Government sector, the aging workforce is particularly noticeable – attend any technical presentation and the room is normally full of 50+ grey-headed people. It is easy to understand given the population explosion of the Baby Boomers and the gap in workers caused through the reforms of the “Rogernomics”. Was it any different back in Henry Ford’s days!

Western Bay of Plenty District Council is a medium-sized organisation servicing around 47,000 residents. Like other organisations in this sector, we compete in a limited market for experienced engineers and technical staff.

This paper highlights the challenges and learnings younger graduates within Utilities business unit have brought to the table highlighting significant benefits that have developed within our team of 27. The two different generations have much to learn from this collaborative teamwork benefiting the overall business operation.

- Baby Boomers have gained “street experience” which cannot be taught in a classroom. The Millennials bring enthusiasm, passion, energy and willingness to explore opportunities outside their comfort zone.
- As the industry moves into the 21st Century, the tech-savvy Millennials help the Baby Boomers in this transition phase.
- Past the initial awkward period, working with those from other generations is a great way to learn and grow as a professional. Collaboration is exactly what it takes for great ideas and solutions to come to fruition, boost productivity and time management.

408: Time: 1100

Community passion – helping create a sustainable workforce

Presenters and authors: *Jim Nicol, Downer*

Community collaboration is the key to success. Downer, in conjunction with Auckland Council and Randwick Park Community group, recently established a pilot partnership programme for the maintenance and care for Randwick Park.

With the approval from Auckland Council, Dave Tims from the Randwick Park Community Group approached Downer to take over the maintenance of the park, facilities and the Community Centre on the basis that he would engage with under-privileged locals and encourage them into full time work. Council would still hold Downer to the contractual requirements of the maintenance on the basis that Downer supports Dave’s team and ensure they delivered the required outcomes.

Sustainability of the programme has been the key success factor. Local people are trained up with appropriate skills and gain valuable work experience. This can then be transferred to full time employment in the wider community. There is also an option to broaden the mandate of Randwick Park Community Group to become more commercially astute and widen their service delivery.

The programme has been running since September 2015 and is now a showcase for what can be achieved by incorporating the community into Council maintenance activities.

409: Time: 1130

Steps to true integration

Presenter and author: *Edward Guy, Rationale Ltd*

Edward Guy has been heavily involved in New Zealand's infrastructure for 20+ years. Integration is an example of a great idea that has taken many years for the sector to deliver on, however there is light at the end of the tunnel.

Edward's first memory of the word integration came from the 2002 New Zealand Land Transport Strategy, which was followed by the Land Transport Management Act 2003. Since then the word integration has been included in numerous policy, planning and legislative documents.

Sometimes it feels like we are given an idea, without the direction required to deliver it. For some recent projects, integration has become a necessity, not just an idea.

Edward will use the Queenstown Town Centre Masterplan project to demonstrate a new way of approaching some historically difficult issues. His discussion will demonstrate how integration must occur, and can occur, to get the outcomes needed. Integrated delivery becomes a necessity, particularly with complex, multivariant and multidisciplinary problems. Diverse teams of skilled people both internally and externally need to be on-board. The team need to function well together and have appropriate support from above. Investor, stakeholder and customer confidence will be the winner of the day, meaning we can deliver the right things, right, with the optimised amount of input and a reduction in waste.

410: Time: 1200

Taking the plunge: shaping the future of water infrastructure delivery

Presenter & author: *Ian McSherry, Wellington Water*

Co-author: *David Hogg*

Wellington Water has stepped away from the old transactional model for the delivery Professional Services, driven primarily by lowest price often at the expense of quality and reliability. In July 2016 a new collaborative, relationship-based model was adopted with establishment of a seven year Professional Services Consultancy Panel. The Panel consists of three consultancy teams and Wellington Waters internal design team tasked with improving the safety, quality and reliability of project delivery; increasing value for money through innovation and knowledge sharing; and ensuring outcomes are aligned with Wellington Water's strategic goals.

This paper firstly details the main drivers for adopting the new model, the structure and philosophy of the relationship-based approach and the key challenges and benefits associated with moving from the old model to working as a collaborative team based on integrity and trust.

Tangible examples are presented of how the new model has increased the efficiency and effectiveness of the way we work, and is already delivering better value for money and improved outcomes to our communities. While there is still work to be done, the early wins and improvements identified for implementation during the life of the Panel will result in an industry leading delivery model for water infrastructure projects.

507: Time: 1030

New tools for infrastructure procurement skill assessment: a landmark collaboration

Presenter & author: *Caroline Boot, Clever Buying and Plan A*

With procurement skill capability identified as a critical constraint to achieving value for money in NZ's infrastructure, the revised NZQA Infrastructure Procurement qualification for tender evaluators was developed and launched in 2016. The next challenge was to develop user-friendly, effective tools for its assessment.

The development and review team combined inputs from representatives from NZTA, MBIE, OAG, Industry representatives and Local Government. Their challenges were significant:

- How do you assess individual competence in infrastructure procurement, when most evidence results from team efforts?
- How do you assess practical application, when candidates often aren't let loose on real projects until they qualify? Catch 22!
- And how do you get buy-in from 'old hands' who insist on using tendering methods dating back to the 80s, and resist upskilling to today's best practice?

The assessment tools that our team developed for the NZQA Level Six Infrastructure Procurement qualification are an eye-opener, and a quantum step forward from those used previously. They're designed to:

- Give triangulated evidence of practical procurement competence
- Be easily applied within both real and scenario-based infrastructure procurement activities
- Give assured consistency of the results from different assessors for a huge range of procurement contexts
- Provide step-by-step user-friendly guides to help candidates and assessors work through the programme

This presentation outlines the process and presents the valuable results of the truly integrated efforts of a wide range of procurement stakeholders.

508: Time: 1100

Innovation strategy – preparing for the future

Presenter & author: *Chloe Smith, Fulton Hogan*

Fulton Hogan, has implemented a new innovation strategy, aimed at delivering more effective, efficient, and safer solutions for our people, communities and customers.

We have delivered a number of key projects. These include both the in-house development of our people's ideas, and procurement of products developed overseas and never before seen in New Zealand.

- ROTO-Chain, a driver-operated hydraulic system for increasing wheel traction in snow/ice.
- Intellicone and X-net for closure breaches, designed to keep our workers safe while working next to live lanes.

- Moving plant proximity alarm, developed here in New Zealand to detect personnel that have breached the exclusion zone of moving plant.

Fulton Hogan is uniquely positioned to leverage off our existing relationships, collaboratively improving delivery value and safety through our joint ventures, alliances, major projects and regional business. We are also working on building our international connections, having recently established a relationship with Heijmans in the Netherlands. Through Heijmans we now have the ability to deliver cutting-edge technology developed and trialled in Europe including:

- BrainJoint – a new system to ensure that expansion transitions in bridges and viaducts cannot be seen, heard or felt. Developed to absorb the movement of the bridge, the joint is covered in flexible rubber asphalt therefore removing any hard edges that may cause a pulse sound when driving over it.
- Bike Scout – an intelligent system that identifies approaching cyclists and pedestrians, determines their speed and likely arrival time at the crossing, and warns drivers.

Other key projects will be presented alongside these.

509: Time: 1130

How resilient is my network?

Presenter & author: *Marcus Gibson, Beca Ltd*

Co-authors: *Richard Young & Mark Christison, Beca Ltd*

Earthquake damage and compromised functionality can impose significant stress on service networks. Resilience modelling can assist asset owners in developing a prior understanding of likely performance and the consequences for a range of synthetic earthquake scenarios and base assumptions. Extensive damage to the water supply and wastewater networks in the Christchurch suburb of New Brighton and subsequent repairs thereto has provided valuable data to support the development and validation of a new theoretical resilience model within a GIS spatial analysis environment. By modelling a range of effects and consequences of strong ground motion and consequential ground deformation on network elements, the risk to the network can be estimated through fragility equations.

This paper will explain how asset management decision making can now be enhanced by output from this new resilience modelling tool. The benefits flowing from resilience modelling include;

- An improved understanding of a networks seismic performance
- Rapid desk top sensitivity assessments given a range of scenarios can inform asset owners on the severity of consequences and relative performance of individual network elements
- Key areas of vulnerability can be identified and programmed for focused mitigation

510: Time: 1200

Shaken not stirred: water supply network resilience in the Wellington region

Presenter & author: *Cedric Papion, MWH Global*

Wellington sits across an active seismic fault line and depends on remote sources for its water supply. With widespread damage expected after a large earthquake, it may be months before a minimal water supply is restored to residents, and even longer before it reaches the tap.

This paper presents a recent study undertaken to identify network vulnerabilities and take the water supply resilience to the next level. The study provided a possible timeline of repairs to the bulk network and restoration of supply to each suburb's reservoir. This highlighted the most critical areas where an alternative supply or storage is needed. The second aspect of the problem is to get the water to the customers after the reticulation has been shaken. The strategy is to develop a seismically-resilient skeleton network connecting reservoirs and key distribution points. A notable innovation was the use of advanced algorithms to determine optimal locations for public tap stands and identify the most cost-effective critical pipe where strengthening upgrades need to be focused. Finally, the study proposed an order of cost for the colossal programme of work involved, and identified risks and opportunities that could significantly impact the final project cost.

