

# Resilient Dams & Levees for Resilient Communities

9 - 12 October 2019 | Pullman Hotel Auckland, New Zealand  
Workshop, Conference, Post-conference Tour



NZSOLD ANCOLD 2019  
Combined Conference



## NZSOLD ANCOLD Conference 2019 – Draft Programme (As of 15 August 2019)

Pre-Conference Workshop Wednesday 9 October 2019 (Please see the separate sheet for Pre-Conference Workshop)	
07:30	Registration opens
08:30	Workshop begins
16:30	Workshop ends
17:30	Welcome Function at the Harbourside Ocean Bar Grill (Please make your own way to the venue)

Conference Day 1 – Thursday 10 October			
07:30	Registration opens		
08:50	Welcome Introduction <b>Trevor Matuschka</b>		
09:00	Opening Speaker <b>Jenny Salesa</b>		
09:30	NZ Keynote Speaker <b>Kelvin Berryman – GNS</b>		
10:00	International Keynote Speaker <b>Mike Rogers – Stantec/ICOLD</b>		
10:30	<b>Morning Tea Break &amp; Exhibition</b>		
11:00 to 12:00	<b>Session 1 Resilient dam design</b>	<b>Session 2 Resilience of reservoir outlets and spillways</b>	
12:00	<b>Lunch &amp; Exhibition Poster Session between 12:45 – 13:30</b>		
13:30 to 14:30	<b>Session 3 Seismic issues in the design for resilient structures</b>	<b>Session 4 Design modelling for resilience</b>	<b>Session 5 Resilient performance of dams</b>
14:30	<b>Afternoon Tea Break &amp; Exhibition</b>		
15:00 to 16:00	<b>Session 6 Resilience in Tailings Dams</b>	<b>Session 7 Emergency preparedness to ensure resilient communities</b>	<b>Session 8 Lightning Presentation Session 1</b>
16:00	<b>Short Break</b>		
16:10 – 17:10	<b>Session 9 Operation for Resilience</b>	<b>Session 10 Geology and geotechnics in resilience</b>	<b>Session 11 Lightning Presentation Session 2</b>
16:58	Instructions and information for evening events <b>Closing of Day 1</b>		
17:50	Assembly at the Pullman Hotel Lobby for the conference dinner (The buses will leave at 18:05)		
18:30	<b>Conference Dinner Pre-Dinner drinks at the Auckland Museum Foyer</b>		
19:30	<b>Conference Dinner at the Auckland Museum Event Centre</b>		

22:30	Transfer back to the Pullman Hotel	
<b>Conference Day 2 - Friday 11 October 2019</b>		
07:30	Registration opens	
08:20	Welcome Introduction	
08:30	International Keynote speaker <b>Elena Sossenkina (HDR)</b>	
09:00	NZ Keynote speaker <b>ENZ Chief Exec</b>	
09:25 – 10:10	<b>Session 1</b> <b>Dam breach and consequence assessment</b>	<b>Session 2</b> <b>Flood hydrology issues for resilience</b>
10:15	<b>Morning Tea Break &amp; Exhibition</b>	
10:45 – 12:00	<b>Session 3</b> <b>Design and safety issues for resilience</b>	<b>Session 4</b> <b>Management of risk</b>
12:00	<b>Lunch &amp; Exhibition</b> <b>Poster Session between 12:45 – 13:30</b>	
13:30 – 14:30	<b>Session 5</b> <b>Resilience of flood storage and levees</b>	<b>Session 6</b> <b>Remote monitoring and emergency preparedness</b>
14:30	<b>Afternoon Tea Break &amp; Exhibition</b> <b>Exhibition - Closes after break</b>	
15:00	Closing Session <b>Trevor Matuschka</b>  Prizes Promotion for 2020 conference Post conference tour information Closing remarks - Trevor Matuschka	
16:30	<b>ANCOLD AGM</b>	<b>NZSOLD discussion on NZ Dam Safety Regulations</b>
17:00 – 18:00	<b>Farewell Drinks</b>	

**Saturday**  
**Post Conference Tour**  
**12 October 2019**  
(Please see the separate sheet for Post conference tour)

## List of Papers and presenters and authors

### Day 1

#### Session 1 - Resilient dam design

**D1/1 – 1 ‘Where to for Reservoirs’ – Global ‘Emerging Trends’ and ‘Essential Elements’ for Multipurpose Reservoirs** Craig Scott  
<sup>1</sup>Stantec

**D1/1 – 2 The Role of a Review Board in Creating Resilient Design** Richard Davidson<sup>1</sup><sup>1</sup>Aecom

**D1/1 – 3 Preparing for Climate Change – Design and Construction of Resilient Dams** Rambod Amigh<sup>1</sup><sup>1</sup>Engineering Geology Ltd

**D1/1 – 4 Towards consistency in unit cost rates for economic consequences** David Stephens<sup>1</sup>, Simon Hone<sup>2</sup><sup>1</sup>HARC, <sup>2</sup>Aither

#### Session 2 - Resilience of reservoir outlets and spillways

**D1/2 – 1 Paloona Dam Trashrack Failures – Revisiting Design Guidelines** David Law<sup>1</sup><sup>1</sup>Entura

**D1/2 – 2 Vertical Gate Design; Considerations for Resilience** Dean Hassall<sup>1</sup>, Simon Sam, Kristen Koo<sup>1</sup><sup>1</sup>Norconsult NZ Ltd

**D1/2 – 3 Dams, siltation and low-level outlets** Bryan Leyland<sup>1</sup>, Roger Fulton<sup>2</sup><sup>1</sup>Leyland Consultants, <sup>2</sup>GHD

**D1/2 – 4 US Army Corps of Engineers Audit of Concrete Chute Spillways on Erodible Foundations** Mike Phillips<sup>1</sup>, Taylor Bradley<sup>1</sup>, Justin Pearce<sup>1</sup>, Steve Townsley<sup>1</sup>, Sal Todaro<sup>1</sup><sup>1</sup>USACE

#### Session 3 - Seismic issues in the design for resilient structures

**D1/3 – 1 Probabilistic fault displacement hazard analysis for dams in Australia** Dr Paul Somerville<sup>1</sup>, Dr Hong Kie Thio<sup>1</sup>, Don Macfarlane<sup>2</sup><sup>1</sup>AECOM, <sup>2</sup>AECOM

**D1/3 – 2 Seismic performance modelling of Mahinerangi Dam** Jason Lim<sup>1</sup>, Bruce Walpole<sup>2</sup><sup>1</sup>Tonkin + Taylor, <sup>2</sup>Trustpower Ltd

**D1/3 – 3 Fault investigation practice in Australia and New Zealand- why Australian dam owners/ operators should care about collecting active fault data** Dr Dee Ninis<sup>1</sup>, Dr Dan Clark<sup>2</sup><sup>1</sup>Seismology Research Centre, <sup>2</sup>Geoscience Australia

**D1/3 – 4 Liquefaction-induced displacement of embankment dams, how good we are in predicting the post-earthquake displacements using numerical models?** Dr Mojtaba Kan<sup>1</sup><sup>1</sup>Principal Dams Engineer, SA Water, <sup>2</sup>Honorary Research Fellow, University of Wollongong

#### Session 4 - Design modelling for resilience

**D1/4 – 1 Modelling Reservoirs with a 2D Hydraulic Model** Andrew Northfield<sup>1</sup>, David Stephens<sup>1</sup>, Tim Craig<sup>1</sup>, Mitchell Smith<sup>2</sup><sup>1</sup>HARC, <sup>2</sup>BMT

**D1/4 – 2 Nonlinear FE Analysis and Remedial Design of Cracked Dam Monoliths Subject to Large Post-tensioning, Flood and Earthquake Forces** Francisco Lopez<sup>1</sup>, Michael McKay<sup>1</sup>, Jonathon Reid<sup>1</sup><sup>1</sup>SMEC

**D1/4 – 3 CFD Modelling in dam outlet pipework and ancillary pumpstation design** Wageed Kamish<sup>1</sup>, Clint Cantrell<sup>1</sup>, Vicki-Ann Dimas<sup>1</sup><sup>1</sup>Tonkin+Taylor

#### Session 5 - Resilient performance of dams

**D1/5 – 1 Statistic-based research on potential failure modes of small and medium sized embankment in Vietnam** Dr Tam Ho Sy<sup>1</sup>, Dr Thai Nguyen Canh<sup>1</sup>, Nga Pham Hong<sup>1</sup><sup>1</sup>Thuyloi University

**D1/5 – 2 The long term performance of seepage improvement works at New Zealand earth dams and canals.** Don Tate<sup>1</sup><sup>1</sup>Riley Consultants

**D1/5 – 3 Hydrophilic waterstops in dam engineering** Sam Taubert<sup>1</sup>, Peter Buchanan<sup>1</sup>, Steve Fox<sup>2</sup><sup>1</sup>GHD, <sup>2</sup>GHD

**D1/5 – 4 A Novel Solution for Ensuring Post-Earthquake Operability of Outlet Towers** Cameron Purss<sup>1</sup>, Francisco Lopez<sup>1</sup>, Steve Gray<sup>2</sup><sup>1</sup>SMEC, <sup>2</sup>AverDyn

#### Session 6 - Resilience in Tailings Dams

**D1/6 – 1 In Defence of Upstream Tailings Dam Construction** [John Phillips<sup>1</sup>](#), [Laila Burger<sup>1</sup>](#)<sup>1</sup>GHD

**D1/6 – 2 Tailings Dam Guidelines – Adopting International Direction** [David Brett<sup>1</sup>](#)<sup>1</sup>GHD Pty Ltd

**D1/6 – 3 Tailings Storage Failures: Impact on the industry, design, operation and people** [Jiri Herza<sup>1</sup>](#), [Ryan Singh<sup>1</sup>](#)<sup>1</sup>GHD

### **Session 7 - Emergency preparedness to ensure resilient communities**

**D1/7 – 1 Estimating the individual risk from dam failure** [Simon Lang<sup>1</sup>](#), Mark Foster<sup>2</sup><sup>1</sup>HARC, <sup>2</sup>AECOM

**D1/7 – 2 Lessons learnt from evacuation modelling for dam failure consequence assessments** [Hench Wang<sup>1</sup>](#)<sup>1</sup>HARC

**D1/7 – 3 Quantitative assessment of dam safety emergency management using HEC-LifeSim – is it feasible?** [Tyson Leong-Cuzack<sup>1</sup>](#), [Chris Nielsen<sup>1</sup>](#), [Chriselyn Kavanagh<sup>2</sup>](#), [Samantha Watts<sup>3</sup>](#)<sup>1</sup>Department of Natural Resources, Mines and Energy, <sup>2</sup>Jacobs, <sup>3</sup>Jacobs

### **Session 8 - Lightning Presentation Session 1**

**D1/8 – 1 Remediation of a Historic Concrete Dam in New Zealand** [Dr Mohammad Okhovat<sup>1</sup>](#), [Broniek Kazmierow<sup>2</sup>](#), [Ashley Ng<sup>3</sup>](#)<sup>1</sup>Damwatch Engineering Ltd, <sup>2</sup>Greater Wellington Regional Council, <sup>3</sup>The University of Auckland

**D1/8 – 2 Emergency preparedness with unknown parameters – sensitivity of fluid properties in tailing dam failure flood estimates** [Dr Nimal Gamage<sup>1</sup>](#)<sup>1</sup>GHD Pty Ltd

**D1/8 – 3 What makes a dam? Temporary sand diversion structures on the Burdekin River** [Nicholas Thomas-kinsella<sup>1</sup>](#), [Malcolm Barker<sup>1</sup>](#), [Rob Saunders<sup>1</sup>](#), [David Sartori<sup>2</sup>](#)<sup>1</sup>GHD, <sup>2</sup>Lower Burdekin Water

**D1/8 – 4 Queensland Dam Safety Regulation: Future focus** [Chris Nielsen<sup>1</sup>](#), [Ron Guppy<sup>1</sup>](#), [Gary Hargraves<sup>1</sup>](#)<sup>1</sup>Dnrme

**D1/8 – 5 Emergency preparedness for underground mines – ways to estimate dam break flood risks** [Dr Nimal Gamage<sup>1</sup>](#)<sup>1</sup>Ghd Pty Ltd

### **Session 9 – Operation for resilience**

**D1/9 – 1 Design embankments for resisting against overtopping flood** [Meysam Safavian<sup>1</sup>](#)<sup>1</sup>Ghd

**D1/9 – 2 Low Level Outlets: necessary evil or a nuisance?** [Philip Winter<sup>1,2</sup>](#), [Thomas Fritz<sup>1,2</sup>](#)<sup>1</sup>Trustpower, <sup>2</sup>NZSOLD

**D1/9 – 3 Ensuring Radial gate resilience against bearing friction** [Ingeborg Bue<sup>1</sup>](#), [Curt Davidson](#), [Chris Lucas](#) <sup>1</sup>Norconsult Nz Ltd

### **Session 10 – Geology and geotechnics in resilience**

**D1/10 – 1 Interpretation of internal erosion susceptibility in a New Zealand canal embankment** [Dr Kaley Crawford-flett<sup>1</sup>](#), [Jeremy Eldridge<sup>2</sup>](#), [Dr Elisabeth Bowman<sup>3</sup>](#), [Chris Wooding<sup>4</sup>](#), [Cam Gordon<sup>5</sup>](#)<sup>1</sup>University Of Canterbury Quake Centre, <sup>2</sup>Qi Solutions, <sup>3</sup>University of Sheffield, <sup>4</sup>Holmes Consulting, <sup>5</sup>Genesis Energy

**D1/10 – 2 In Situ Stress Determination: Recent experiences in acquisition and analysis** [Deryk Forster<sup>1</sup>](#)<sup>1</sup>SMEC Australia

**D1/10 – 3 North Pine Dam 3D Geological Modelling – Creating a Client Asset** [Christopher Bennett<sup>1</sup>](#), [Helena Sutherland<sup>2</sup>](#), [Graham Irvine<sup>1</sup>](#)<sup>1</sup>GHD, <sup>2</sup>Seqwater

### **Session 11 – Lightning presentations Session 2**

**D1/11 – 1 Economic impacts of Flood Schemes and Local Flood Management** [Dr Patrick Walsh<sup>1</sup>](#)<sup>1</sup>Manaaki Whenua-landcare Research

**D1/11 – 2 Assessing the behaviour of the filter-core interface of embankment dams under dynamic loading** [Katharine Vincent<sup>1</sup>](#), [Petra Garratt<sup>1</sup>](#), [Dr Mark Stringer<sup>1</sup>](#), [Dr Kaley Crawford-Flett<sup>2</sup>](#)<sup>1</sup>University Of Canterbury, <sup>2</sup>University of Canterbury Quake Centre

**D1/11 – 3 Is the price right for dam safety? The social and environmental costs of risk reduction** [Sean Cowan<sup>1</sup>](#)<sup>1</sup>Melbourne Water Corporation, <sup>2</sup>Engeny Water Management

## Day 2

### Session 1 - Dam breach and consequence assessment

**D2/1 – 1 One breach or more? - Assessment of potential multiple flood overtopping breaches and sequencing** Lindsay Millard<sup>1</sup>, Michel Raymond<sup>1,1</sup>*Seqwater (Queensland Bulkwater)*, <sup>2</sup>*GHD*

**D2/1 – 2 Dam-Break Consequence Assessments – Framework for Estimation of Population at Risk** William Veale<sup>1,1</sup>*Damwatch Engineering Ltd*

**D2/1 – 3 Evidence Based Procedure for Estimating Itinerant Loss of Life** Tim Rhodes<sup>1,1</sup>*Smec*

### Session 2 – Flood hydrology for resilience

**D2/2 – 2 Estimating extreme rainfall probabilities for large catchments in northern Australia** Simon Lang<sup>1</sup>, Dr Rory Nathan<sup>2</sup>, Declan O'Shea<sup>2</sup>, Matthew Scorch<sup>1</sup>, Jing (Ashley) Zhang<sup>1</sup>, Dr George Kuczera<sup>3</sup>, Dr Mel Schaefer<sup>4,1</sup>*HARC*, <sup>2</sup>*University of Melbourne*, <sup>3</sup>*University of Newcastle*, <sup>4</sup>*MGS Engineering Consultants*

**D2/2 – 2 Estimating Design Floods with a Specified Return Period Using Bayesian Analysis** Haden Smith<sup>1,1</sup>*U.S. Army Corps Of Engineers, Risk Management Center*

**D2/2 – 3 Rare Design Rainfalls for Durations Less Than One Day** Janice Green<sup>1</sup>, Catherine Jolly<sup>2,1</sup>*Bureau Of Meteorology*, <sup>2</sup>*Bureau of Meteorology*

### Session 3 – Design and safety issues for resilience

**D2/3 – 1 Understanding reservoir sedimentation in South East Queensland** Dr Deb Gale<sup>1</sup>, Michel Raymond<sup>1</sup>, Nathaniel Deering<sup>2</sup>, Dr Alistair Grinham<sup>2,1</sup>*Seqwater*, <sup>2</sup>*School of Civil Engineering, University of Queensland*

**D2/3 – 2 Lessons Learned and Construction Challenges for the Leslie Harrison Dam Upgrade** Ryan Cantrill<sup>1</sup>, Peyman Andaroodi<sup>2</sup>, Colin Thompson<sup>2,1</sup>*GHD*, <sup>2</sup>*Seqwater*

**D2/3 – 3 Waimea Community Dam – Design of a resilient CFRD in a highly seismic environment** Dominic Fletcher<sup>1</sup>, John Grimston<sup>2</sup>, Mark Taylor<sup>2</sup>, Dan Andrews<sup>3</sup>, Hayden Bowen<sup>1</sup>, Eric Guilleminot<sup>4</sup>, Philippe Cazalis de Fondouce<sup>4</sup>, Ian Walsh<sup>5,1</sup>*Tonkin & Taylor Ltd*, <sup>2</sup>*Tonkin & Taylor Ltd*, <sup>3</sup>*Tonkin & Taylor Ltd*, <sup>4</sup>*Mott MacDonald*, <sup>5</sup>*WSP Opus*

**D2/3 – 4 A resilient dam for a resilient community in East Africa - challenges in designing small hydropower for a wild river** Andrew NOBLE<sup>1,1</sup>*WSP Australia*

**D2/3 – 5 TSF Design and the Inclusion of Recovery Controls for the Event of a Tailings Dam Failure.** John Plunkett<sup>1</sup>, Dr Jarrad Coffey<sup>1,1</sup>*Rio Tinto*

### Session 4 – Management of risk

**D2/4 – 1 Responding to new operational challenges for flood risk at Hume Dam** Andrew Bishop<sup>1</sup>, Tom Zouch<sup>1,1</sup>*Murray-Darling Basin Authority*

**D2/4 -2 Performance and management of the Cromwell Gorge landslides, Clyde Dam reservoir** Don Macfarlane<sup>1</sup>, Peter Silvester<sup>2,1</sup>*Aecom New Zealand Ltd*, <sup>2</sup>*Contact Energy Ltd*

**D2/4 – 3 Rationale behind the U.S. Army Corps of Engineers Tolerable Risk Guidelines** Nathan Snorteland<sup>1,1</sup>*U.S. Army Corps Of Engineers*

**D2/4 – 4 Using maturity matrices to evaluate a dam safety program and improve practices** Dan Forster<sup>1</sup>, Lizzie Smith<sup>2,1</sup>*Dam Safety Intelligence*, <sup>2</sup>*CEATI International*

**D2/4 – 5 Dam Safety Maturity Matrix to Evaluate Health of USACE Dam Safety Program** Jacob Davis<sup>1,1</sup>*U.S. Army Corps Of Engineers*

### Session 5 - Resilience of flood storage and levees

**D2/5 – 1 Natural hazard exposure assessments of New Zealand's stopbank (levee) network: integrating a new stopbank inventory and recent seismic hazard models** Dr Daniel Blake<sup>1</sup>, Dr Liam Wotherspoon<sup>2</sup>, Dr Kaley Crawford-Flett<sup>3</sup>, Eduardo Pascoal<sup>4</sup>, Dr Matthew Wilson<sup>4,1</sup>*University Of Canterbury*, <sup>2</sup>*University of Auckland*, <sup>3</sup>*Quake Centre*, <sup>4</sup>*Geospatial Research Institute*

**D2/5 – 2 Auckland Council's Dam Safety Management System** John O. Grimston<sup>1</sup>, Mohammed S. Razak<sup>2</sup>, Dewi M. Knappstein<sup>1</sup>, Paul D. McCallum<sup>1</sup> <sup>1</sup>Tonkin & Taylor Limited, <sup>2</sup>Auckland Council

**D2/5 – 3 Designing flood storage reservoirs for resilience** John Gosden<sup>1</sup>, Alan Brown<sup>1</sup>, Andy Courtnadge<sup>1</sup> <sup>1</sup>Jacobs

**D2/5 – 4 Systematic condition and structural assessment of extensive flood protection levee infrastructure to support resilient community infrastructure in Otago** Tim Morris<sup>1</sup>, Scott Sutherland<sup>1</sup>, Scott Forster<sup>1</sup> <sup>1</sup>Tonkin & Taylor

### Session 6 - Remote monitoring and emergency preparedness

**D2/6 – 1 The role of InSAR for tailings dam safety assessments** Jessica Morgan<sup>1</sup>, Giacomo Falorni<sup>2</sup>, Davide Colombo<sup>3</sup> <sup>1</sup>TRE Altamira Inc., <sup>2</sup>TRE Altamira Inc., <sup>3</sup>TRE Altamira Inc.

**D2/6 – 2 Leveraging open-access remote sensing imagery to monitor dam infrastructure: Case study of the Cadia tailings dam collapse, Australia** Dr Thomas Fuhrmann<sup>1</sup>, Sean Chua<sup>1</sup>, Dr Matthew Garthwaite<sup>1</sup> <sup>1</sup>Geoscience Australia

**D2/6 – 3 Breaking through the breach: global perspectives on dam-failure flood estimation** Samantha Watt<sup>1</sup>, Alan Brown<sup>2</sup>, Duane McClelland<sup>3</sup>, Chriselyn Kavanagh<sup>4</sup>, Peter Kinley<sup>5</sup> <sup>1</sup>Jacobs Group (Australia) Pty Ltd, <sup>2</sup>Jacobs UK Ltd, <sup>3</sup>Jacobs US, <sup>4</sup>Jacobs Group (Australia) Ltd, <sup>5</sup>Jacobs NZ Ltd

**D2/6 – 4 Using risk communication to address the dam safety knowledge gap in communities** Sophie Walker<sup>1</sup>, Amisha Mehta<sup>2</sup>, Ellen Tyquin<sup>2</sup>, Aimee Tutticci<sup>1</sup>, Dr Clinton Weeks<sup>2</sup> <sup>1</sup>Seqwater, <sup>2</sup>QUT Business School

### Poster Presentation List

#### Day 1

**Contract Strategies for Dam Projects - Reflecting on Melbourne Water's journey** Robert Belcher<sup>1</sup>, Bill Welsford <sup>1</sup>Melbourne Water

**A System Approach for Managing and Communicating Risk for Levee-Protected Communities** Sharyn Westlake<sup>1</sup>, Rebecca Polvere<sup>1</sup>, George Bowman<sup>1</sup>, Colin Munn<sup>1</sup> <sup>1</sup>Greater Wellington Regional Council

**Determining Flood Extent due to Undocumented Stopbanks** Thomas Wallace<sup>1</sup> <sup>1</sup>University of Canterbury

**New regulatory framework for NSW Dams Safety** Chris Salkovic<sup>1</sup> <sup>1</sup>Dams Safety NSW

**Adapting to extreme weather condition in Gobi Desert: Sustainable operation and construction for Mine Tailings Storage Facility** Ninjin Tzolmon<sup>1</sup> <sup>1</sup>Oyu Tolgoi Llc

**Evaluation of Seismic Response of Earth Dams Using A Finite Element-Boundary Element Formulation** Maz Mahzari<sup>1</sup> <sup>1</sup>Stantec Co

**Design of an Innovative Spillway Integrated Low Gradient Bypass Fishway** Nigel Moon<sup>1</sup>, Mr Donovan Rowe<sup>1</sup> <sup>1</sup>Golder Associates

**Seismic analysis of embankment and tailings dams – Correctly using ground motions** Alireza Mojami<sup>1</sup>, Malcolm Barker<sup>1</sup> <sup>1</sup>GHD

**Challenges in estimating earthquake hazard in a lower seismic hazard environment** Elodie Borleis<sup>1</sup>, Mr Gary Gibson<sup>1</sup> <sup>1</sup>Seismology Research Centre

**Homogeneous Embankment with Static and Seismic safety for resilience community** Behrouz Gordan<sup>1</sup> <sup>1</sup>Engineering Seismology and Earthquake Engineering Research Group (e-seer), Universiti Teknologi Malaysia 81310 Skudai, Johor, Malaysia

**A standardised nationwide inventory of New Zealand's stopbank (levee) network** Dr Daniel Blake<sup>1</sup>, Dr Kaley Crawford-Flett<sup>2</sup>, Eduardo Pascoal<sup>3</sup>, Dr Matthew Wilson<sup>3</sup>, Dr Liam Wotherspoon<sup>4</sup> <sup>1</sup>University Of Canterbury, <sup>2</sup>Quake Centre, <sup>3</sup>Geospatial Research Institute, <sup>4</sup>University of Auckland

**Developing multipurpose dam assets to maximise value for the community – Providing flood mitigation at Mt Bold** Darrell Hamlyn<sup>1</sup> <sup>1</sup>SA Water

#### Day 2

**Stability of embankment dam on highly permeable rock foundations** Iain Lonie<sup>1</sup>, Jonathon Reid<sup>2</sup>, Brendan Trebilco<sup>3</sup> <sup>1</sup>SMEC, <sup>2</sup>SMEC, <sup>3</sup>SunWater

**Mundaring Weir: Examination of potential instability in the stilling basin** Sonel Reynolds<sup>1</sup>, Bob Wark<sup>1</sup>, Alex Gower<sup>2</sup> <sup>1</sup>GHD, <sup>2</sup>Water Corporation

**Recent developments considered in the ANCOLD Practice Notes on Design Criteria for Arch Dams** Dr Radin Espandar<sup>1</sup>, Marius Jonker<sup>1</sup> <sup>1</sup>Entura

**Environmental and social challenges of developing small hydropower projects in Uganda, the issues, impacts and benefits** Jon Roe<sup>1</sup> <sup>1</sup>WSP

**Seqwater Dam Safety Policy Implementation for Management of Dam Safety Risks on Communities** Neranjala Fernando<sup>1</sup>, Barton Maher<sup>1</sup> <sup>1</sup>Queensland Bulk Water Supply Authority Trading As Seqwater

**Valuable assets from defective dams: the role of pumped hydro** Mike Westerman<sup>1</sup> <sup>1</sup>Ghd

**Namuk Dam, more than 10 years after closure** Tri Hartanto<sup>1</sup> <sup>1</sup>Ministry Of Public Works And Housing

**Hydro-mechanical commissioning of a novel large-scale triaxial permeameter (TX-P) for testing of widely-graded embankment soils** Dr Kaley Crawford-flett<sup>1</sup>, Dr Mark Stringer<sup>2</sup>, Dr Sean Rees<sup>2</sup> <sup>1</sup>University Of Canterbury Quake Centre, <sup>2</sup>University of Canterbury

**The Role of Agricultural Area Dams in the Development and Sustaining of Resilient Communities in Western Australia** Josh Oliver<sup>1</sup>, Robert Woods<sup>1</sup> <sup>1</sup>Jacobs

**You don't know what you don't know.** Tim Mills<sup>1</sup>, Tim Logan<sup>2</sup> <sup>1</sup>Meridian Energy Limited, <sup>2</sup>Dam Safety Intelligence

