

# STEVEN PELLIS

BE (Civil) Hons, MEngSc

## **Educational Qualifications:**

Bachelor of Engineering (Civil) (Hons),  
University of New South Wales, 2000  
Master of Engineering Science (Coastal Engineering/  
Hydrogeology), University of New South Wales, 2001

## **Professional Associations:**

Member, International Institute of Engineers, Australia  
Member, International Association of Hydrogeologists

## **FIELDS OF SPECIALISATION:**

- Assessment and Design of Hydraulic Structures
- Water Resources and Surface Water Hydraulics
- Hydrogeology and Seepage Hydraulics
- Coastal Structures and Wave Dynamics

## **EMPLOYMENT:**

### **2011 – Current**

Associate, Pellis Consulting

### **2009 – 2011**

Senior Project Engineer - WRL, University of New South Wales

### **2008 – 2009**

Senior Water Engineer - Cardno Willing

### **2006 – 2007**

Senior Water Engineer - Ove Arup Partners

### **2001 – 2006**

Project/Senior Project Engineer - WRL, University of New South Wales

### **1997 – 2001**

Graduate Geotechnical Engineer - Pellis Sullivan & Meynink  
Soils Technician (P/T) - Coffey Partners

### **1994 – 1997**

Carpenter/Joiner - LW Hough P/L

## PROJECTS RELATED TO HYDRAULIC STRUCTURES

### 2003-2005

#### Major Projects

Physical Testing of Large Diameter Valves	Australia	Physical testing to determine headloss characteristics of large diameter flow valves.
Physical Testing of Large Diameter Pipe Plug	Australia	Physical testing of the effectiveness of purpose built apparatus to plug and decommission an underground 1m diameter pipe, whilst in operation.
Physical Modelling of An In-Stream Detention Basin	Kellyville, NSW	Management, supervision, design and construction of a physical model of instream flood control basin.
Assessment of Dam Intake Structures for Jindabyne Dam	Jindabyne, NSW	Management, design, construction and testing of a physical model to assess the performance of a proposed dam intake structure.
Design of Scour Protection for Rock Weirs	Australia	Large scale physical modelling and analysis to develop specifications for rock scour protection for weir structures.

### 2006-2011

#### Major Projects

Assessment of Hydraulic Forces on Causeway Structures	Queensland	Hydraulic assessments were used as a basis for preparation of guidelines.
Lined Storages - Storage and Distribution of Caustic Soda	Gladstone, QLD	Preliminary hydraulic modelling, review of drainage technologies and design principles, review of pipeline technologies and specialist advice on scale modelling of caustic soda distribution networks.
Appraisal and Remediation of Existing Tidal Weir Structures	East Trinity, Qld	Project manager for the assessment of existing tidal control structures and design of new structures to support tidal flushing of acid sulphate remediation activities at East Trinity, Cairns.
Testing of Tidal Energy Turbine	Australia	Laboratory testing of power output and efficiency from turbine designs.
Physical Model of Outlet Works, Adelaide Desalination Plant	Adelaide, SA	Design, construction and testing of a physical model of the outlet works from a desalination plant. The model was primarily of clear acrylic piping and, at the scale of 1:6, was over 4 storeys in height.
Expert Review of Embankment Dam	Dorrigo, NSW	Expert review of the embankment and hydrology of a 15 m earth embankment dam to advise legal proceedings.

## PROJECTS RELATED TO COASTAL ENGINEERING

### 2001-2004

#### Major Projects

Breakwater / Revetment Design, Sydney Airport	Sydney, NSW	Undertaking physical model studies for optimisation of toe scour protection requirements for a breakwater / revetment structure at Sydney Airport.
Estuarine Numerical Modelling	Auckland, New Zealand	Set up and calibration of 2D numerical hydrodynamic model for examination of tidal currents and estuarine processes in a region of Auckland Harbour to allow examination of impacts of proposed developments.
Numerical and Physical Modelling of Mooring Structure	Darwin, NT	Numerical and physical modelling studies to assess amplification or modification of currents adjacent to a large wharf structure during the mooring of large sea vessels.
Ocean Outfall Assessment,	Wollongong, NSW	Undertaking physical modelling of a section of proposed outfall design for examination of saline intrusion.
Wind-Wave Growth and Dissipation Studies and Research	Australia	Physical testing and research to investigate the physics of wind – wave interactions and the processes of wave growth and dissipation. Studies resulted in the publication of new research into the growth and dissipation of wind waves.
Seawall Assessment and Design	Manly, NSW	Detailed assessment of the stability and long term performance of a high profile seawall in Manly, Sydney.
Coastal Erosion Assessment	Glenelg, SA	Numerical assessment of coastal longshore sediment transport to support expert advice for litigation following coastal erosion issues at Glenelg, Adelaide.
Design of Wave Paddle System	Australia	Design, construction and calibration of a wave generation system for undertaking wave basin modelling studies.
Assessment of Sediment Response to Offshore Reef Structures	Australia	Research into the shoreline response to offshore reef structures. Tasks included design, supervision and testing of a movable bed physical model.

## PROJECTS RELATED TO COASTAL ENGINEERING

### 2005-2009

#### Major Projects

Physical Modelling of Desalination Brine Outlet	Perth, WA	Design, construction and application of a physical model to examine diffusion processes of brine discharge from a large scale desalination plant.
Foreshore Embankment Stabilisation	Penrith, NSW	Provision of specialist advice on options for stabilisation of foreshore regions against erosion around a series of inland lakes.
Appraisal and Design of Coastal Protection Structures	Green Island, Qld	Project manager for the review of the function and condition of a sediment control groyne on Green Island (Great Barrier Reef).
Assessment of Greenwater Overtopping of Offshore Structures	Browse, WA	Technical studies to investigate the extent and impacts of green water overtopping of a number of large scale offshore structures.
Burwood Beach Ocean Outfall Modelling	Newcastle, NSW	Detailed analyses of meteorological conditions were undertaken to predict the statistical frequency of pollution events at beaches adjacent to an ocean outfall.
Review of Sub-Aerial Landslide Tsunami Generation and Propagation, Lihir Gold Mine,	Papua New Guinea	A tsunami event, caused by a sub-aerial landslide, was recorded at a local tidal monitoring station. Analyses of the characteristics of the tsunami event were undertaken and used to postulate on the extent, velocity and timing of the landslide.

## PROJECTS RELATED TO HYDROGEOLOGY

### 2002-2005

#### Major Projects

Assessment of Surface – Groundwater Connectivity	Centennial Park, NSW	Field investigations, monitoring and analysis to provide recommendations to irrigators regarding the impacts to groundwater from the abstraction of water from a public lake systems.
Feasibility of Saline Intake Bores for Seawater Desalination	Central Coast, NSW	Detailed field investigations and associated interpretation to assess feasibility of large intake bores for a planned seawater desalination scheme. Tasks included undertaking resistivity surveys, drilling supervision, supervision and interpretation of aquifer pumping tests, slug tests and groundwater level and quality monitoring.
Assessment of Groundwater Pollution Sources	Confidential	Presentation and interpretation of resistivity survey data to assess location and extent of groundwater pollution from industrial sources. Advice was used to support litigation.
Groundwater System Characterisation	Blue Mountains, NSW	Supervision of field investigations to characterise groundwater hydraulics and quality in sandstone aquifers in the Blue Mountains, NSW. Tasks included supervision of drilling, bore logging, groundwater sampling, and undertaking packer and slug tests and associated analysis to estimate hydraulic properties.
Impacts of Effluent Disposal on Groundwater in Coastal Aquifers	NSW	Management and undertaking of detailed field investigations into groundwater hydraulics and quality in coastal aquifers at various sites New South Wales, including Hat Head, South West Rocks, Iluka, Hasting Point and Sussex Inlet. Monitoring was undertaken to determine baseline conditions and assess the impacts to groundwater systems subsequent to development of effluent disposal schemes.
Assessment of Groundwater Seepage for Tunnel Design	Sydney, NSW	Undertaking of permeability testing of sandstone bores in the CBD of Sydney. Results were interpreted to provide parameters to support design of tunnelling works.
Design of a Groundwater Effluent Disposal Scheme	Iluka, NSW	Detailed field investigations and associated interpretation to assess feasibility and support design of an effluent disposal scheme. Tasks included supervision and interpretation of aquifer pumping tests, and assessment of planned infrastructure development locations with respect to coastal processes.

## PROJECTS RELATED TO HYDROGEOLOGY

### 2006-2011

#### Major Projects

Yamba Hill Groundwater and Slope Stability Monitoring	Yamba, NSW	Supervision of drilling and installation of groundwater monitoring bores and inclinometers to assess slope stability at Yamba.
Aquifer Storage and Recovery Feasibility Assessment, Ipswich	Ipswich, Qld	Desktop studies to assess the feasibility and potential yield of a proposed Aquifer and Storage Recovery Scheme near Ipswich, Brisbane. Studies included desktop assessment of local aquifer systems based on available borehole data, catchment hydrology assessment and analysis of potential yields. Recommendations were prepared with respect to yields, risks and infrastructure costs.
Perth Airport Drainage Strategy, Review of Groundwater	Perth, WA	Review of aquifers, recharge and surface water-groundwater interactions in the superficial aquifers in the Swan Coastal Plain. A review of numerical modelling techniques was undertaken, and advice given to hydrologists to assist with flood modelling of the Perth Airport site.
Review of Geothermal Heat Pump Applications, Energy Australia Building	Sydney, NSW	The design of a large Geoexchange system was reviewed based on site characterization and the derivation and application of analytical techniques to simulate heat transport. Inconsistencies in current design guidelines were highlighted, and ongoing opportunities for research into this field have been sought.
Groundwater Characterisation and Numerical Modelling for Rainbow Beach Estate	Rainbow Beach, NSW	Specification of a groundwater investigation and monitoring scheme for characterisation of a coastal aquifer near Port Macquarie. A 3D numerical groundwater model was assembled to simulate the aquifer and to assess impacts from a proposed development.
Review of Seawater Intrusion of Coastal Aquifers	Christchurch, New Zealand	Literature review on the processes, international experience and management of seawater intrusion of coastal aquifers to provide guidance for policy development in the Christchurch region, New Zealand.
Managed Aquifer Recharge Options and Investigations	Borambil Creek, NSW	Scoping studies to evaluate and advise on aquifer management, enhanced recharge and stream restoration, Borambil Creek in the Upper Namoi catchment, New South Wales.
Review of Surface Water – Groundwater Interactions, Longwall Mining	Newnes Plateau, NSW	Field reconnaissance, data review and surface water modelling tools were used to provide advice on potential impacts to surface water systems from longwall mining effects.

## PROJECTS RELATED TO HYDROGEOLOGY

Expert review of groundwater impacts from longwall mining

Southern Coalfields, NSW

Independent review of environmental assessments of impacts of mining subsidence on groundwater and surface water resources.

Review of hydrology of Thirlmere Lakes

Southern Coalfields, NSW

Undertaking of an independent review of the hydrology of Thirlmere Lakes, and comments on the evidence for impacts from mining.

## PROJECTS RELATED TO WATER RESOURCES AND SURFACE WATER

### 2002-2006

#### Major Projects

Design of Stormwater Capture and Treatment Ponds	Eraring, NSW	Desktop analysis of catchment hydraulics to prepare preliminary design of stormwater capture and treatment infrastructure.
Physical Modelling of Flooding and Evacuation, Penrith Lakes	Penrith, NSW	Management, supervision, design and re-construction of a physical model to examine flood characteristics, floodplain risk planning and evacuation timing for large lakes development scheme in Western Sydney.
Feasibility of Flood Harvesting Infiltration Galleries	Broken Hill, NSW	Desktop studies and field investigations to assess feasibility of flood capture infrastructure.
Water Resource Assessments, Far North Queensland	Qld	Preparation of a water supply strategy for the Far North Queensland region. A comprehensive review and appraisal of existing and potential future supply options to meet regional forecast demands over the next 50 years was undertaken. Technical sub-studies were then undertaken to assess the yield and reliability of traditional and alternative supply options, ranging from large dams to residential rainwater tanks and stormwater harvesting.

### 2006-2011

#### Major Projects

Design of flood detention ponds	Cecil Hills, NSW	Hydrologic analyses for design of flood detention ponds to support large residential subdivisions. Hydraulic analysis
Urban flood hydrology	Marrickville, NSW	Development of 1D stormwater network models to assess flood risk and design flood mitigation options for an urban catchments in Sydney.
Flood modelling and design	Porters Creek, NSW	Supervision of hydrologic and 2D flood models for flood studies of the Porters Creek catchment.
Review of Catchment Processes for Flemington Road Pond P2, Canberra	ACT	Installation and operation of field equipment to monitor responses to rainfall within aquifers and ponds in a small catchment in Canberra and development of water balance models for the catchment.
Ranger Uranium Mine – Flow Modelling of Post-Closure Conditions	NT	Construction and calibration of a hydrologic and 1D hydraulic flow model of catchments adjacent to the Ranger Uranium Mine.

## LIST OF PUBLICATIONS

### JOURNAL PAPERS / RESEARCH REPORTS

1. **PEIRSON, W L, FIGLUS, J, PELLIS, S E and COX, R J** - Placed Rock as Protection against Erosion by Flow down Steep Slopes Journal of Hydraulic Engineering. Volume 134, Issue 9, pp. 1370-1375, 2008.
2. **PEIRSON, W L and PELLIS, S E** - A Laboratory Study Of Wave Growth And Air Flow Behaviour Over Waves Strongly Forced By Wind. WRL Research Report 219 on behalf of the United States Army, European Research Office Funding under contract number N62558-04-M-0002, 2004.
3. **PEIRSON, W L, GARCIA, A W and PELLIS, S E** - Water Wave Attenuation Due to Opposing Wind Journal of Fluid Mechanics 2003 Vol 487, pp 345 -365, 2003.
4. **PELLIS, S E & FELL, R** - Damage and Cracking of Embankment Dams by Earthquake and the Implications for Internal Erosion and Piping 21st ICOLD Congress 2003 Montreal Q83 83/R18 18.
5. **PELLIS, S.E & FELL, R** - Damage and Cracking of Embankment Dams by Earthquake and the Implications for Internal Erosion and Piping. UNICIV Report Vol 408, 220 pages. UNSW 2002.

### CONFERENCE PAPERS

1. **PELLIS, S.E** - Potential impact of sea-level rise on coastal aquifers. Groundwater 2010 Conference, 31 Oct – 4 Nov 2010, Canberra.
2. **PEIRSON, WILLIAM L; FIGLUS, JENS; PELLIS, STEVEN E and COX, RONALD J.** - Large Rock Protection against Erosion by Flow Down Steep Slopes. In: 9th National Conference on Hydraulics in Water Engineering: Hydraulics 2008. Barton, A.C.T.: Engineers Australia, 2008: [142]-[148].
3. **PELLIS, S.E** - Desktop Estimation of Yield For Aquifer Storage Recovery Schemes. In: Lambert, Martin (Editor); Daniell, TM (Editor); Leonard, Michael (Editor). Proceedings of Water Down Under 2008. Modbury, SA: Engineers Australia ; Causal Productions, 2008: 1037-1048.
4. **TIMMS, W., GLAMORE, W & PELLIS, S.E.** - Groundwater Quality Impacts Of On-Site Effluent Disposal On-Site '05 Conference Proceedings 2005.
5. **PELLIS, S.E., TIMMS, W and TURNER, I.L.** - Managing Groundwater in Coastal Sand Aquifers NSW Coastal Conference Proceedings, 2004.