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# water NEW ZEALAND

## Stormwater Education, Training & Sector Development

### PART 3: APPENDICES

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DRAFT report for industry comment



**Environmental Communications Ltd**

**Environment & Sustainability Strategy & Training Institute**

P O Box 147424, Ponsonby, AUCKLAND 1144

Phone: + 64 9 973 0880

Mobile: 021 631 843

E-mail: [clare@clarefeeney.com](mailto:clare@clarefeeney.com)

Web: [www.clarefeeney.com](http://www.clarefeeney.com)

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**Acknowledgement**

The author gratefully acknowledges the prior work, expertise and generosity of water New Zealand staff and the members of the Education and Training Subgroup of Water New Zealand's Stormwater Special Interest Group, as well as the excellent input from the wider industry during this three-year process before and during her involvement. Members of the Committee and Subgroup are named in Appendix A.

**How to use this Plan**

This Plan is based on a lot of work carried out over several years. It proposes a lot more work for the sector – work the sector wants, much of which it is itself best placed to deliver.

To keep core information ready to hand for those who will step up to this work, the Plan is in three parts:

- a short **Plan**
- a set of **Toolkits** with practical detail for working groups implementing the Plan
- this short set of **Appendices** for other information collected as part of this process.

A great deal of other work is going on, so working groups will be supported with several key documents referenced in the Plan, especially the 2018 WSUD report, ongoing work by the Ministry for the Environment and the Auditor-General's December 2018 report on Managing stormwater systems to reduce the risk of flooding.

This Plan can only be implemented by the kind of ongoing communication and collaboration that characterises the stormwater sector. An exciting time lies ahead.

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## Appendix A Water New Zealand staff and Stormwater Group Committee

As well as the group members listed below, thanks are also due to Vicki McEnaney, Communication and Engagement Manager at Water New Zealand during this period.

### 2016/2017

Mike Hannah (Chair)

Andy Irwin

Bronwyn Rhynd

Dean Watts

Frances Charters

Hamish Jones

James Reddish

Konrad Heinemann

Nick Simpson

Peter Christensen

Sarah Sutherland

Sue-Ellen Fenelon

Troy Brockbank

Zeb Worth

Peter Christensen

Sarah Boone

Sarah Sutherland

Troy Brockbank

Zeb Worth

### 2018/2019

James Reddish (Chair)

Bronwyn Rhynd

Daniel Wairepo

Dragan Tutulic

Frances Charters (upon return from maternity leave)

Gretel Roberts

Hamish Jones

Hannah Breeds

Jon Rix

Kate Purton

Peter Christensen

Sarah Boone

Sarah Sutherland

Shaun Jones

Tom Cochrane (for France Charters)

Troy Brockbank

Wolfgang Kanz

Zeb Worth

### 2017/2018

Mike Hannah (Chair)

Andy Irwin

Bronwyn Rhynd

Daniel Wairepo

Dean Watts

Frances Charters

Hamish Jones

James Reddish

Konrad Heinemann

Nick Simpson

## Appendix B Project brief, methods and tasks

### Brief

The brief was to deliver a three-year executable Education and Training Plan which provides:

- an adaptive framework adjustable to both the regional and national context, with a focus on:
  - needs: what training is needed in identified areas
  - delivery: how the training might be delivered
  - funding: how the training might be funded
- tangible outcomes towards industry goals defined in feedback received over the past two years
- quantitative and qualitative methods to evaluate the effectiveness of the Plan.

### Methods

The work fell into the following tasks:

Task 1: Review information

Task 2: Conduct training needs assessment: the subject of this draft report

Task 3: Summarise training development, delivery and funding options

Task 4: Develop training management and evaluation plan

Task 5: Develop three-year executable Education and Training Plan.

A further task, to identify public awareness needs related to and aligned with the Plan, is deferred: given the pace of current developments, there could be numerous partners for this in the future.

The following collaborative steps were included in all tasks:

- circulate the material to the Subgroup for feedback and additions, in google docs or similar
- amend the material in line with feedback received and forward to client.

As part of Task 2 it is very important to do a full needs assessment to make sure that the right training is provided, along with any other support that may be needed– training is quite often not the solution to the problem, and is seldom the whole solution.

Tasks 1-4 generated 200 pages of information and references. These have been split into three documents:

- a lean Plan
- a set of Toolkits to act as working resources to support the implementation of this Stormwater Training Plan
- detailed Appendices with all the information from Tasks 1-4 that is not contained in the Plan or the Toolkits.

### Tasks

#### Task 1: Review information

- 1.1 Collate, read and review the information listed in section 1 and other relevant sources. Summarise this under key headings, e.g. training goals and outcomes, identified training needs, training delivery methods and available training programs, topics and providers
- 1.2 Broadly indicate the areas where costs will be incurred by not delivering adequate education and training.

#### Task 2: Conduct training needs assessment

- 2.1 List the key government policies and other guiding and requiring documents to define the strategic context and outcomes that stormwater management must and may deliver.
- 2.2 Build a matrix of the development cycle/infrastructure life cycle, e.g. research, policy / planning, design, construction, operation, maintenance, decommissioning along the top row); and the associated issues, audiences & workshops down the left-hand column. Populate the matrix with available training workshops and tertiary education courses.
- 2.3 Summarise relevant overseas examples.
- 2.4 Carry out an analysis of:
  - where training is needed but is not currently available (gap analysis)
  - a rough assessment of priorities, or a set of criteria for defining these – and how to enlist industry views on priorities
  - what trainers are currently and potentially available in New Zealand and overseas
  - where training is not the solution to the problem, and other solutions are needed.

#### Task 3: Summarise training development, delivery and funding options

- 3.1 Summarise and compare the preferences expressed in surveys and other information for how education and training can be delivered
- 3.2 List other options also available, including by existing providers.
- 3.3 Identify other support needed for effective training
- 3.4 Identify methods for developing new training and adapting existing training
- 3.5 Summarise and analyse the options suggested for how training delivery can be funded. Align as far as possible the training needed with the delivery and funding options
- 3.6 Prepare a short list of issues that will need to be addressed in the future, such as intellectual property, keeping the information up-to-date, selection/quality control/moderation/evaluation of training and trainers and so on.

#### Task 4: Develop training management and evaluation plan

- 4.1 Summarise the five globally accepted levels of evaluation of adult vocational training, up to and including full financial ROI (return on investment) of training. Show how the outcomes of these can be aligned with a simple but effective catchment-scale outcome monitoring framework
- 4.2 Consider the need for a sector-wide Learning Management System (LMS) to track training delivery and effectiveness, including the use of electronic badging
- 4.3 Summarise and analyse options for accreditation and certification based on the levels of NZQA-accredited education courses, industry feedback received, prior work, Water New Zealand's recent work and the template provided by WEF's NGICP
- 4.4 Scope the feasibility and pros & cons of an appropriate agency, such as Water New Zealand, the existing Quality Planning website or the proposed Urban Development Authority, for taking on responsibility for setting up and maintaining a centralised resource page of public training workshops and links to private ones.

#### Task 5: Develop three-year executable Education and Training Plan

- 5.1 Integrate the above information into an adaptive framework adjustable to both the regional and national context, building on my past experience with similar projects
- 5.2 Define vision, mission, goals/objectives, tasks, roles, responsibilities, reporting and review, ideally by way of a face-to-face afternoon workshop with key stakeholders
- 5.3 Put in place quantitative and qualitative methods to evaluate the effectiveness of the Plan, including tangible milestone targets over the three-year implementation period and

a formative evaluation at the 18 months-two year mark, with a summative evaluation at the end of the three years.

Task 6: Identify public awareness needs (deferred)

- 6.1 Identify public awareness needs related to and aligned with the Plan
- 6.2 Broadly identify agencies and initiatives already under way or proposed
- 6.3 Make some high-level recommendations about public awareness of stormwater matters for future exploration (not as part of this project).

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## Appendix C A short history of water-related training in New Zealand

This section summarises the:

- Ministry of Works and its legacy
- The Auckland contribution
- scope and constraints of other recent training.

### The MOWD and its legacy

The Ministry of Works (MOWD) was founded in 1876 as the Department of Public Works, renamed as MOWD in 1943 and disestablished for privatisation in 1988<sup>1</sup>. As well as constructing much of New Zealand's transport, energy, water supply and wastewater infrastructure, MOWD also had two other important divisions; Water and Soil Division and the Town & Country Planning Division.

These divisions worked closely with the then Department of Scientific and Industrial Research, the predecessor of today's Crown Research Institutes (CRIs), to ensure that research and other information was disseminated amongst the Catchment Boards, Regional Water Boards and councils responsible for land use and water management across New Zealand. Graduates received their specialist training on the job, and they and others were also trained via a comprehensive system of skilled apprenticeships related to hydrological and related data collection.

Rapid growth after the end of World War II saw the need for water and wastewater treatment plant operator training. In 1953, the MOWD established the Ministry of Works Sewage Treatment Plant Operator Training School at the Trentham Sewage Treatment Plant and then in 1963 it set up the Water Treatment Operator Training School at Bulls (swimming pool water treatment training was added in 1965). The Trentham training school offered the first recognised sewage treatment plant operator training courses in 1959 with the "C" grade course. The B & A grade courses following shortly after and in 1987 the two schools were amalgamated to form the Water & Wastewater Treatment Centre (WTC) at Trentham<sup>2</sup>. In 1997 Works Consultancy Services became Opus International Consultants WTC became Opus Environmental Training Centre (ETC), to better reflect a new operating focus, offering training services other than plant operator training. The ETC became an NZQA approved Private Training Establishment in 1998 and was granted approval and accreditation from NZQA for certificated courses.

Recognising the water industry needed to be more supportive of training, Opus and the New Zealand Water and Waste Association formed the New Zealand Water and Environment Training Academy (NZWETA), a joint venture between the organizations committed to providing a vehicle designed to facilitate training for all sectors of the broader water and wastes industry. At the date of writing, the ETC continues its work along with the other training delivered by NZWETA for national qualifications and professional development short courses has now reverted to the Opus Environmental Training Centre<sup>(ibid)</sup>.

### The Auckland contribution

In the 1970s, a second post-war growth surge triggered the need for specialist environmental management skills, especially around erosion and sediment control and flooding. Management programs and associated training for erosion and sediment control were set up in the 1990s in Auckland, where the needs were most pressing, and spread rapidly around New Zealand<sup>3</sup>.



Between 1995 and 2012, the Stormwater Unit and other parts of the Council offered several training workshops on a fee-paying basis for trainees. Most of the workshops were delivered by expert consultants, including NIWA (for the SEV workshop) although the TP148 training was delivered by Council staff who had received two 1-day “Train the Trainer” workshops with follow-up review and mentoring. The Council’s 15 existing and proposed workshops were<sup>4</sup>:

1. erosion and sediment control 1 - for contractors (TP90)
2. erosion and sediment control 2 - for consultants (TP90)
3. erosion and sediment control 3 - chemical treatment
4. stormwater management design (TP10)
5. low impact design (LID) for stormwater (TP124)
6. stream ecological valuation training (SEV)
7. how to write integrated catchment management plans whose implementation and outcomes can be measured
8. hydrological modelling (HEC-HMS)
9. rural riparian zone management (TP 148)
10. how to prepare an assessment of environmental effects (well-received but low uptake)
11. environmental management for utility organisations (pilot only)
12. environmental management on small construction sites - council staff (pilot only)
13. environmental management on small construction sites – builders (proposed only)
14. erosion and sediment control in rural and forestry areas (proposed only)
15. urban riparian training (requested by catchment planning engineers but not developed).

Of these, the longest-lived and most frequently run were the TP 90 workshops. They were also the only ones for which evaluation of training beyond Level 1 was carried out, via analyses of onsite compliance monitoring and scoring results. Working together with an industry partnership approach, clear performance guidelines, effective consenting and strict onsite compliance monitoring achieved major uptake with the industry and the development of an entirely new and highly skilled group of environmental professionals on civil construction sites<sup>5</sup>.

Level 1 feedback on workshops 11 and 12 highlighted the need for tailoring to better reflect the industries’ needs and constraints on site. This work got under way but no more training was delivered.

Since then, Auckland’s earlier technical publications (TPs) have been updated to Guidance Documents (GDs), and the Auckland Council Healthy Waters has identified an urgent need to provide training on the first three of the following:

- GD01 (TP10) Design guideline manual for stormwater treatment devices
- TP108 (will be GD02) Guideline for stormwater runoff modeling in the Auckland region
- GD04 (TP124) Low impact design manual for the Auckland region
- GD05 (TP90) Erosion and sediment control guideline for land disturbing activities in the Auckland region.

#### Scope and constraints of other recent training

Table C summarises the scope, constraints and limitations of existing stormwater-related training in New Zealand as at 2017. The findings reveal that most of the constraints and limitations to uptake of training and frequency of delivery relate to cost and numbers of trainees.

Table C Scope and limitations of stormwater-related training in New Zealand

Source: Water New Zealand Stormwater Education and Training Subgroup (2017)<sup>6</sup>

Course and provider	Outline content	Frequency and location	Constraints and limitations	Actions
Water Sensitive Design (WSD): Jamie Comley, Clearwater, Melbourne	Operation and maintenance of WSD devices?	Held once at the 2017 Stormwater Conference in Auckland.  Could be run again	Ran at a loss when last held – may need further funding, cost reduction, or better attendance.	Financial review to determine whether it can be run again.  Course consent review  Discuss with IPENZ whether CPD credits can be assigned.
Stormwater Management and Design – An Introduction: IPENZ (Alan Leahy)	Flow and volume calculations  Treatment methods  Introduction to WSD  Practical Exercises	Held multiple times per year around New Zealand	N/A	Liaise with IPENZ on course content and stormwater training gaps identified [in this current 2018 report].
The Auckland Unitary Plan (AUP): Auckland Council Stormwater Unit	Understanding and application of AUP Stormwater Rules	Held once at the 2017 Stormwater Conference in Auckland.  Could be run again	Ran at a loss when last held – may need further funding, cost reduction, or better attendance.  Next course may focus more on practical application, rather than what the rules say.	Financial review to determine whether it can be run again.  Discuss with IPENZ whether CPD credits can be assigned.
Hydrological/hydraulic software: commercial providers	Guidance on how to use software	Regular around the country. Software providers organise.	Applicable to software practitioners only. Software costs are generally high.  Generally only covers the software operator, rather than hydraulics/ hydrology first principles.	Promote training

## Appendix D What does the 30-year Infrastructure Action Plan mean for the three waters sector?

Find out more and download the plan from <https://treasury.govt.nz/information-and-services/nz-economy/infrastructure/thirty-year-new-zealand-infrastructure-plan-2015>.

The Action Plan provides the first steps to achieving the 2045 vision. This means:

- The sector will be recognised for its mature **asset management practices** across all providers, underpinned by **reliable and accurate data** on the state and performance of the network to support better decision-making. A key focus is **optimising the existing three waters network**. This will be achieved through:
  - Developing national metadata standards for water infrastructure to ensure a consistent base to build evidence, undertake forecasting, deepen capability (LINZ, NIU, local authorities, and sector bodies).
  - Establishing centres of excellence responsible for collating the data obtained through the shared metadata standards, providing the necessary analytics and supporting local decision-making (NIU, sector bodies, and local authorities).
  - *EquiP LP*, Local Government New Zealand's centre of excellence, is developing a Governance Development programme and an Organisational Performance programme to assist councils in raising the standard of governance, performance and asset management (LGNZ).
  - The LGNZ 3 Waters project to lift the performance of our potable water, wastewater and stormwater services and infrastructure. The project established a National Information Framework survey in 2014 and the issues paper released in October 2014 explores the issues facing New Zealand's three waters sector. LGNZ will be releasing a position paper in 2015 to outline what a well performing three waters sector should look like and propose options for a sector led approach to improving performance in the future.
- Infrastructure providers **collaborate more effectively within and across regions**, taking a long-term view and **ensuring adequate investment in high-growth communities**. This will be achieved through:
  - Investigating options to support long-term integrated regional infrastructure plans, potentially with legislative recognition incorporating central, regional and local government objectives (NIU).
  - The *Future Urban Land Supply Strategy* being developed across Auckland, sequencing structure planning and live zoning of the future urban areas to achieve the best outcomes, including housing and infrastructure. It is a collaborative project and will be completed by October 2015. It recognises the importance of aligning infrastructure delivery with planning (Auckland Council).
  - Cross-boundary study between Hamilton City Council, Waipa District Council and Waikato District Council to determine how each council should manage water, wastewater and stormwater services across the subregion. Three options are currently being considered (Waikato Councils).

## Appendix E About the New Zealand Qualification Framework

The New Zealand Qualification Framework (NZQF) is a government agency that issues quality-assured qualifications. The NZQF is divided into 10 levels, and covers a range of qualifications from certificates (level 1) to doctoral degrees (level 10). At secondary school, students work towards NCEA (National Certificate of Educational Achievement), which covers levels 1 to 3 of the NZQF. After secondary school, students who want to continue their study at a tertiary level can choose from a number of education options ranging from universities to polytechnics, private training establishments, industry training organisations and more.

There is a summary below.

<https://www.nzqa.govt.nz/studying-in-new-zealand/understand-nz-quals/>

### Qualification types on the NZQF

Level	Certificate	Diploma	Degree
10 			Doctoral Degree
9 			Master's Degree
8 	Postgraduate Certificate	Postgraduate Diploma	Bachelor Honours Degree
7 	Graduate Certificate	Graduate Diploma Diploma	Bachelor's Degree
6 	Certificate	Diploma	
5 	Certificate	Diploma	
4 	Certificate		
3 	Certificate		
2 	Certificate		
1 	Certificate		

About education organisations

<https://www.nzqa.govt.nz/providers-partners/about-education-organisations/>

An education organisation can be any educational organisation supplying education and/or training and/or assessment services to learners. A wide range of programmes and qualifications are offered in New Zealand.

All education organisations can be accredited to assess for national qualifications. Before applying for accreditation, private and government training establishments must be registered with the New Zealand Qualifications Authority (NZQA).

## Types of education organisations in New Zealand

Organisation type	Description
School	Of the primary, intermediate and secondary schools in New Zealand, the New Zealand Qualifications Authority deals largely with schools at the secondary level (years 11-13 and NZQF levels 1-3).
Polytechnic/institute of technology (ITP)	State-owned bodies that deliver technical, vocational and professional education. They also promote research, particularly applied and technological research that aids development. See a <a href="#">list of ITPs</a> .
Private training establishment (PTE)	A privately owned and funded organisation providing education and training. PTEs must be registered by NZQA. PTEs' programmes are mostly in specific vocational niches at certificate and diploma level. Some companies and government training establishments register their staff training operations as training establishments.
Government training establishment	A state-owned organisation providing education or training (for example, NZ Police Training Services, New Zealand Army).
Māori provider	Over 100 registered providers identify themselves as Māori providers. These educational institutions deliver Māori subjects, conduct their courses in a Māori environment, or focus specifically on the needs of Māori learners.
Wānanga	Wānanga are recognised tertiary institutions and are regarded as the peers of universities, polytechnics. They are teaching and research institutions that maintain, advance and disseminate knowledge, develop intellectual independence, and assist the application of knowledge regarding āhuatanga Māori (Māori tradition) according to tikanga Māori (Māori custom). There is a list of Wānanga <a href="#">here</a> .
University	Higher, degree-level education is mainly offered at universities. Programmes are research-led and generally academic, as distinct from vocational. Characterised by a wide diversity of teaching and research, especially at a higher level, that maintains, advances, disseminates, and assists the application of knowledge and develops intellectual independence.
Industry Training Organisation	A body recognised under the Industry Training Act 1992 as having responsibility for setting standards and arranging the delivery of industry training for the sector it represents. Commonly known as an ITO. Industry Training Organisations (ITOs) are not education providers, but can become accredited to register assessors within specified fields of the Framework.
Standard-setting bodies	A collective term that covers industry training organisations and advisory groups. These organisations are recognised by NZQA as nationally representative of experts in a particular field, for the purposes of establishing standards for national qualifications.

## References

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